EMERGING TRENDS FOR FUTURISTIC DEVELOPMENT IN HOME SCIENCE RESEARCH AND INNOVATION

proceedings of the National conference

""EMERGING TRENDS FOR FUTURISTIC DEVELOPMENT IN HOME SCIENCE RESEARCH AND INNOVATION"

[HSRI]2023

On

06/10/2023

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Department of Nutrition and Dietetics

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KSRCASW

KSR College of Arts and Science For Women

Wings of Wisdom

KSR COLLEGE OF ARTS AND SCIENCE FOR WOMEN

(An ISO 9001-2008 Certified Institution, Affiliated to periyar University, salem-11Recongnized Under Section 2(f)and 12(B) of the UGC Act1936)

TIRUCHENGODE -637 215,

NAMAKKAL (DT), TAMILNADU, INDIA

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TIRUCHENGODE – 637215, NAMAKKAL (DT), TAMILNADU, INDIA

DEPARTMENT OF NUTRITION AND DIETETICS

&

PG DEPARTMENT OF COSTUME DESING AND FASHION

Organized

National Level Conference on

“EMERGING TRENDS FOR FUTURISTIC DEVELOPMENT IN : HOME SCIENCE RESEARCH AND INNOVATION” (HSRI – 2023)

CONFERENCE PROCEEDINGS

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Editorial……

The science of today is the technology of tomorrow. We live in a society exquisitely dependent on science and technology, in which hardly anyone knows anything about science and technology. The overloading of the electromagnetic environment is one of these disastrous policies that must stop.

"The Arts and Sciences are avatars of human creativity."

—**MAE JEMISON**—

Emerging Trends for Futuristic Development in: Home Science Research and Innovation welcomes high-quality research articles in all feature of emerging horizons on home textile. The underlying aim of all work is to develop sustainable concepts. The conference encompasses the full continuum of Home Science Research and Innovation including fashion product design, eco-friendly textile, sustainability, textile clothing sustainability, enzymes, nanotechnology, E- Textile, nutrition, novel food survey, food toxicity, safety, security, clinical and personalized nutrition, microbial aspects in food, immunology. A National conference on **"Emerging Trends for Futuristic Development in Home Science Research and Development"** was Coordinately organized by Department of Nutrition and Dietetics and PG Department of Costume Design and Fashion on 06/10/2023.

Emerging technologies play a vital role in the modernization of industries. New technologies help in transforming enterprises into a digital world. This technology is mainly helpful in manufacturing, energy and mobility markets. Home Science is both a science and an art related field of study which draws upon many disciplines such as chemistry, physics, physiology, biology, hygiene, economics, rural development, child development, sociology and family relations, community living, art, food, nutrition, clothing, textiles and home management.

We are thankful to the professors, research scholars and other well-wishers for their recent efforts for helping us to climb the ladder of success. We also would like to show our gratitude to the dignitaries for sparing their valuable time to in the form of message.

தெய்வதிரு Lion. Dr. K. S. Rangasamy MJF

தாளாளர் ஆசியுடன்

Chairman

"People always ask me what the trends are, but I'm not a believer in trends. Individuality is more important to me, to stand out and have the confidence to wear something you're comfortable in – it just happens. I'm comfortable wearing a suit."

-DAVID GANDY

I cognizant extremely delighted to know that PG Department of Costume Design and Fashion associated with Department of Nutrition and Dietetics are organizing National Conference on **–"EMERGING TRENDS FOR FUTURISTIC DEVELOPMENT IN: HOME SCIENCE RESEARCH AND INNOVATION"** - (HSRI-2023) with full diligent. It is apart of innovation and to generate Futuristic Development of Home science Research and new innovations. This Conference will really help many Student, research Scholar and Industrialists. The future trends and innovation in nutrition and textile designing.

I want to extend my sincere congratulations to the dedicated organizing committee for their tremendous efforts in nurturing innovative ideas to fruition. I wholeheartedly wish the conference great success and hope it paves the way for further groundbreaking research.

Warm regards

Mr.R.Srinivasan

Chairman

Executive Director

"Proper nutrition is the difference between feeling exhausted and getting the most out of a workout."

– Summer Sanders

I feel extremely jubilant to propose my regards to the PG Department of Costume Design and Fashion and Nutrition and Dietetics for organizing a National Conference on — "**Emerging Trends for Futuristic Development in : Home Science Research and Innovation"(HSRI-2023)**as a joint professor.

I whole heartedly recognize that this is a valuable initiative to tap into profound insights and foster new perspectives, which will undoubtedly propel us towards future innovations. The focus of this conference lies in the thorough examination and research of 'Home Science.' Such research serves as a genuine source of inspiration, encouraging scholars to prioritize health and invest their time in promoting a healthy lifestyle.

I am genuinely thrilled to extend my warmest wishes to both the delegates and organizers, accompanied by a resounding round of applause for their dedicated contributions. Their hard work is paving the way for what promises to be an immensely successful conference, one that holds the potential to shine a brilliant light on future research endeavours."

Best wishes

Tmt. Kavitha Srinivasan

Executive Director

"To those who rarely create art, it may seem as though the process of creation is easy and comes without any challenges. But, for those of us who know that creating a work of art is rarely simple, this quote by Henri Matisse will likely resonate."

--Albert Einstein

I am blissful to accentuate my warm greetings to the PG Department of Costume Design and Fashion and Nutrition and Dietetics for organizing National level Conference on

"Emerging Trends for Futuristic Development in : Home Science Research and Innovation" (HSRI-2023). In recent times, there has been a burgeoning interest in the field of home science and food nutrition, leading to their increased presence in various industries. This development has opened up new avenues and opportunities for learners, charting previously unexplored paths. This National Conference underscores the importance of research for aspiring professionals in the coming years.

I am pleased to extend my heartfelt greetings to the dedicated panel members who have wholeheartedly supported this conference. I would like to express my enthusiasm for the excellence of this national-level conference and its role in inspiring and empowering learners.

Warm regards

Dr. M. Karthikeyan

Principal of KSRCASW

Dr Geetha Santhosh

It is a privilege to be associated with K.S.R. College of Arts and Science for Women at the National Conference on "Emerging Trends for Futuristic Development in Home Science Research & Innovation (HSRI) – 2023".

The recent years have witnessed the recognition of nutrition, resurgence of millets and tracing the roots with a blend of technology. The topic "Innovative Millet Food & Nutrition Products & Technologies for Public Health Care" is apt when the world is joining hands this year to celebrate the International Year of Millets.

Millets popularly referred to as "Shree Anna" are gaining prominence worldwide and it's important to equip with right knowledge for its effective utilization. In fact, millets being yesterday's coarse grains and today's nutri cereals could play a potential role in the fight against food insecurity and malnutrition.

I take this opportunity to congratulate the team for organizing the conference with relevant topics. I am sure this conference would give comprehensive exposure, deliberate on pertinent issues, and culminate with positive insights to promote right nutrition.

I wish the conference great success in their contribution to building a healthier community.

Best Wishes,

Dr Geetha Santhosh
Associate Professor
Department of Food Science & Nutrition
Mount Carmel College, Autonomous, Bengaluru

Dr. Nithya Venkataraman

It is indeed my pleasure to be associated with the KSR college of Arts and Science for Women and be a part of the National Conference on

"Emerging Trends for Futuristic development in Home science Research and Innovations (HSRI) - 2023".

Home science has moved much beyond domestic sciences and has now emerged as the springboard for various career pathways in Textiles, Fashion, Nutrition, Resource Management, Psychology and many other viable professional streams. It is heartening to note that there is now increased focus on research practices in this domain, thanks to efforts such as this conference by KSRCASW.

As a fashion professional from NIFT who graduated in Home science, I am delighted to see the stream evolve as germination grounds for young women for textiles, clothing and fashion. I am sure that the young minds of today will engage more in research practices and dialogue, to make fashion a meaningful and fruitful pathway for millions of women across the country. I wish the conference all success.

BEST WISHES

Dr. Nithya Venkataraman

Associate Professor

National Institute of Fashion Technology

Bengaluru

V. A. Rinsey Antony

“Learning is not attained by chance. It must be sought for with and our and attended with diligence.”

It gives me immense pleasure to be a part of the National conference titled

“Emerging Trends for Futuristic Development in Home Science Research and innovation (HSRI)-2023 with a theme “Emerging Horizons on Home Science.” I strongly believe that this conference will provide tools and knowledge to bring about a significant change by identifying innovative ideas and methods introduced by researchers and students. I appreciate KSR College of Arts & Science for Women for thinking out of the box in bringing such conference in the field of home science. I am confident that the conference will prove to be the much-needed respite and change that we so desire in today’s world. I wish all the participants an enriching learning platform and knowledge sharing.

Best Wishes

V. A. Rinsey Antony
Dean of Applied Science
Head - B. Sc (CDF)
Sri Krishna Arts and Science College (SKASC),
Coimbatore.

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SUSTAINABLE DYEING OF COTTON FABRIC WITH INDIAN MADDER ROOT ANT MINT LEAVES

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**** Ms. M. Nandhini**
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ABSTRACT

The most environmentally destructive industry in the world is the textile industry. Eco-friendly dyes are favored over synthetic dyes and chemicals as environmental consciousness grows. Many natural materials that are used in our daily lives have colorant components yet are wasted. Similar to this, when soaked in water or cooked, the Rubia Cordifolia (Indian Madder Root) and Mentha (Mint Leaves) produce excellent red colorant compounds, but the water is drained off or thrown away. The objective of the current work was to sustainably use the aforementioned extract. Therefore, an effort is undertaken to dye cotton cloth using alum as a mordant and colorant extract at various temperatures. Chopped Madder roots were soaked for three hours to soften, and then they were further boiled with Mint leaves to extract the dye for 1 hour. The fabric was dyed at mild temperature for one hour using the colorant extract and mordants. The dyed fabric samples underwent tests for various color fastness characteristics, including resistance to washing, rubbing, and light. Successful outcomes were discovered. The research's ramifications so point to a bright future for environmentally friendly cotton fabric dyeing.

Keywords: Chopped Madder roots, Mint leaves, Cotton fabric, Dyeing, Natural dyeing, Eco friendly dye

INTRODUCTION

Due to the broad variety of vibrant colors, lower cost, and superior fastness features of synthetic dyes compared to natural dyes, the textile industry has used a significant amount of them over time. Some synthetic colors include carcinogenic amine because petrochemical sources are used in their manufacturing. Therefore, using such colors poses a health risk and contributes to the imbalance of the ecosystem. Natural dyes are becoming more popular as a result of growing environmental awareness because they are non-toxic, renewable, biodegradable, and offer a wide range of colors with good color fastness features.

Natural dyes have been used since ancient times. They are extracted from natural sources like parts of the plant such as roots, barks, leaves, fruits and flowers and are applied on the fabric with mordant for better color fixation and to enhance the shade depth. Moreover, India is known for its rich biodiversity of flora. Thus, this rich biodiversity contributes to a huge number of diverse natural products, including natural dye. Some natural dyes show functional properties such as antimicrobial and medicinal property. These additional values of natural dye are resulting in an increased use of natural dye in many small and medium-scale industries, to give a sustainable
end product.

Due to the increasing demand for natural dye, the current study's application of the eco-friendly natural colorant extract generated by soaking Rubia tinctorum is intended to address this issue. The bedstraw and coffee family Rubiaceae includes the herbaceous perennial plant species known as Rubia tinctorum, sometimes known as the rose madder, common madder, or dyer's madder. The common madder can reach a height of 1.5 meters. The evergreen leaves, which are produced in whorls of 4 to 7 star-shaped leaves around the central stem, measure around 5 to 10 cm long and 2-3 cm wide. It uses microscopic hooks at the leaves and stems to climb. The roots, which can be up to 12 mm thick and over a meter long, are the source of the red colors rose madder and turkey red.

Mentha spicata, a species of mint, is also known as spearmint, garden mint, common mint, lamb mint, and mackerel mint. It has a wide-spreading fleshy underground rhizome from which it grows, is 30-100 cm tall, and has stems and foliage that range in hairiness from hairless to hairy. The culinary source of mint is the leaf, whether it is fresh or dried. Menthol and mint essential oil are widely used as flavorings in mouthwashes, toothpaste, chewing gum, sweets, breath fresheners, and candies like mint and mint chocolate. Additionally utilized in aromatherapy, menthol and mint essential oil may be clinically effective in reducing post-surgery nausea. By using leftover Chopped Madder roots and Mint leaf extract to color the cotton fabric in a sustainable manner.

MATERIALS AND METHOD

Material

We used cloth made entirely of cotton as our foundation. because using it is pleasant and comfy. Additionally, while dyeing cotton cloth, the color is nicely absorbed. The skin of the individual wearing apparel made of this material won't become irritated. Cotton won't react with sweat and produce rashes even in hot temperatures. Cotton allows the skin to breathe and lowers the chance of allergies and rashes.

Dye Extraction

To extract natural dye, we used Indian madder root and mint leaves. The madder root is removed, thoroughly cleaned, and submerged in water for one to two hours. To soften the roots, they are submerged in water. The mint leaves are then gathered, thoroughly washed, and stored individually. They are stored at ambient temperature. Then add water to the large vessel and bring it to a boil. Use the hot water bath to extract the dye quickly. Mordant alum is added. Small bits of crushed alum are added to the boiling water. Add the soaking madder root and mint leaves to the container for the hot water bath dye extraction process. Leave it alone and let them simmer at a low temperature for another hour. The complete color is extracted in the end. The natural dye is then removed after the solution has through two filters.

Preparation of Fabric

Get the vessel ready, put your fabric item through the washing machine first if it is brand new. Then, cover it with a rag or towel that you don't mind getting dirty, and put boiling water in a big bucket or basin. In a sink, soak your fabric in warm water. Once it is moist, add it to the dye bath and stir it with a stainless-steel spoon to make sure it is evenly coated. For about ten minutes, stir it continuously. The fabric should be rinsed thoroughly. After removing your cloth, put it in a sink and rinse it in warm water before switching to cold water gradually.

Application of Dye

A dyeing process is the interaction of a dye with a fiber and the migration of the dye into the fiber's interior. A dyeing procedure typically entails two steps: adsorption (where colors are transferred from an aqueous solution to the surface of the fiber), and diffusion (where colors are absorbed by the fiber). Place the filtered dye in a basin with the necessary amount of water, then dip the sample into it. This sample receives a 30-minute treatment. Treatment of the fabric is done at room temperature. The sample is removed, cleaned, and dried after the requisite amount of time.

RESULT

Physical Testing of the Sample

Washing Fastness Test

Different washing processes are designated for various types of washing. The solution should be preheated to the necessary washing temperature. After using soap, rinse twice with cold water before running cold water from the faucet. Next, it was squeezed and dried. It was noted how washing fastness performed. Because the fiber does not have a strong affinity for naturally occurring colors. Even though it is naturally occurring, this color remains on cloth for some washings. After five washing in soapy water, the color somewhat changed, but in the event of regular water, the fabric's dye cannot endure.

S. No	Color fastness to washing	
	Color change	Staining on Cotton
1	4	4-5
2	5	5
3	5	5
4	5	4-5
5	4	4-5
	5	4-5

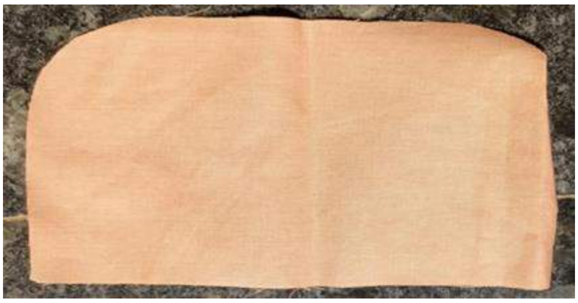
Rubbing Test(Using Hand) Dry

Take a piece of colorful fabric and rub it vigorously for five minutes with both hands. It was found that the dry state's color retention quality was good. Nothing altered the fabric's hue in any way. The increased retention capacity of the dye molecules in the dry state may be the cause of this.

Rubbing Test(Using Hand) Wet

Use ordinary water to wet a rubbing cloth to around 100% pick up. It's acceptable that the rubbing cloth picks up its own mass in water. It is crucial to comprehend the caliber of the water being used here. Weigh the dry rubbing cloth before thoroughly wetting it with regular water and squeezing it. Permit the tested rubbing cloth to air dry in a warm environment. Additionally, it was discovered that the color keeping property was good in a wet state. No change in color was seen. It's also because color molecules have tremendous staying power when they're wet. Actually, the molecule begins to split or easily separate from the cloth when it comes into touch with water.

S. No	Colorfastness to crocking	
	Dry	Wet
1	4-5	4-5
2	4-5	4-5
3	5	5
4	5	4-5
5	5	4-5
	5	4-5



CONCLUTION

The dye using ingredients like mint leaves and Indian madder root was effective. With the aid of boiling or grinding, the natural color was removed as needed for processing. In this project, alum is used as a mordant while dye is applied to cotton cloth. Here, the results of standard water washing, rubbing, and drying fastness test were better. Additionally, cotton yields from Indian Madder Root and Mint leaves were 99% satisfactory. These leaves and roots are widely available and useful in a variety of ways. The human body is unaffected by this natural dye. The dyeing of cotton by coloring materials taken from madder roots and mint leaves produced pretty excellent results.

The research to select the best cotton dyeing recipe so that the best outcomes could be achieved. According to the research, cotton cloth responds to natural dyes with alum as the mordant 99% of the time.

ACKNODGEMENT

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DEVELOPEMENT OF ANTIBACTERIAL BEAUTY BLENDER WITH NANOPARTICLE CHARCOAL EXTRACT

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ABSTRACT

Beauty blender is a sponge to apply foundation is great for creating a sheer to medium cover look. To clean the makeup, wet a sponge with water the moisture will help prevent the sponge from absorbing the makeup, and squeeze out excess water. The sponge will also assist in blending. Sponges with pointed tips for a superb blending of the eye area. Reusing sponges can be unhygienic, so sponges should be washed and dried thoroughly after every use. After washing the bacteria present in the blender remains the same. So, preparation of antibacterial beauty blender using natural herb coating is made. Finishing is very important to all type of areas. Later various physical and mechanical properties test were carried out in blenders. The physical properties are made for both normal as well as coated beauty blender. After the blender is dipped and dried for 24 hours using the natural herb and charcoal, mechanical and physical testings are done for the blender.

INTRODUCTION

Beauty blender is a sponge to apply foundation is great for creating a sheer to medium cover look. A triangular sponge is good for blending in liquid foundation and concealer. A rounded sponge is best for powder foundations. To clean the makeup, wet a sponge with water the moisture will help prevent the sponge from absorbing the makeup, and squeeze out excess water. The sponge will also assist in blending. Sponges with pointed tips for a superb blending of the eye area.

Beauty blender was created without edges in order to eliminate visible lines and streaks. Bounce Beauty blender against the face when applying makeup. Bouncing, called stippling in the makeup world, blends make up without creating changes in the texture or tone of the skin. Beauty blender with pointed side are hard-to-reach spots like around the nose and mouth, and under the eyes. The round base is used for foundation and blush on the larger areas such as forehead, cheeks and chin.

These finishes have a very important role in Meditech. These finishes are also used in food packaging systems. The Anti-Bacterial finish has overcome the fact of increasing the bacteria and parasites, by applying it at any of the thing which is used in daily lives. The finish removes or kills the bacteria and parasites present on the surface of the material or fabric and protect from different diseases that other faces commonly. It’s a major role is to resist the bacteria and protect the material. An anti-bacterial surface contains an antibacterial agent that opposes the ability of micro-organisms to grow on textile materials. Treatment designs to prevent the growth of bacteria to reduce the number of bacteria or to kill bacteria. There are many textile products are now available in market with different trade names with anti-bacterial properties. anti-bacterial finish consists of molecules that are chemically bond to fibers surfaces. The anti-microbial finishes can only control those microbes that are present or exists on the fabric surface, not in the surroundings. These are also called “Bound Anti-Microbial” because of their attachment to the fiber can potentially be grinded away, or became deactivated and loose long-term durability. These anti-microbial finishes can also control the growth and spread of microbes move properly called Biostats.

Keeping the above points in mind, the study on the extraction of Annona’s bark and charcoal coating for antibacterial finish in blender with the following objectives,

1. To study on activated carbon, Annona squamosa.
2. To choose the best antibacterial compound.
3. To select the good quality of beauty blender.
4. To extract the bark and activated carbon.
5. To compare the best antibacterial coatings in blenders.
6. To survey the finished product

METHODOLOGY

The methodology of the study Antibacterial Coated Beauty Blender is comprised under the following headings.

SELECTION OF BEAUTYBLENDER

Beauty blender is used as a makeup sponge applicator. This is used from blending the makeup in all areas to removal of makeup (cleaning). This is eco-friendly and soft to touch, looks like an expensive material Rea Ann

Silva . Blender is durable after several washes and excellent for makeover and has unique luster designates Krish.

The antibacterial properties of the blender keep odor away. The absorbent properties make the sponge feel more comfortable as it does not stick to the skin Rita. The properties make blender as suitable material for the person, who are more health and beauty conscious. Keeping these points in mind, the investigator selected the beauty blender for the study. Beauty blender sample is shown in sample

MAKEOVER

Re usage of beauty blender has more bacteria. Hence, herbal and charcoal coating is made to make antibacterial beauty blender. Procurement of beauty blender is made in Madurai whole seller shop named “Colorful Beauty”. The investigator has used two top most branded blenders. “KELI” a top most makeup brand in China, nonirritating beauty blender is used as a powder puff. Keli brand tools were elastic, durable and comfortable. Keli powder puff which has a tag line” Let beauty makeup is more interesting”. Makeup artists use the powder puff because finger grease and bacteria destroy good makeup look, unique cosmetic powder has good structure of hydrophobic softness, easier to clean faces at same time. It is also suitable for oil resistance, blush and ideal of powder.

CLEANING METHODS OFBLENDER

1. Cleanser or natural soap is used, certain amount of water has been poured.
2. The dirt and makeup sponge are cleaned with hand pinching method.
3. Plenty of water is used to rinse it off.
4. Clean towel is used to make it absorb.
5. Finally placed in ventilated area to make the blender dry.

SELECTION OF HERB

“Annonasquamosa” a natural herb was selected which has a antibacterial activity in the bark. It is also known as the bark of custard apple. Annonasquamosa is a small, well-branched tree or shrub from the family Annonaceaethat bears edible fruits called sugar-apples or sweetsops. It tolerates a tropical lowland climate better than its relatives Annonareticulata and Annonacherimola helping make it the most widely cultivated of these species. Annonasquamosa is a small, semi deciduous, much branched shrub or small tree 3 meters (9.8 ft) to 8 meters
(26 ft) tall similar to soursop. The bark and leaves contain annonaine, an alkaloid. A bark decoction is used to

stop diarrhea, while the root is used in the treatment of dysentery. A decoction of the leaves is used as a cold remedy and to clarify urine. Annona squamosa Linn., family Annonaceae, is said to show varied medicinal effects, including insecticide, antiovulatory andabortifacient. The fruits of Annona are Haematinic, cooling, sedative, stimulant, expectorant, maturant, tonic. They are useful in anemia, burning sensation. The seeds are abortifacient and insecticidal and are useful in destroying lice in the hair. Leaves are used to overcome hysteria and fainting spells. Fruit is used in making of ice creams & milk beverages. Anethanol extract of A. squamosa and bark is reported to have anticancer activity .Methanolicextract of A. squamosa bark possesses antimicrobial activity against gram-positive and gram-negative bacteria. Methanolicleaves extract of A. reticulata show design ificantactivity against Bacillussubtilis, Staphylocoxccusaureus and Vibrio

COMPOSITEPREPARATION

Extraction is one of the important process in utilisation of herbs. Thus charcoal coating helps in preventing bacteria so antibacterial finish is made in blender. There exist several types of extraction, including, liquid–liquid extraction, solid-phase extraction, and acid-base extraction. In liquid-liquid extraction compounds separate according to their relative solubility in two different immiscible liquid phases. Both the bark of Annona and charcoal has good antibacterial activity the composite extraction is to be done to test the activity of blender after coating. An extraction of both bark and charcoal (composite) is prepared. The powdered bark is taken as 0.4 grams and 0.5 grams of charcoal with 45 ml of water. The Material:Liquor ratio is 0.5:45 for 2 samples. That are mixed well with stirrer and kept in a shaker for 12 hours. It is filtered and the extraction is prepared.

PRODUCT DEVELOPMENT

The sample product is developed with the extraction of bark and charcoal powder with ethanol and water. There are three sets of samples which is prepared. The sample is made with the extraction of bark with ethanol

and bark with water. The next set of samples is developed using charcoal with ethanol and charcoal with water. The other set of samples is prepared using composite preparation of bark and charcoal with water. The antibacterial coated beauty blender samples are made with the extracted herbs and charcoal with help of ethanol. Immersion (dip and dry method) is made for the separate samples. A beauty blender is dipped and dried in bark extracts the other beauty blender is dipped and dried in charcoal extract and the separate blender is dipped and dried in composite extracts with ethanol and water. The product which is to be developed for sample testing is totally 5 samples i.e., The bark (2 gm) which is extracted and filtered using filter paper and mixed with ethanol (35 ml). The solution is prepared and the sample is dipped and dried for 24 hours.

EVALUATION

Evaluation is the systematic determination of merit, worth and significance of the samples. Evaluation of samples can be tested subjectively and objectively enunciates Crowfoot (1998).

SUBJECTIVE EVALUATION

Subjective evaluation was to judge the merits of goods and services based on the generalized needs and values along with comprehensive range of effects defines Elieen (1996).General appearance, color etc. can be evaluated by subjective evaluation. The color of the beauty blender is Original, Pure, Pro and Body, Ed coin Especial, Micro Mini. Each shape of the beauty blender serves for a particular area in the skin. The appearance and luster of the beauty blender attracts the users.

OBJECTIVE EVALUATION

Evaluation carried out with pre-set criteria that give a measurable indication of results. The objective evaluation can be determined using lab tests and the outcome of these tests provide the basics of determining the value of the object. The objective evaluation of the beauty blender describes about the strength, abrasion resistance, weight of the beauty blender ,stiffness of the blender etc.

RESULTS AND DISCUSSION

Subjective Evaluation Antibacterial Assessment for Selected and Trialed Samples:

Antibacterial Activities	Qualitative (AATCC 147) Diameter of the zone of inhibition(in mm)				
Samples	Bacillus subtills	E.coli	Streptococcus	Staphylococcus	Quotative (AATCC10 0)
Charcoal+$H2O$	4.8	3.2	1.7	2.5	FAD
Charcoal + ethanol	---	---	---	---	NAF
Bark+ H 2O	4.5	2.8	2.3	2.8	FAD
Bark+ ethanol	2.1	2.5	1.8	2.6	FAD
Composite+$H2O$	3.3	3.0	1.7	2.5	FAD

ANTI BACTERIAL ACTIVITYTEST

FAD-FEW ACTIVITIES DETECTED. NAF- NO ACTIVITIES FOUND

Shows that, charcoal coated beauty blender with ethanol mixed sample shows excellent antibacterial activity. The antibacterial activity is compared with charcoal mixed water and ethanol, bark of annonasquamosa mixed with ethanol and water, the composite extraction with water. The product (charcoal coated beauty blender) shows the best antibacterial compound when compared to another used herb. The samples charcoal with water, bark with water and ethanol, composite(bark and charcoal) has few activities detected in the samples. The sample charcoal coated beauty blender has no bacterial activities.

SUBJECTIVE EVALUATION OF BEAUTY BLENDER

Skin Irritation Studies of Charcoal Coated with Ethanol and Water Bark of Annona with Ethanol and Water, Composite Extraction with Water. The plates of five samples shows the image of a small area of hand covered with the skin contact beauty blender of charcoal coated with ethanol and water, bark of which are kept under the observation for 24 hours for the symptoms such as reddishness, rashes, irritations and for other allergic reactions. After the contact time, the beauty blender was removed and observed for the irritations/no irritation reactions. Thus, it proves that the charcoal coated beauty blender is an anti-allergen which was safe to use.

SKIN IRRITATION TEST FOR SELECTED AND TRIALED FINISHED SAMPLES

S.NO	PROPERTIES	CHARCOAL+ $H2O$	CHARCOAL +ETHANOL	COMPOSITE+ $H\,2O$	BARK+ $H\,2O$	BARK+ ETHANOL
1.	Skin irritation test	SIR	NIR	SIR	SIR	SIR

Visual and Wearability Evaluation of Developed Charcoal Coated Beauty Blender:

PREFERENCE SURVEY

S.NO	QUESTIONS	BEAUTY BLENDER	WET WIPES	BRUSH	FINGERS
1.	Prefer to remove makeup	10	15	3	2

The preference level to remove the makeup level of the subjects on products are evaluated, where as 10 people prefer beauty blender to remove the makeup and 15 people prefer wet wipes to remove the makeup and remaining people prefer the other products to remove the makeup.

COMFORT LEVEL

S.NO	QUESTIONS	VERY THIN	THIN	BULKY
1.	Comfort level of charcoal coated beauty blender	20	6	4

The comfort level of the charcoal coated beauty blender is evaluated, where as 20 people says that the beauty blender is very thin enough to use comfortably and 6 people says that the blender is thin and 4 of them needs more thinness.

Awareness and Acceptability

S.NO	QUESTIONS	YES	NO
1.	Aware of Beauty blender	28	2
2.	Prefer beauty blender for daily use	22	8
3.	Aware of charcoal coated beauty blender	10	20
4.	Coated beauty blender bleed while using	2	28
5.	Irritates the skin after several uses	3	27
6.	Color acceptable	29	1
7.	Pores after several washes	14	16
8.	Tares after several uses	10	20
9.	Cost affordable	25	5
10.	Preference of the product further	28	2

We came to know that among 30 correspondence 28 of them are aware of beauty blender and 22 people prefer it for daily use. Were as 29 people satisfied with the existing color of the product and 1 need more other colorful beauty blender. The cost of the product is affordable for 25 people among 30. The coated blender has pores and gets irritated to the skin after several washes for minimum people among 30. Thus, the product yields good score on subjective evaluation consider on awareness and acceptability.

Frequency of Changing the Beauty Blender after Washes

S.NO	QUESTIONS	DURATION			
	Frequency of change	9 days	12 days	14 days	15 days
1.	Evaluation	2	4	8	16

Frequency of changing of beauty blender during several washes

The wearability analysis shows that 2 of the women uses the charcoal coated beauty blender for 9 days,4 of the women uses the charcoal coated beauty blender for 12 days,8 of the women uses the charcoal coated beauty blender for 14 days,16 of the women uses the charcoal coated beauty blender for 15 days. It varies depends up on the women who uses makeup. Thus, the product withstands up to the usage of 15 days and above.

EVALUATION GRADE FOR SATISFACTION LEVEL

S NO	QUESTION	GOOD	FAIR	POOR
1.	Thickness	21	9	0
2	Comfort	24	5	1
3.	Overall satisfaction	28	2	0
4.	Texture of coated beauty blender	28	1	1
5.	Quality of coated beauty blender	29	1	0
6.	Fragrance of coated beauty blender	20	9	1

The satisfaction level of the subjects and product are evaluated, where as 21 people says that the beauty blender is comfortable and 9 of them need some more thinness. Large number of feminine are satisfied with the thickness and comfort-ness in usage of the product, charcoal coated beauty blender. Above 25 people says that the coated beauty blender has good quality and texture, were as 15 and above people are comfortable with the fragrance of coated beauty blender. Thus, the product yields good overall satisfaction among the people evaluated during visual and wear ability study.

From the overall results it has derived with the conclusion that the charcoal coated beauty blender product is accepted by a greater number of people and comfortable in using the product. The people in the market are satisfied with the cost, and color of the charcoal coated beauty blender and thus reached in the market successfully.

CONCLUSION

Finishing is very important to all type of areas. Later various physical and mechanical properties test were carried out in blenders. The physical properties are made for both normal as well as coated beauty blender. After the blender is dipped and dried for 24 hours using the natural herb and charcoal, mechanical and physical testing are done for the blender.

1. Beauty blender had the highest weight and thickness.
2. Beauty blender had an average stiffness.
3. It also had the highest abrasion resistance and air permeability.
4. Coated beauty blender does not irritate the skin.
5. Coated blender had a good antibacterial activity.

6. Beauty blender had a good wash ability and does not bleed while using.

Consumer experiences of disposable hygiene products designed and developed by the natural products are focused in this study pertained good results. The anti-bacterial finish highlights the product from the natural component potentials as avoiding bacteria in the blender after several usages. Its quality satisfies the users, gives the comfort as skin friendly. The product gives excellent care on health and environment. Natural materials in the product are playing major role through its application and undoubtedly the future of the antibacterial beauty blender product will appear to be bright and the demand for cost saving with high performance product will fulfill by this research work on natural coated beauty blender.

SCOPE OF FUTURESTUDY

1. Increasing awareness on cosmetic hygiene among women remains one of the primary factors facilitating the growth of Indian cosmetics product in the market.
2. The disposable hygiene products can be manufactured with the charcoal extracts with ethanol after tried with the bark of annonasquamosa with water and ethanol.
3. The product protects from bacteria after several uses and washes, the customers in the market are comfortable to use the product that does not bleed and irritates the skin.

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COSMETIC FINISHING TEXTILES: CONCEPT, PURPOSE, MEDICINAL APPLICATIONS

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ABSTRACT

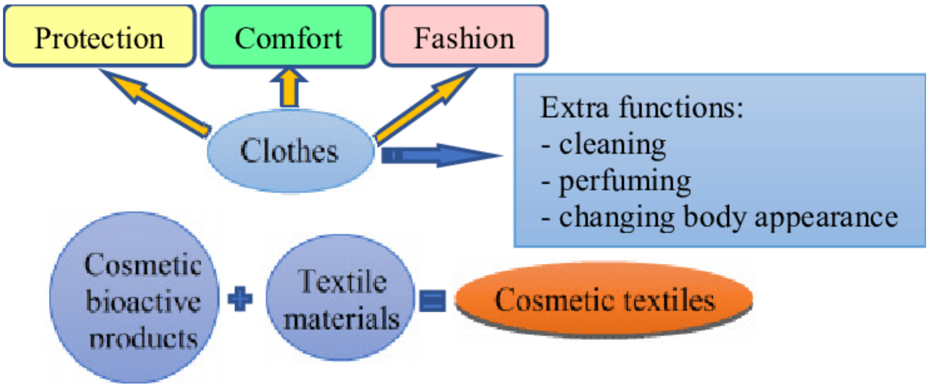
Be it a fashion, protection or support clothes had given a variety of functional purposes. In recent time- the surgeon, psychologist, physiologist, scientists in textile had created many intelligent applications for textile field. In this, the cosmetic textile is a concept of creating a cosmetic active substance like aleovera and other materials for human skin. The skin-care ingredients as like anti-aging, vitamins, sunscreens, lotions., are added on to the textiles since the clothes are in contact with the skin. This kind of cosmetic textiles are produced for people who can't able to wear the cosmetic products directly on their skin. The cosmetotextile (cosmetic textile) has a unique way of delivering the cosmetic products. Products with healthcare applications along medicinal herbs are also a cosmetic textile material like hair band, sleep- pillow, eye pillow, t-shirt, trousers, etc., In this paper the applications which can used in cosmetotextile- their functionality and purpose are explained by following.

Keywords: intelligent application, skin-care, medicinal herbs, functional cosmetic textile products.

INTRODUCTION

In upcoming years, the technologies and evolution of innovative fashion is going to transform the market ultimately. In the other hand cosmetic and beauty means more interest through garments to consumers. Approximately it is said that between 15 to 20 years , the 85% of textiles will be technologically developed and functionalized. Garment technology not only creates aroma, it also provides a healthier life through natural raw material to the consumers.

The cosmetic healing effect of textiles is not a new concept, it's an old concept of traditionally made fabrics or yarns with the effect of natural finishing. The natural herb extract gives the effect to the body or skin beneficially. With the growing trend people not only expect warmth and comfort, they are need with environmental protection, pollution protection which is anti-pollutant and most important beauty and health care. The Cosmo textile (fig 1.1) industry products are optimistic and these products will create a new set of targeted groups in sustainable market. One of the particular examples of this textile industry is to transfer the cosmetic finishing substance to the body through in contact with the skin.



(Fig 1.1)

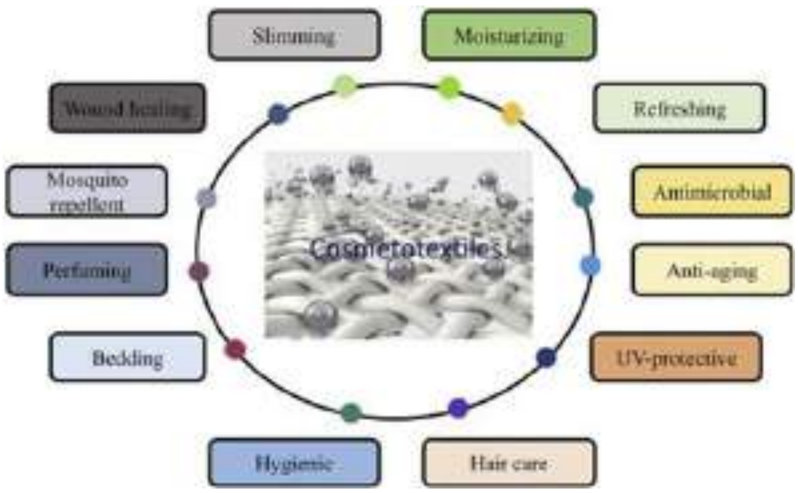
The main concept of this textile is by applying and imparting the pharmaceutical ingredients to fabric- so by the movement of body, the skin naturally gets freshened. The microencapsulation technology provides the functional effect to the fabric with high performance and durability.

PURPOSE OF COSMO TEXTILE

As the name indicates, it is defined as the materials having the properties of cosmetic products. These textiles are categorized into different categories (fig 1.2) as like cosmetic products according to their end uses:

1. UV protection
2. Relaxing and energizing
3. Pressure release
4. Slimming
5. Anti- microbial and anti- fungal
6. Moisturizing
7. Whitening
8. Anti- wrinkle
9. Aromatic

Active textiles can sense and react simultaneously compared with common textile, such as thermal, chemical, mechanical, and other sources. The health-related textiles are increasing in designing and fabricating. There are a wide range of applications in active textiles such that bio medical and engineering, sports, construction and also skin care. The development of cosmetic textile offers a function of our daily routine cosmetic cream and lotion directly into our day-to-day life. It provides an easy and alternative way of application to our body in the modern life which is suitable for our busy day.



(Fig 1.2)

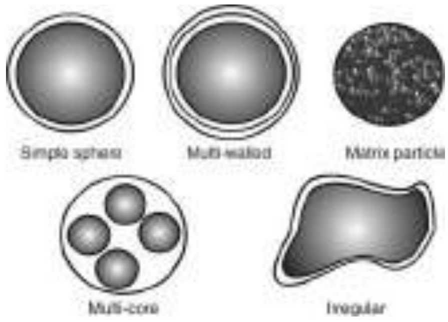
The cosmetic textile and product differentiate by the time in which the raw material releases to the skin according to their end use. The cosmetic products will appear in a time limit at its particular range, while the cosmetic textiles will range long lasting since it's in contact with skin all throughout the day. It keeps the skin performance beneficial through its end usage of certain applications. Also, these cosmetic textiles have some disadvantages like skin absorption and ingredients release in effect of the ratio of time and absorption of the skin.

APPLICATIONS OF COSMETIC TEXTILE

In contact with the skin, the cosmetic textile undergoes some application which refers to the microencapsulation method of technology used in these fabrics. This gives a typical benefit in textile material protection. In increasing demand, the researchers and manufacturers invested the application of cosmetic textile product development.

MICROENCAPSULATION

This field is rapidly developing in chemical finishing techniques for its versatile and flexible performance. It is a micro packaging technique where the production involves microcapsules that protects in the wall of solids and liquids.



(Fig 1.3)

WALL MATERIAL	EXAMPLE
Natural	Gum, sodium alginate, calcium alginate, fat, sucrose, starch, gelatin, waxed,
Semi-synthetic	Sodium carboxymethyl cellulose, hydrogenated easter oil, cellulose acetate, cellulose nitrative,
Synthetic	Copolymer & acrylic polymer.

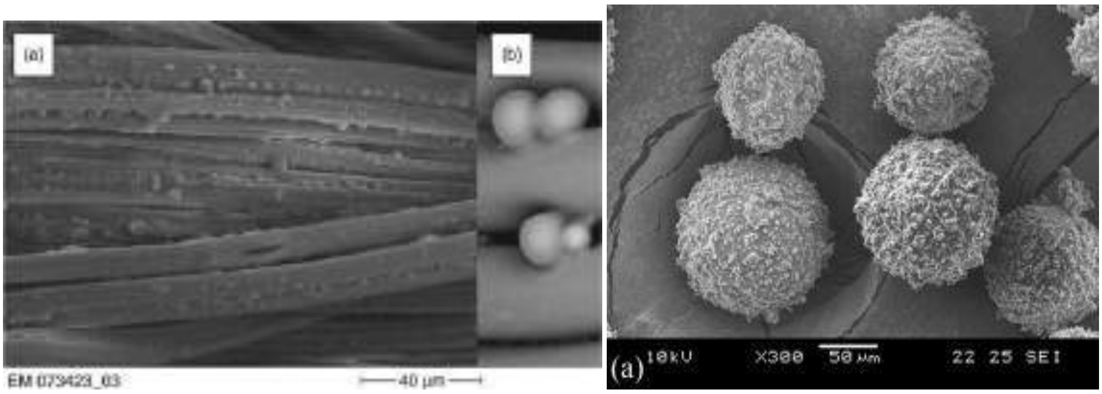
(Table 1)

The packaging appears in different shapes (fig 1.3). This micro packaging technique is applied in a wide range of industries such as agriculture, food processing, cosmetic and toiletry industries,

STRUCTURE OF MICROCAPSULES:

These micro capsules appear as a small liquid, solid or aerosol particles (fig 1.4) which is surrounded by a substance to protect the material and control the release of core material. This kind of packaging is a way of storing the materials in microscopic level, it consists of two components:

1. Active ingredient
2. Wall shell



(Fig 1.4)

Active ingredient : This substance may be in a form of liquid or solid which is filled in the fabric coating. It is also referred to the encapsulate, payload, active, core contents.

Wall shell: It is a coating with polymer that surrounds with active ingredients like shell, external phase, membrane, wall. The polymer which is used may be natural, semi synthetic or synthetic polymer.

It can be made of various kinds of forms and structure , but more often it results in spherical form. Irregular Micro capsules are called as spherical form with- single nucleus, multi nucleus, indeterminate form and with multi nucleus. The typical diameter of a microcapsule is in a range of 1-1000 microns. They also can be produced in diameters between 0.01 and 10,000 microns. The thickness refers in a range of 0.5 – 150 microns. Some the example of typical core materials used in the micro capsulation fabrics of cosmetic textile (table 2)

Type of core material	**Example**
Fragrance	Specially made compositions, menthol
Food	Oils, fats, spices & flavors
Colors	Dyes and pigmentations
Solvents	Paraffin, ethers, alcohol, water, benzene, etc.,
Agri based chemical	Pesticides, insecticides , herbicides
Rust inhibitor	Zinc and other components
Pharmaceuticals	Vitamins, aspirin and other amino acids

(Table 2)

CONCLUSION

The study about cosmetic textile is in trend while the products increasing the interests to the consumers. There are in need of researching in this area. This cosmetic textile provides obvious benefit to the wearers. The outlook standards are a promising added value product with increase in number and quality in upcoming years. The explored and unexplored natural materials find a wide range of commercial importance in the market industry. There are possibilities of new outcomes for various kinds of wearers. Although there are some disadvantages, this textile will reach a range of industry. This material must be manufactured in such a way that the finishing composition fabric structure works together and it should possess good result and long-lasting need for the consumer.

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APPLICATION OF AROMATHERAPEUTIC FINISHING IN SOY FABRIC

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ABSTRACT

Apart from the aesthetic use of textiles, it should give some functional properties to the user. In this way, much research is going on to develop functional textiles. The advanced method of imparting aromatherapeutic finishing on the textile material is also one of the categories of functional finishes. Aroma finishing is said to be the application of aroma oil or essential oil application on the textile surface, by this, the aroma finishing is to be applied. Sometimes, the selected essential oil may serve therapeutic use to the customer. In this study, lavender oil is selected and applied to the soy fabric. Generally, soy fabric has antimicrobial property with it. When combined the lavender oil with it, it will give wonderful smoothness to the wearer and make the person stress relief when using it.

Keywords: aromatherapeutic finish, essential oil, soy fabric

INTRODUCTION

While being used as treatments for human illnesses for centuries, medicinal plants have attracted a lot of attention recently because of their low toxicity, pharmacological properties, and commercial viability. It demonstrates a more dramatic trend away from dangerous, non-biodegradable, chemical-based products towards natural ones that are advantageous to health and
well being. With the introduction of the idea of aromatherapy, consumer demands for fabrics, quality, comfort, and utility increased. Functional textiles are textiles that have been altered by the addition of a chemical agent or item. When activated, these textiles perform a specific action that has a defined result. Functional fabrics have recently been researched to meet customer demands for comfort and safety.

People all across the world have been using essential oils as a component of alternative medicine for many years. The adoption of more natural alternatives to synthetic ones is currently popular. An innovative, natural, and risk-free substitute for potentially harmful pharmaceuticals is provided by essential oils. One of the herbs that is frequently studied for its medical properties is lavender, or Lavandula, which belongs to the Liliaceae family. Soybean protein fibers (SPF) are manufactured fibers made mostly from synthetic polymer (polyvinyl alcohol) and regenerated soya Glycine Max soybean proteins. Textiles made of SPF may be identified as being made of azlons from soybean, per textile fiber labelling. Azlons are synthetic fibers whose fiber-forming component is made up of naturally occurring proteins that have been restored.

SELECTION OF MATERIAL

To apply an aromatherapy finish, soy textiles are chosen. It is silky, supple, and lightweight. Comparing to cotton, soy silk transfers moisture more effectively. Comparatively speaking to wool, silk, and cotton, it has a strong breaking point. Soy textiles do not shrink when wet with hot water.

For the purpose of applying an aromatherapy finish to the substrate, lavender oil is chosen. The medical benefits of lavender essential oil include antibacterial activity, anxiolytic effects, anti-inflammatory effects, antinociceptive effects, and antioxidant effects. Among the most popular and useful essential oils for aromatherapy is this one. The oil is believed to treat anxiety, allergies, anxiety, sleeplessness, dermatitis, vomiting, and menstrual cramps. It is produced from the plant Lavandula angustifolia.

METHEDOLOGY

The essential oil is distilled with 1:5 ratio with water and applied on the fabric by spray technique. Aroma finishing through spray method involves the application of a scented solution or fragrance onto the fabric surface using a spray gun or other spraying equipment. The general steps to apply aroma finish through spray method:

(i) Prepare the scented solution

The aroma finish is prepared by mixing the fragrance or scented solution with a suitable carrier or solvent. The ratio of fragrance to carrier may vary depending on the type of fabric, the desired intensity of the aroma, and the type of aroma finish being used. The solution should be well mixed and filtered to remove any impurities.

(ii) Test spray equipment

Before applying aroma finish, test the spray equipment to ensure that it is functioning properly and that the spray pattern is suitable for the fabric being finished. It is also to calibrate the spray equipment to ensure that the correct amount of finish is applied to the fabric.

(iii) Apply the aroma finish

Apply the scented solution onto the fabric surface using the spray equipment, taking care to apply an even and consistent layer of finish. The spray should be directed towards the fabric surface from a distance of about 6 to 8 inches, using a sweeping motion to cover the entire surface.

(iv) Dry and cure the fabric

After applying the aroma finish, the fabric should be allowed to dry and cure according to the manufacturer's instructions. This may involve air drying or using a dryer, depending on the type of finish being used. Curing is important to ensure that the finish adheres properly to the fabric and that the aroma is fully developed.

(v) Test the finished fabric

Once the fabric is fully cured, it should be tested to ensure that the aroma finish meets the desired specifications. This may involve sensory evaluation, chemical analysis, or other textile testing methods.

RESULD AND DISCUSSION

The treated fabrics are subject to washing test and the range of aroma is tested up to ten washes. The soy fabric had a very strong and pleasant smell, which was different from the smell of other natural fabrics. The smell was not overpowering, but it was noticeable. The results of using lavender oil on fabric are very positive. The scent is relaxing and calming, the fabric is soft to the touch, and the color is beautiful. The only downside is that the oil can be somewhat expensive.

CONCLUTION

For those who want to preserve balance between their physical and psychological comfort, aroma therapeutic textiles are a suitable option. The use of essential oils on textiles has a lot of possibilities for creating textiles with added value. Aromatherapy textiles have become necessary in daily life due to their use in a variety of disciplines (cosmeto-textiles, home textiles, sportswear, medical textiles, etc.).

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TEXTILE PRODUCTION MANAGEMENT AND MERCHANDISING

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ABSTRACT

Textile production management and merchandising represent critical aspects of the textile and apparel industry, bridging the gap between creative design and efficient production. This abstract provides a comprehensive overview of these intertwined disciplines, emphasizing their significance in the contemporary textile landscape.

INTRODUCTION

Textile production management and merchandising are integral components of the textile industry, ensuring that textiles are manufactured efficiently and meet market demands. This abstract explores key facets of textile production management and merchandising, including their roles, processes, and significance.

What is Production Management?

Production management is the process of planning the conversion of raw materials into finished products, procurement of necessary materials, supervision and control. In the textile industry, production management refers to the process of making a garment from beginning to end. Production management includes everything from the collection of raw materials for the manufacture of garments to the planning of activities required for the transformation of garments, procurement of necessary materials, supervision, control, proper layout of employees and even handing over of garments to buyers.

CONTRIBUTION OF PRODUCT MANAGEMENT

Conducts the activities of every worker, employee and officer working on the production floor in order to produce the highest quality product within the stipulated time as per the demand of the buyer. It is the responsibility of the production management to control and plan the work to ensure that it is being made properly after a style operation.

SCOPE OF PRODUCTION MANAGEMENT

Production Management has the following scopes:

1. Production Planning and Development: It is related to the activity of evolution of new product and design it according to the specification of department in order to satisfy large number of consumers in the market.
2. Production Administration: It deals with basic three activities that is (A) Production planning, (B) production engineering (C) production control. All the above functions underproduction management have its own value and importance. Production management system directly depends on this scope.
3. Implementation Function: It refers to the activity of execution of plan, policies and decisions. It is a continuous activity in production management system which requires motivation of employees who are in charge of production so that the things can be produced in time.

4. Other Allied Activity: These are some of the other activities related to standardization, simplification, quality control, inventory control, research and development.

BENEFITS OF PRODUCTION MANAGEMENT

Production management is essential and beneficial different parties like:

1. The Consumer: The benefit of production goes primarily to the customer. All the goods and services are meant for the use of customers. A good production management system helps the customer from higher productivity, better and reliable quality, reasonable price, satisfactory service and timely delivery of goods and services. So, the benefit of production management system goes to the consumer in the society.
2. The Employee: A good production management system benefits the employees of an organization. Higher remuneration, job security, stable employment opportunity, better working condition as well as job satisfaction can be possible when there is more and more production in a systematic manner. It is said that productivity and satisfaction are inter relate to each other. On the other hand, high employee morale due to job satisfaction provides higher output.
3. The Investor: Maximum return on investment is the objective of each and every investor. Enterprise having good production management system ensures higher productivity which attracts the investors to invest more in this prosperous enterprise. More productivity ensures higher value in market in terms of security and asset value which is one of the benefits for the investors.
4. The Supplier: Most of the large, small and medium companies depend on the suppliers in terms of raw material, machine components, and allied services during the course of production. So, the role of a supplier is crucial in production management system. A good production management system ensures that intercommunication and mutual confidence among the producer and supplier can be better. More is the production better is the partnership satisfaction of both the parties.
5. The Society: A better production management system will benefit the society as a whole. More timely production of goods and services in better quality ensures community satisfaction which leads to the society will benefit out of that. More productivity means better economic prosperity. Economic prosperity leads to social prosperity and social prosperity leads to all round development in the society.

DECISIONS OF PRODUCTION MANAGEMENT

The decisions of a production management system have been classified into three basic categories.

They are:

1. Strategic Decisions: When a decision related to long term importance of a production organization it is called as strategic decision. Under this decision it is necessary to look into the future capability of the production unit

in terms of product, production process and the facilities available to meet the probable demand of the consumers in the market. This type of decision is concerned for a long-range production strategy relating to product and production process so that maximum product can be available in minimum time period with a low cost of production. Some of the strategic decisions are:

(a) Launching of a new product in future for the production unit.

(b) Decision to change the production process of the product.

(c) Decide to change the utilization of labor force and the machine.

(d) Establishment of new facility in production unit for the future.

2. Operating Decisions: When the decisions are made to meet the day-to-day operations of the production unit in order to meet the demands of consumers in the market it is regarded as operating decision. Under this decision the production managers have to look into the day today operation of the production unit and suggest how to improve the condition so that there can be maximum production in the unit. Some of the operational decisions are:

(a) Decision to maintain desired level of raw material for each production process.

(b) Decide the production schedule for the next month according to the order.

(c) Deployment of skilled and unskilled labor force for the production purpose in each unit.

(d) Decision for the engagement of supplier for the coming production process.

(e) Decision for the terms and conditions of payment of finished product.

3. Control Decision: This is a managerial decision of production unit. Under this decision it is necessary to take control measures regarding financial soundness of the production organization. When some measures are taken for the use of men, machine, material and money for an effective use of resources so that the cost of production can be minimum at a particular time period. Generally, the control decisions are taken by a production manager when the production unit face the conditions of financial shortage. Some of the control decisions are:

(a) Decide the action to be taken for the failures of a particular department.

(b) Decision for the improved labor cost and the measures to reduce them for more profitability.

(c) Decision for a changed quality control measure in order to improve the quality of the product according to the demand of the consumers.

(d) Preventive measures to be undertaken in order to increase the operating efficiency of the plant and machinery.

(e) Steps to be taken in order to increase quality of the product so that the cost of the product can be competitive in market. In nutshell it can be concluded that all the above-mentioned decisions are taken in order to improve the production capacity as well as the quality of the product so that more and more revenue can be generated in the production unit. The primary aim of the above decisions is to produce maximum product with a minimum cost in order to increase profitability.

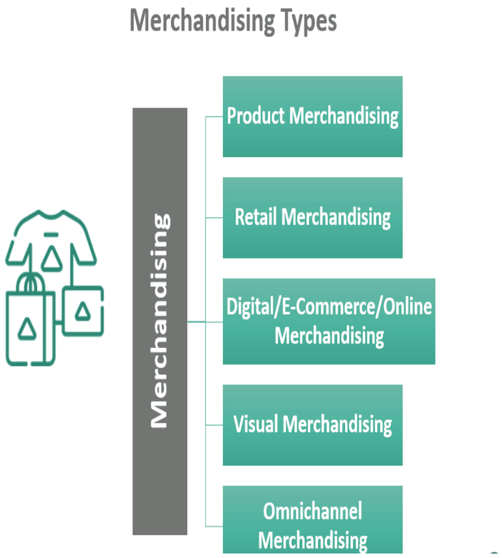
MERCHANDISING

Textile Merchandising

Merchandising is a process through which products a replanned, developed, executed and presented to the buyer. It includes directing and overseeing the development of product line from start to finish. Marketing and merchandising department: A team of merchandisers and marketers work together under a profit controls head. Merchandisers handle the foreign buyers. The teams are made according to the buyers being handled. Merchandising is the department which mediates marketing and production departments. Sometimes, merchandising department will have to do costing and pricing also. In any case, the merchandiser is the person whose responsibility is to execute the orders perfectly as per the costing and pricing. So, it is a very valuable department. Following are the main responsibilities of merchandisers.

Two types of merchandising done in garment exports

1. Marketing merchandising.
2. Product merchandising.



The main function of marketing merchandising is

Product development

Costing

Ordering Marketing merchandising is to bring orders costly products development and it has direct contact with the buyer.

Product merchandising

Product merchandising is done in the unit. This includes all the responsibilities from sourcing to finishing i.e., first sample onwards, the products merchandising work start and ends till shipment.

A Merchandisers key responsibility is as follows:

1. Product Development
2. Market and Product Analysis
3. Selling the concept
4. Booking orders
5. Confirming Deliveries
6. Designing and Sampling
7. Costing
8. Raw Material
9. Flow Monitoring
10. Production Follow Ups
11. Payments Follow
12. Internal & external communication,
13. Sampling
14. Lab dips
15. Accessories & Trims
16. Preparing internal order sheets
17. Preparing purchase orders
18. Advising and assisting production,
19. Advising quality department about the quality level
20. Mediating production and quality departments
21. Giving shipping instructions and the following shipping,
22. Helping documentation department
23. Taking responsibility for inspections and
24. Following up the shipment.
25. Internal & external communication

Earlier, we had seen the importance of communication with buyers. In the same way, internal communication is also very much valuable. As the other departments will follow the instructions given by the merchandising department, they have very high value. Other departments don’t know the buyer’s instructions; they know only the merchandising department’s instructions. So, it is the sole responsibility of merchandising department to instruct other departments the specifications and instructions of buyer’s orders clearly. Even a small omission, mistake or deviation of instruction may create big problems. Sometimes, they may not be correctable. Hence all the instructions to be double checked before being informed by other departments. Prevention is better than cure.

Flow Chart of Merchandising Task

Receive product package from buyer

↓

Sample development

↓

Price negotiation

↓

Order confirmation and receive order sheet

↓

Souring best items at right time with low price

↓

Material collection and receive it in factory

↓

Check and listing

↓

Swatch card making and approval

↓

Pre-production meeting

↓

Collect daily production and daily quality report

Arrange final inspection

Shipment

Sustainability Initiative

In both textile production management and merchandising, sustainability is gaining prominence. Initiatives encompass eco-friendly production processes, responsible sourcing of materials, and transparent communication about product sustainability to meet the growing consumer demand for eco-conscious textiles.

RESULT

New technologies are also creating new opportunities for the textile industry. These technologies include 3D printing, artificial intelligence, and robotics. These technologies can be used to improve the efficiency and productivity of the textile industry and the future of merchandising is one where we must respond rapidly to the market with the right product offerings in the right place at the right time.

CONCLUTION

Textile production management and merchandising are indispensable components soft the textile industry, working hand in hand to ensure efficient manufacturing and successful market placement of textile products. Advancements in technology, sustainability, and consumer preferences continue to shape the landscape of these disciplines. In a dynamic and ever-evolving industry, the integration of data-driven decision-making and sustainability practices is essential for the future of textile production and merchandising.

PLASMA TECHNOLOGY & ITS APPLICATION IN TEXTILE WET PROCESSING

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ABSTRACT

Plasma treatments are gaining popularity if the textile industry due to their numerous advantages over conventional wet processing techniques. The plasma treatment does not alter the bulk property. Plasma surface treatments show distinct advantages,
because they are able to modify the surface properties of inert materials, sometimes with environment friendly devices. Application of "Plasma Technology" in chemical processing of textiles is one of the revolutionary ways to enhance the textile wet processing right from pretreatments to finishing. This paper deals with application of plasma technology for
cotton pretreatment and finishing.

KEY WORDS: Cotton, Dyeing, Finishing, Pretreatments, Plasma Technology.

INTRODUCTION

Textiles have undergone chemical processing since time immemorial. The textile industry is searching for innovative production techniques to improve the product quality, as well as society requires new finishing techniques working in environmental respect. Over recent years, physicochemical techniques have become more commercially attractive and have begun to overcome conventional wet chemical methods for property modification.

The importance of surface modification of textile materials extends over a wide range of alterations or embedded selective additions, to provide desired single or multi features for various applications. It is a highly focused area of research in which alterations to physical and/or chemical properties lead to new textile products that provide new applications or satisfy specific needs.

These processes, however, can involve numerous chemicals, some of which are toxic to humans and hazardous to the environment. Additional problems also arise due to degradation and/or weakening of the treated material. Alternative techniques have been investigated over the past two decades to decrease or eliminate dependency on chemical treatments. One recent alternative, involving non-aqueous processing, is plasma treatment of textile materials. Appropriate choice of gas and control of plasma operation conditions provide a variety of effects on textiles (improvement of dyeability, printability and color fastness, improvement of adhesion properties of coated fabrics, increase in hydrophobicity and water resistance, etc.). Surface modification via plasma treatment not only eliminates the need for wet processing, but also yields unique surface characteristics. Several modifications include, but are not limited to: hydrophilicity/ hydrophobicity alterations, surface roughening, grafting, flame retardant, antimicrobial, insect repellant, stain resistant, and single or multiple surface functionalization. An ideal plasma treatment for textile applications is plasma system that can introduced into the production line without major changes or system interruption, allowing for high speed and continuous processing.

“Plasma” derived from the Greek and referring to “something molded or fabricated”. Plasma can be considered as a gaseous condition that contains several excited species such ions, free electrons and a large amount of visible, UV and IR radiations. The plasma state can be generated by:

1. Electrical energy
2. Nuclear energy
3. Thermal energy
4. Mechanical energy
5. Radiant energy

TYPES OF PLASMA

Plasma is generally classified as thermal or nonthermal. In thermal plasma, temperature of several thousand degrees is reached which is of a destructive nature and no material can stand their action. Contrary to thermal plasmas, non-thermal plasmas are „cold‟ plasmas where the chemically active environment is achieved at nearly room temperature and this one is used for surface modification of textiles. There are two types of cold plasma which can be used for application on textiles, namely vacuum pressure and atmospheric pressure. Since plasma cannot be generated in a complete vacuum the name vacuum pressure is somewhat misleading and only refers to the low working pressures of such systems. Many authors, however, choose to classify vacuum pressure plasmas into sub categories of low and medium pressures. The table below gives an idea of the working pressures of vacuum and atmospheric plasmas.

This text, due to very little difference between the sub classes of vacuum plasma will not differentiate between the two forms and discuss two main classes of plasma which are (near) vacuum pressure plasmas and atmospheric pressure plasmas. Both these forms are suitable for application on textiles and progress continues to determine their effect on textiles. More work has, however, been documented on characterization of vacuum pressure plasmas as compared to atmospheric pressure plasmas.

The coupling of electromagnetic power into a process gas volume generates the plasma medium comprising a dynamic mix of ions, electrons, neutrons, photons, free radicals, meta-stable excited species and molecular and polymeric fragments, the system overall being at room temperature. This allows the surface functionalization of fibers and textiles without
affecting their bulk properties. These species move under electromagnetic fields etc. on the textile substrates placed in or passed through the plasma.

This enables a variety of generic surface processes including surface activation by bond breaking to create reactive sites, grafting of chemical moieties and functional groups, material volatilization and removal (etching),dissociation of surface contaminants/layer (cleaning/scouring) and deposition of conformal coatings. In all these processes a highly surface specific region of the material (<1000 A) is given new, desirable properties without negatively affecting the bulk properties of the constituent fibers.

Plasmas are acknowledged to be uniquely effective surface engineering tools due to:
Their unparalleled physical, chemical and thermal range, allowing the tailoring of surface properties to extraordinary precision.

1. Their low temperature, thus avoiding sample destruction.
2. Their non-equilibrium nature, offering new material and new research areas.
3. Their dry, environmentally friendly nature.

PLASMA REACTORS

Different types of power supply to generate the plasma are:

1. Low-frequency (LF, 50–450 kHz)
2. Radio-frequency (RF, 13.56 or 27.12 MHz)
3. Microwave (MW, 915 MHz or 2.45 GHz)
4. The power required ranges from 10 to 5000 watts, depending on the size of the reactor and the desired treatment.

Effect of plasma on fibers and polymers

Textile materials subjected to plasma treatments undergo major chemical and physical transformations including

1. Chemical changes in surface layers
2. Changes in surface layer structure,
3. Changes in physical properties of surface layers.

Polymer surfaces results in the formation of new functional groups such as -OH, -COOH which affect fabric wettability as well as facilitate graft polymerization which, in turn, affects liquid repellence of treated textiles and nonwovens.

In the plasma treatment of fibers and polymers, energetic particles and photons generated in the plasma interact strongly with the substrate surface, usually via free-radical chemistry. Four major effects on surfaces are normally observed. Each is always present to some degree.

But one may be favored over the others, depending on the substrate and the gas chemistry, the reactor design, and the operating parameters. The four major effects are surface cleaning, ablation or etching, cross-linking of near surface molecules and modification of surface chemical structure.

Plasma cleaning and etching

Plasma cleaning and etching means a removal of material (impurities or substrate material) from the exposed surface. Plasma activation consists of the introduction of new functional groups onto the treated surface. Properties of the surface then depend on the nature of the chemical groups.

Plasma-assisted grafting is a two-step process in which the plasma activation is followed by the exposure to a liquid or gaseous precursor, e.g., a monomer. The monomer then undergoes a conventional free radical polymerization on the activated surface. In plasma polymerization, a monomer is introduced directly into the plasma and the polymerization occurs in the plasma itself.

ENVIRONMENTAL BENEFITS

The complexity of textile processing environmental impact starts with high water and energy consumption, high oxygen demand of several input materials being used as well as a generation of huge amounts of effluents with high chemical oxygen deman (COD)excessive color, pH and toxicity. In general, desizing, dyeing, washing and finishing are the main sources of effluent
pollution. The main advantage of plasma processing is that it is a dry treatment. Additionally, it is a very energy efficient and clean process. In general, the environmental benefits of plasma treatment.

CONCULSION

Plasma technology with all its challenges and opportunities is an unavoidable part of our future. The possibilities with plasma technology are Immense and numerous. It can rightly be said that plasma technology is slow, but steady in the industrial revolution. The substantial shortcoming of plasma treatment of textiles is that it cannot replace all wet processes, but it can be a viable pretreatment, which can provide plenty of environmental and economic benefits. Therefore, textile industry should consider the concept of higher initial investments in equipment that will be paid off quickly with respect to environment related savings and the profit of the sale of high value-added products.

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BIOPOLYMER BASED MICROENCAPSULATION TECHNOLOGY FOR SUSTAINABLE TEXTILES DEVELOPMENT

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ABSTRACT

Microencapsulation methods in product development may result in innovative products with improved stability, functionality, and active chemical release (s). Microcapsules may be made out of biopolymers instead of synthetic polymers because of their biodegradability, lower production costs, and greater accessibility. The potential of biopolymers-based microencapsulation technology in sustainable textiles is substantial despite this field only getting started. This short review explores the role of biopolymers such as chitosan, gelatin, alginate, and cellulose in microencapsulation-mediated sustainable textile technology. The long-term effects of using microencapsulation made from biopolymers are also discussed, with an eye toward sustainability.

Keywords: Microencapsulation, Sustainable textiles, Functional textiles, Chitosan, Cellulose

INTRODUCTION

Microencapsulation is the process of isolating active substances (in a liquid, solid, or gaseous state) to produce micro metrically sized, spherical products in which a membrane protects the active material or core from the outside environment. The microencapsulation process results in a solid partition between the interior and outside components. It shields fragile components from the environment, including humidity, pH, and oxidation. Shearing, solubilization, heating, pH, or enzyme activity are only some of the methods that might cause the release of micro particle material at regulated rates. In light of this, microencapsulation technology has been singled out as a viable method to extend the useful life of textiles.

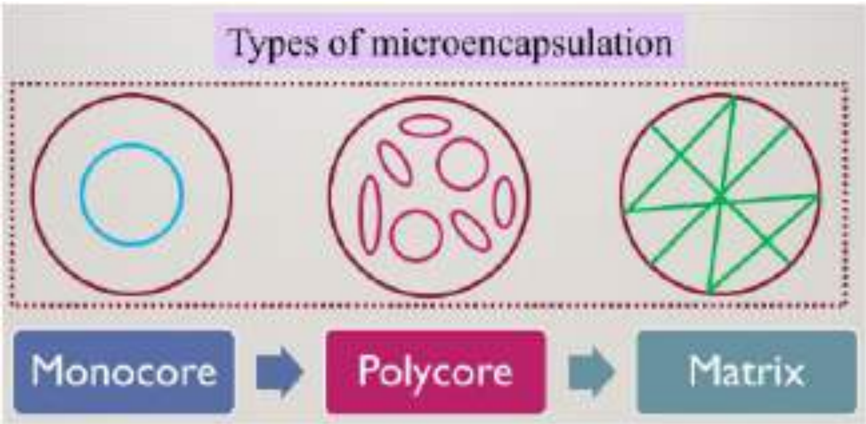
Microencapsulation is a research field with significant untapped potential for further advancement. This is particularly evident in the area of environmentally friendly formulations, which can be determined by the active ingredient selection for the coating, the polymeric membrane structures, textile finishing methods for fixing the particles, and the functionalization medium. According to the observations made by Gordon Nelson, the ultimate goals for the majority of textile applications that make use of a microencapsulation formulation are for the formulation to be readily applied, for it not to change the qualities of the fabric, and for it to have adequate durability to the garment so that it may ease the process of maintaining the textiles. Microencapsulation protects the core and the surrounding environment from potential chemical reactions. Microencapsulation has several advantages, one of which is the ability to adjust the rate at which the active ingredient in the core is released. Applying new chemicals like scents, colors, insect repellents, antimicrobials, or phase change materials may be made possible via microencapsulation, which presents a number of significant potentials for the enhancement of the . Since then, there has been a vigorous study on getting items that may satisfy even the most demanding client requests. This research has resulted in numerous commercial products, and many more are now in the research and development stage. As a direct consequence, items that just a few decades ago were regarded as being in the realm of science fiction may today be found in almost every market. The most demonstrative examples are textiles with long-lasting perfumes, shirts with thermo-changeable colors, military uniforms with microencapsulated insecticides, thermoregulation car seats, ski coats and gloves, etc. The design of the process, on the other hand, has to ensure that product standards are satisfied while also complying with limits regarding cost and the environment.

As public interest in and understanding the value of safe, environmentally friendly materials and methods grows, so do researchers' and producers' interest in green chemistry techniques. While there are some microcapsules manufactured of phenol-formaldehyde, melamine-formaldehyde, or urea-formaldehyde resins, the vast majority of those on the market are designed for use in textiles. While these polymers are useful because of their thermal stability and adaptability, they pose a significant risk to human and environmental health due to their potential to be manipulated to
achieve specific release profiles. The carcinogenic and poisonous properties of formaldehyde are a major factor, as well as the fact that thermosetting polymers are not recyclable. Therefore, it is crucial to find alternatives to these polymeric systems that are both safe for the environment and do not pose any health risks to humans. Natural and naturally derived polymers are being seen as viable replacements for synthetic polymers for several reasons, including their low environmental impact, high availability, and lack of potential health risks to humans. Because of their versatility and availability, biopolymers, including chitosan, gelatin alginate, and cellulose, have drawn interest for use in various ecological and medicinal contexts. Large surface area, high efficiency, bioactivity, nontoxicity, elasticity, antimicrobial activity, and ease of synthesis are the remarkable features of these biopolymers . The selectivity and reactivity of biopolymers much surpass those of man-made polymers. Microencapsulation based on biopolymers may be affixed to textiles without altering the materials' inherent qualities like softness or breathability, allowing them to retain their structural integrity. Since then, biopolymers have been the most popular option for preparing sustainable microencapsulation toward multifunctional fabrics.

Microencapsulation based on biopolymers has been the subject of various research on functional textiles in recent years. However, there has not been a unified strategy in the published efforts on creating functional textiles based on biopolymers' microencapsulation. This article aims to synthesize information from the literature on the principles of combination, manufacturing techniques, and emerging trends for making biopolymers microencapsulated functional textiles. To the authors' knowledge, this is the first review to focus on microencapsulation based on biopolymers and their potential use in the textile industry.

MICROENCAPSULATION ON TEXTILE MATERIALS

Several chemical techniques, including interfacial polymerization, *in situ* polymerization, sol-gel, coacervation, and phase separation, are used in microencapsulation procedures. Microcapsules range from a few microns to a few millimeters. Depending on their shape, microcapsules may be divided into three distinct categories: Monocore, Polycore, and Matrix.



The application of microcapsules to textiles may be accomplished by stamping processes, exhaustion dyeing, impregnation, padding, coating, or spraying. This application uses microencapsulated liquids in the solid powdered form to easily deposit them onto the textile fibers. In addition, microcapsules can be directly absorbed into the fiber, without causing any changes to its feel or color. A binder is necessary for all of these different processes. For example, it might be starch, acrylic, polyurethane, or silicone. It is responsible for securing the capsules onto the cloth to remain in place even after the fabric has been washed and worn. The padding technique relies on squeeze rolls, sometimes known as "mangle rolls," to remove the surplus solution from the cloth after it has been transferred to a bath containing micro or Nano capsules. Because the fabric is submerged in a solution containing micro- and nano capsules, the substance may diffuse into the fabric similarly to padding but without using squeeze rolls. Using the printing technique, a printing paste may be prepared by combining microcapsules and nano capsules with a binder. The micro and nano capsules are printed onto the fabric's surface after the fabric is passed through a rotary screen attached to a rotary roll containing a printing paste. In addition, the coating is created by heating microcapsules and nano capsules deposited on the cloth's surface . Applying microcapsules or nano capsules to the fabric's surface in an enclosed space using a spray nozzle is another kind of technological procedure. It is necessary to stabilize the goods, traditionally accomplished by heating them at a high temperature. (130–170 °C). The rapid evaporation and swelling contribute to the capsules' walls being ruptured, allowing

The contents to escape and reducing the capsules' stability. Curing by microwaves or ultraviolet light (UV) is an alternative to traditional heating. Microwaves with short wavelengths cause molecules to vibrate and polarize, which results in the production of heat and the stabilization of micro- and nano capsules on the surface of the fabric . UV curing involves subjecting the fabric to ultraviolet radiation for a short period to polymerize the resin component in the form of a continuous film and stabilize the capsules on the fabric's surface . This process has many benefits, including a high production rate, a short and low-temperature procedure, significant energy savings, and reduced environmental impact. This prevents shattering the capsules and causing the core material to evaporate, enhancing the product's longevity. The durability of the completed fabric treated UV was almost 50 washes better than that of the fabric cured with thermal curing (25 washes) The characteristics of the core material determine the choice of a specific approach, the encapsulant, as well as the many features and morphologies that are secured in the capsules. The type of the core and shell chemicals, as well as the solvent necessary to either dissolve or precipitate them, are the primary factors influencing the decision of which procedure to use. Silk, cotton, synthetic fiber, etc. may all have microcapsules applied to them in order to create a wide variety of functional textiles for use in sports, medicine, fragrance, E-textiles, antimicrobials, thermochromes, UV protection, dyes, phase change materials, and beyond For instance, using mini-emulsion polymerization, Liu et al. synthesized methyl methacrylate-styrene nano capsules containing cologne essential oil and applied them to cotton fabric by immersion. Because 6.8% of the cologne was still detectable after 15 washes, the treated cloth had a homogenous covering of fragrant nano capsules on the fabric surface without significant agglomeration, indicating high washing endurance used a commercial binder, pH 5.5–6, and 120 °C for 2 minutes to cure neem, Tulsi, and turmeric microcapsules that they applied to cotton and silk textiles using the simple diffusion technique. Poly(ethylene glycol)-poly(e-caprolactone)-poly(ethylene glycol) is a thermosensitive hydrogel composite that Gong et al. loaded with curcumin to create a solid dispersion. Hydrogel produced for use as a wound dressing showed good tissue adhesiveness and sustained release of curcumin over a long period. Microencapsulated phase change materials have several applications due to their ability to be used to fabricate active smart textiles that can detect and respond to circumstances or stimulation, appealing to a large and varied consumer base. They may be permanently woven into the fiber to create thermoregulated fibers, embedded in a coating compound at the end of the production line, or blended into a foam before lamination to create a layer. It may be sewn into a wide variety of garments, including outerwear, undergarments, UV protection, gloves, military uniforms, and civilian clothing; it can also be used to make beds, seating, and footwear. (Car seats, wheelchair, furniture covering, etc.)

Overall, it can be shown in several surface modification methods are available in the literature, but the microencapsulation method has been identified as a versatile route for developing functional textiles by means of application areas.

APPLICATION OF SUSTAINABLE MICROENCAPSULATION IN TEXTILES

Textiles may be modified in terms of functionality by using microencapsulated materials ranging from natural to synthetic. Consumers in the present day are becoming more interested in and demanding the functionalization of textiles via the use of sustainable natural materials. To meet the criteria of environmentally friendly chemical finishing of textiles, biopolymers in microcapsule form may be used.

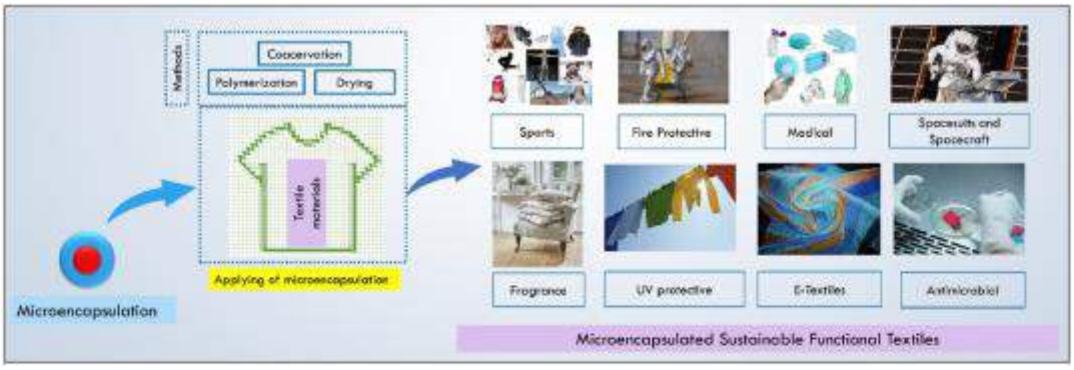


Table 1. Surface modification techniques for textiles.

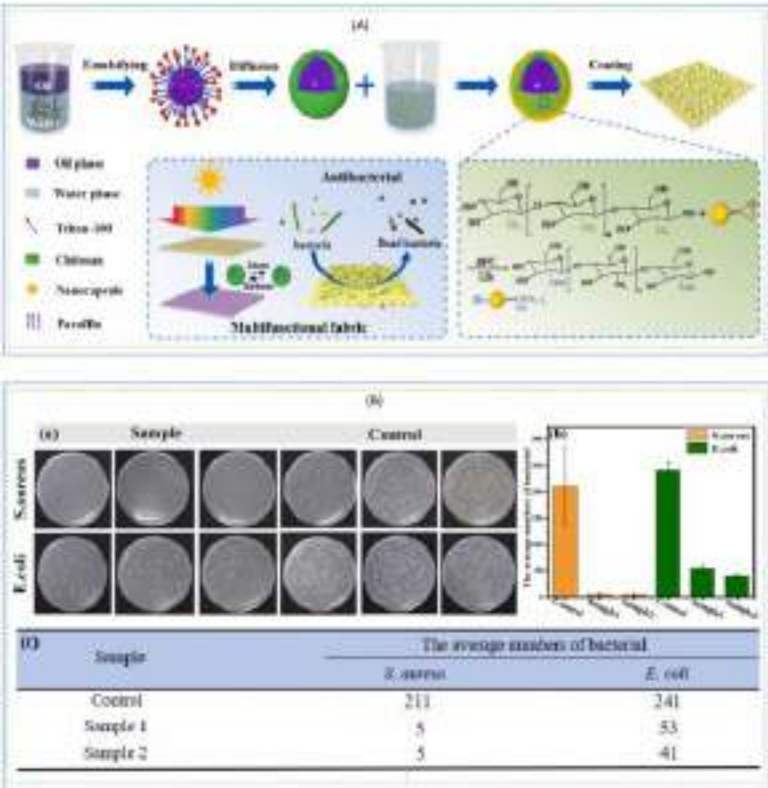
Chitosan-based microencapsulated textiles

Polymers	Preparation method	Textile materials	Application
Chitosan	Pad-dry-cure	Cotton	Antimicrobial and thermoregulating textiles

Chitosan	Padding	Viscose	Advanced medical textile, antimicrobial textile
Chitosan	Pad-dry-bake	Wool	Antimicrobial and insect-resistance
Chitosan	Padding	Cellulose	Antimicrobial and insect-resistance
Gelatin	Complex coacervation	Cotton	Durable and aroma finishes
Gelatin	Pad dry	Cotton	Antibacterial
Gelatin	Complex coacervation	–	Insect repellent
Alginate	Pad-dry-bake	Cotton	Biomedical and sports
Alginate	Printing	Cotton	Antibacterial and aroma finishes
Alginate	Padding	Cotton	Colorimetric detection of urea
Cellulose	Emulsion-solvent evaporation	–	Thermal reliability
Ethyl cellulose/silica hybrid microcapsules with lavender fragrance	Emulsion-solvent diffusion on	Commercial cotton	High UV-resistance (159 UPF value) and durable aroma finishes (90 days)
Ethyl cellulose microcapsules and rosemary lavender	Phase separation method	Cotton	Durable fragrances, Antibacterial agent, skin softeners, and phase-change materials

Chitosan is an emerging biopolymer that has been extensively used for textile-based encapsulation due to its biocompatibility, bacterial resistance, cheapness, availability, lower toxicity effects, etc. Chitosan is also used extensively in textiles for antibacterial, coloration, UV resistance, thermal stability, and so on .It is one of nature's most important organic biomaterials with outstanding cationic characteristics. It plays a significant role in trapping material along with long-lasting effects by controlling the release rate. The most common interest of chitosan for textiles encapsulation is in the applications of thermal comfort, aroma finishes, antibacterial functioning, and insect repellency. The entire designing process of textiles needs to be healthier, sustainable, cheaper, and safer for consumers. Chitosan and chitosan-capped nanoparticles like silver have significantly been practiced for functionalizing textiles. Additionally, chitosan is used as a binder to finish the textile fabrics against degradation by maintaining the mechanical properties and as the binder for printing or even as the dyeing auxiliaries. The active substances could be delivered over the textiles by changing the shell permeability or from external stimuli (like temperature, pressure, diffusion via polymer wall coating, friction, biodegradations, and so on) degradations.

Moreover, chitosan-based microencapsulation is advantageous for the following reasons: (1) the polyatomic nature in acidic conditions makes the basement for versatility and potential applications, and (2) it facilitates chemical modification through covalent bonding . The chemical feature of chitosan provides superior antibacterial performances. However, it is affected by environmental conditions like temperature, pH, and/or ionic strength. Chitosan is a positively charged material and can easily react with negatively charged substrates. Due to its nontoxic properties, chitosan is often used as the shell material of microcapsules. Therefore, reported phase change in the chitosan-based microcapsule, which was initially prepared using a single coagulation technique, later strawberry chitosan microcapsules were prepared through grafting photochromic microcapsules with chitosan microcapsules. Interestingly, changing antimicrobial and color could be regulated by adjusting Nano capsules on the chitosan cover factor.



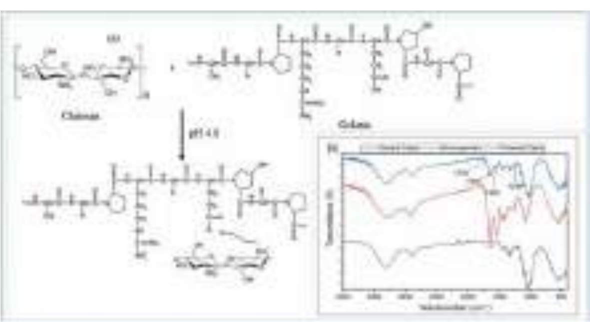
Strawberry microcapsule preparation process on treated fabrics and (B) antibacterial development over-treated and control fabrics: Samples 1 and 2 indicate treatment of

GELATIN-BASED MICROENCAPSULATED TEXTILES

Gelatin also possesses excellent biocompatibility, water retention, anti-carcinogenicity, and film-formation capabilities. Gelatins are produced through mixing poly and oligopeptides obtained through collagens partial hydrolysis containing 18 amino acids. The amino acids in collagen are bonded with peptide bonds by linking together and building larger chains. By applying the complex coacervation method, encapsulated moxa oil into Gelatin-Arabic gum microcapsules to improve antibacterial performances. They have investigated the moxa oil containing microcapsules (loaded 0.2 ± 0.01 mg/ml) in terms of particle size (6.42 μm, spherical), surface morphology, drug loading, and antibacterial characteristics and found significant performances.

Moreover, the moxa oil was gradually released from the microcapsules, and the cotton fabrics treated with the same oil microcapsule provided strong inhibition growth against staphylococcus aureus bacteria. The higher loading of moxa oil microcapsule (50 $\mu g/cm^2$) showed a higher inhibition zone (7.5 ± 0.5 mm) than that of lower loading (25 $\mu g/cm^2$). In another study, a gelatin microcapsule encompassing vitamin C was developed by implementing an emulsion hardening method for cosmetic textiles. The cosmetic textiles were prepared by grafting the gelatin microcapsules in the fibers.

Singh et al., proposed an interaction mechanism of chitosan/gelatin microcapsules formation through a two-step methods procedure where, as being a cationic character of chitosan (acidic condition) made reaction with negatively charged gelatin at pH 4.8 (isoelectric point) due to electrostatic interactions . The same study also revealed that the finished fabric contains microcapsules due to the peaks present within 3000 to 2500 cm^{-1}, which correspond to the O–H bond for the carboxylic acid group of gelatin.



ALGINATE-BASED MICROENCAPSULATED TEXTILES

Alginate is also another tremendously studied biopolymer used for microencapsulation. It is grown in brown

algae, which is like a skeleton component. It is considered one of the most efficient microencapsulation over various materials, which could be performed by applying different methods. This is a linear polysaccharide (anionic) which consists of α-L-guluronate and β-D-mannuronate residues, generally linking through (1,4)-glycosidic bond in an irregular block-wise form. Microcapsules could be formed using the combination of chitosan and alginate. Alginate contains a carboxylic acid group with negative surface charges, which strongly facilitates a spontaneous reaction with the chitosan's amide group when both polymers are mixed together. The most common reactions are hydrogen bonds, electrostatic, and dipole-dipole associations. Interestingly, the developed complexes can resist pH variations, have stability against any leakage from the loaded material, and provide better mechanical performances. Alginates have
a higher gelling capability, low toxicity, and biocompatibility; therefore, they are utilized in the case of oil encapsulations, especially beside the other polymers used in membranes . The alginate macromolecules create crosslinking for forming a three-dimensional network when present with Ca^{2+} (calcium ions) called hydrogel. However, such a process of encapsulation can be carried out in three ways: Internal gelation mechanisms, External gelation mechanisms and Inverse gelation mechanisms.

In the case of textiles, the chitosan-alginate complex exists applications for medical products like cotton-gauges and antibacterial peptides. The side effects of the multifaceted application of medical textiles toward human health are minimized when naturally derived products are incorporated. Therefore, Rehan et al. developed a microcapsule comprising a starch core and guava leaf powder (bioactive compounds were extracted by ultrasonic method), where calcium alginate was used as the membrane material . The same study revealed that the developed products contain outstanding antibacterial, UV-resistance, wound healing, and antioxidant characteristics. Moreover, sodium alginate and other reagents are also getting attention for treating the effluents discharged from textile industries.

CELLULOSE-BASED MICROENCAPSULATED TEXTILES

Natural cellulose is the most common organic polymer. Plants are the primary BioSource for cellulose. Cellulose, a polysaccharide composed of glucose monomers, is one of the primary components of plant cell walls. There are several cellulose derivatives available, including ethyl cellulose (EC), cellulose acetate (CA), cellulose acetate butyrate (CAB), cellulose acetate phthalate (CAP), trimethylsilyl cellulose (TMSC), etc. Industrial usage of cellulose derivatives is widespread because of their inexpensive cost, biodegradability, and low physical characteristics.

Recent work has successfully encapsulated eugenol in cellulose derivatives (EC, CA, CAB, and CAP) that have been successfully integrated into cotton textiles. The primary component of clove oil, eugenol, has potent antiseptic, antibacterial, and antiviral effects . Producing these microspheres required solvent evaporation, and then they were applied to fabrics using padding methods. The study findings they obtained indicate that CA-based microspheres were more effective. In conclusion, these microspheres performed well in storing and preserving hydrophobic active chemicals for potential textile applications. Later, a mesostructured reactor was created to continuously manufacture cellulose acetate microspheres used in textile impregnation.

Microencapsulation of essential oils in EC was also explored. These oils included rosemary, lavender, and sage. Microcapsules containing essential oils were manufactured using the phase separation process and then used to treat fabrics for odor control. Essential oils may be used as a relaxant, an antimicrobial, and a deodorant. In addition, they managed the microcapsule sizes by varying the stirring speed throughout the encapsulation process (350–1000 rpm). The microcapsules produced with the greatest stirring speed were the tiniest and smoothest on the outside.

By combining ethyl cellulose and silica in microcapsule form, Chen et al.established a water-based fabric coating with a wide range of applications. Hybrid microcapsules of ethyl cellulose and silica-containing lavender fragrance oil (LFO) were created by dispersing LFO in a solvent to form an emulsion. These microcapsules include a core-shell design with UV absorbers and silica grafted with methacrylic acid in the outer shell and have a diameter of 30 m. To create fabric coverings with various uses, these hybrid microcapsules were added to polyciliate resins that were dissolved in water. Performance tests revealed that cloth treated with cellulose/silica hybrid microcapsules infused with lavender fragrance oil (LFO-CSHM) retained scents for far longer than fabric treated with LFO alone. This occurs when the lavender oil used to scent the capsules is released gradually. This coating may be applied to outdoor textiles such as sportswear, curtains, and upholstery.

In response to certain wavelengths of light, photochromic dyes undergo rapid and reversible color changes. There has been a recent uptick in interest in using these dyes for smart and practical textiles. Coacervation and *in situ* polymerization techniques were used to microencapsulate two photochromic dyes . Shells were made of ethyl cellulose and melamine-urea-formaldehyde. Characterization revealed that photochromic microcapsules were round, smooth, and uniform in composition. Microcapsules were successfully printed onto cotton fabric. It didn't take long after printing for the colors of the materials to shift drastically when seen in various lighting conditions. These textiles have strong fatigue resistance and a reversible photochromic reaction. The outcomes of the mechanical and physical tests and the tests' findings are all very promising. The authors propose that photochromic microcapsules are viable for securing textile brands and warding against counterfeits.

Microencapsulation shells made from cellulose and cellulose derivative polymers are becoming popular because of their biodegradability. However, the use of cellulose microcapsules in the textile industry is still in the experimental stages. As global environmental and sustainability concerns grow, sustainable microencapsulated functional textiles made from cellulose should be developed by the textile science and technology community.

SUSTAINABILITY CONSIDERATIONS: ENVIRONMENTAL PERSPECTIVE

This review has shown how biopolymers may be used in a variety of ways and explored how they can be used as inputs in the development of sustainable microencapsulation. There are substantial information gaps concerning the environmental effect of designed microcapsules that need to be addressed before bringing these concepts from the lab to the real world, even though the notion of sustainable microencapsulation for functional textiles applications may seem to be an appealing solution at first sight . Once discharged into the environment (laundry washing), i.e., soil, air, and water, it is predicted that the majority of the novel microcapsules are highly mobile, quickly dispersible, and extremely reactive, potentially endangering human health.

Although biopolymers are considered biodegradable, some additives incorporated into the process make it more viable in a toxic environment through the leaching phase. A stable binding procedure carried out during the fabric's finishing stage may, thus, reduce the likelihood of leaching. Sustainable manufacturing also necessitates efficiently using the energy, water, and other natural resources needed to produce these goods . Achieving this objective depends on how well the several functional agents are integrated into the substrates. It may permanently attach these active substances to the fibers or remove them easily. Positive end-user engagement is possible through an assembly process that considers a lower level of integration with relatively low negative environmental consequences, which is a supportive route for recycling and reuse, cleaning and washing, and ever-evolving technology. Additionally, using sustainability factors, such as ecological risk assessment, life cycle assessment, and possible hazard identification, may be an effective technique to advance microencapsulation-based sustainable textile technology.

CHALLENGES AND PERSPECTIVE

Microencapsulation coatings on textiles made from natural sources are an exciting area of research with significant potential for the textile industry in the future. Microencapsulated textile products based on biopolymers have allowed manufacturers to produce high-quality textiles that satisfy customer demand by maintaining safety, human health, or environmental sustainability. Nevertheless, various concerns must be resolved before commercial applications can be created with a long-term focus.

Environmental degradation of microcapsules is a significant issue for biopolymers-embedded microencapsulated textiles since it may occur in a variety of contexts, including natural media, mechanical agitation, and photo degradation.

Unlike traditional synthetic polymers, biodegradable polymers may rapidly discharge a large number of microcapsules into the ocean or a river.

Consequently, an alternate way to solid development might be the use of binding agents instead of the coating process. They may be more long-lasting if chemical finishing is added following the microencapsulation process.

The relative importance of biopolymer microcapsules in multi-functional textiles is nuanced and still requires convincing and significant data.

Post-use processing of the biopolymer microcapsule is an important consideration.

Microcapsules made from biopolymers are expected to gain popularity shortly for usage in a wide range of niche scientific and textile industry applications. We also anticipate the widespread use of biopolymer-based microencapsulation in the not-too-distant future. These particles will aid in advancing the high performance and give a deeper insight into and enhanced qualities of textile materials. Researchers will be incentivized to develop nanoencapsulation based on biopolymers, which would enhance the properties of textiles. Furthermore, we are certain that cutting-edge, environmentally friendly, and user-friendly synthesis techniques will be developed to fully use biopolymers-based microcapsules. We hope this review will stimulate additional studies into developing and implementing microcapsules based on biopolymers for use in textiles.

CONCLUTION

Microencapsulation is utilized in the production of eco-friendly functional textiles to improve upon already present attributes or to introduce entirely new ones; this increases the utility and monetary value of the finished products. Microencapsulation has the ability to make major strides forward as a subject of study, notably in eco-friendly formulations, thanks to the factors of active ingredient choice, polymer membrane structure, textile finishing for attaching particles, and support functionalization. The application of microcapsules to textiles presents a number of technological challenges that need to be addressed in future research. These include the necessity for fixing agents, the short lifespan after washing, and the altering of textiles' physical properties. It is expected that the growth and development of multifunctional textiles will soon lead to additional growth and the introduction of new possibilities, including the use of microencapsulated materials in the functionalization of textiles. To solve this challenge, insight into this crucial area of chemistry is required. In the future, microencapsulation and its use in textiles will necessitate cutting-edge engineering and modern production processes. This review effort can help to solidify the potential of further research into the microencapsulation production of eco-friendly textile products for the textile community.

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ABSTRACT

Increasing customer demands for durable and functional apparels manufactured in a sustainable manner has created an opportunity for nanomaterials to be integrated into textile substrates. Nanotechnology is a growing interdisciplinary technology often seen as a new industrial revolution. Fabrics that resist water are essential for everything from rainwear to military tents, but conventional water repellent coatings have been shown to persist in the environment.

Ent and accumulate in our bodies. Nano moieties can include stain-repellent, winteriness, static elimination and electrical conductivity to fibers without compromising their comfort and flexibility. Nanomaterials also offer a wider application potential to create connected garments that can sense and respond to external stimuli via electrical, color, or physiological signals. Risk factors including nanotoxicity, nanomaterial release during washing and environmental impact of nanotextiles based on life cycle assessments have been evaluated. Intelligent clothing has been increasing in the prominent fashion weeks in New York, London and Paris. Fashion designers are creating functional materials and integrating emerging, communication devices, flexible electronics and nanomaterials to garments and designer cloths.

KEYWORDS: Nano technology, Water repellent

INTRODUCTION:

A surface is not simply the physical division between an object and its environment, it fulfills a range of functions of its own which often plays a crucial part in product design. Surfaces are supposed to feel good to the touch and to look good for as long as possible. It should be easy to maintain and not be spoiled by dirt, water stains or finger marks. Traditional coating materials often do not stand the test of the increased demands made on materials today. In recent years however advances have been made using methods described in nanotechnology. Nanotechnology improves the water repellent property of fabrics by creating nano-whiskers which are hydrocarbons and 1/1000 of the size of a typical cotton fiber that are added to the fabric to create a peach fuzz effect without lowering the strength of cotton. The spaces between the whiskers on the fabric are smaller than the typical drop of water but still larger than the water molecules. Water thus remains on the top of the whiskers and above the surface of the fabric. However, the liquid enters the fabric if pressure is applied on it. The performance is permanent while maintaining breath ability.

MATERIALS AND METHODOLOGY:

MATERIALS

Hydrophilization with additives (aluminum organic salts, paraffin emulsions with aluminum salts)

Hydrophilization with resin type reactive agents.

Hydrophilization through chemical modification of the fibers.

Textile finishing with nanoparticles. Lyophilization techniques gives textile4 materials the property of repelling oils and thus creating protection against dirt and smudges while increasing the hydrophilization effect.

Fluorocarbon resins are often used as lichenization agents.

Plasma treatment of the textile materials, plasma polymerization or plasma depositing of organic silicone polymers can give a hydronic character to materials that are typically not hydrophobic (like cotton)

METHEDOLOGY

The lotus plant is revered in Asia for its exceptional cleanness. Although it grows in muddy water its leaves always appear immaculately clean. The plants' leaves are superhydrophobic i.e., drops of water roll off free of residue taking any impurities with them.

Investigations into the surface using reflections electron microscopy (REM) have shown that the surface of the Leafe is not especially even, which you might intuitively assume but instead it has a special characteristic roughness. Systemically arranged, water repellent, nanosized wax crystals from three dimensional structures similar to small nipples which Nare no greater than a few nanometers or micrometers in size. When combined with the waxes the wart repellent chemical properties make the lotus leaf extremely non wettable. This state is called ultra hydrophobia or super-hydrophobia and they give it the self-cleaning property. Dirt particles only sit on the wax crystals and as a result only a very small surface area comes into contact with the plant's surface. So that if a water drop falls on the leaf and if the leaf titles slightly the water drop immediately rolls off taking the dirt particles with it. The principle of self-cleaning was discovered in 1973 by the Wilhelm Bartlett and his team.

As the above-mentioned demonstration there are still only a handful of practical applications available on the market which have the lotus effect. Nevertheless, there are already a several products with dirt repellent and water repellent properties on sale which the manufacturer claims are based on nanotechnology or contain nanoparticles. For example, ceramic sanitary facilities, spectacle lenses or textiles.

MANUFACTURING

Transparent hydrophobic or oleophobic coatings of this kind can be manufactured using sol-gel processes. In simple terms, the raw materials are so called silanes with a silicon base atom which can be modified by adding certain chemical substances to it in order to retain the required properties. Nanoscale particles are produced from the silanes by means of chemical reactions in a solution. The dispersion of the particles is called as sol. The sol is applied to a great veracity of surfaces using traditional industrial processes such as dip coatings, spraying or spin-coating. The resulting coatings are only a few nano meters thin and transparent. Impregnating agents are also available which make textiles and leather dirt and water repellent and which manufacturers claim that it contains nanoparticles are based on nanotechnology. Based on the current understanding of nanotechnology one-dimensional nanostructures would probably also be categorized. However, it appears that many products do not fulfill an essential criterion of nanotechnology-i.e., that the material has new properties. There are still some impregnating materials on the market which manufacturers claims with reference to the lotus plant which produces surface roughness and hydrophobia on materials by means of nanoparticles making them dirt free ant water-repellent.

SUMMARY AND CONCLUTION

The customers demand in improved appearance, functionality and connectivity in fashion has motivated the development of nanotechnology-based textiles. Over the last two decades numerous nanostructures and nanomaterials including NPs, CNTs, Bragg diffraction gratings and nano-electronic components have been deposited or woven into textiles. The development of these nanomaterials also created new fabrication methods involving particle impregnation, spray coating, multifunctional composites fiber drawing and direct weaving at industrial scale. In addition to protection from weather conditions like rain and wind, breathability is expected from sportswear. That’s why for water-repellent and waterproof/water-resistant breathable fabrics are preferred. Water-repellent fabrics are coated with a finish (such as DWR) that is resistant but not impervious to penetration by water so water-repellent clothes will keep you dry for a relatively short time when walking in the rain. Thus, water repellent cloths will provide some protection against intermittent rain but they are not suitable to be worn in a downpour or in prolonged rainy weather. The biggest advantage of water-repellent pants and jackets is tehri breathability combined with some degree of water resistance. Waterproof breathable fabrics are impervious to water and provide moisture vapor transfer from the inner side to the outer side of the material. They prevent the penetration and absorption of liquid water from outside while allowing water vapor to be transmitted to the outside of the fabric.

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ABSTRACT

Sustainability in the Medical textile is one of the topics that develops in today's world. Now a days the whole earth is suffering from a lack of resources. As it is necessary to switch to sustainability in order to face the problems around the world and save the sources up.

To use a particular type of medical textile we should consider the features of the products which show whether the products are with the overall good performance, cost-effective, user-friendly, and eco-friendly. Moreover, these features also comprise if it allows you to breathe, has an antimicrobial resistance to the bacteria, virus, etc., or has high strength and durability.

KEYWORDS: Implantable products, cost effective, Antimicrobial, User-friendly, Healthcare textile.

INTRODUCTION

Medical Textile Materials provides the latest information on technical textiles and how they have found a wide range of medical applications, from wound dressings and sutures, to implants and tissue scaffolds. Medical healthcare is one of the most important parts of textile industry due to the constant improvement in textile technology and medical procedures. Medical textile is referred to all fiber-based products and structures used in medical applications such as tissue engineering and drug delivery systems. With the development of materials science and related research works, new fibrous materials and manufacturing technologies have been introduced for medical sectors.

Physical and chemical modifications of fiber structures, developing stimuli-responsive materials and multifunctional finishing on textiles are the most important approaches for the preparation of new medical textiles with promising applications. Medical devices and implants, smart drug delivery systems, sutures, healthcare textiles, surgical dressing, sanitary napkins and incontinence diapers are the most commonly used medical textile products.

MATERIAL AND METHADOLOGY

You will generally find one of two main groups of fibers utilized within medical textiles: commodity fibers and specialty fibers.

Commodity fibers are fairly standard and are often made out of materials such as cotton, polyester, or nylon. Specialty fibers, on the other hand, are more unique. Also known as high-performance fibers.

IMPORTANT CHARACTERISTICS OFF MEDICAL MATERIALS

Mechanical properties: These properties include durability, strength and elasticity of the fibers used in the materials.

Non-toxicity: This is the most important property considered during the production of medical textiles. It is ensured that the material used should not cause rise in the body temperature, allergic reaction, any kind of inflammation and should be non- toxic in nature.

Ability to be sterilized: This property deals with the clean ability of the material as it may be contaminated with bacteria.

Biocompatibility and optical properties: The materials used should be bio-inert and bioactive. Also, it should possess optical properties for contact lens purpose specifically.

Diffusion properties: It is an essential property for controlled drug delivery systems and membranes like in the artificial kidneys.

Fibers used in medical textiles: In medical textiles, different types of fibers are used as per there area of applications, like specialty fibers, commodity fibers, biodegradable fibers and non-biodegradable fibers.

Specialty fibers: This type of fibers include Chitosan, Chitin, Collagen and calcium Alginate fibers.

Commodity fibers: Commodity fibers are further classified into two categories, natural fibers and synthetic fibers. Natural fibers include silk, cotton, viscose which is used as non- implantable materials and for hygiene products. Whereas, the synthetic fibers include polyamide, polypropylene. PTFE and carbon.

Biodegradable fibers: These fibers can be absorbed by the body within 2-3 months after implanting them. Includes polyamide, collagen and alginate.

Non- Biodegradable: Include polyester, PTFE carbon as the name suggests the fibers do not degrade and are used for external use only.

CLASSIFICATION OF MADICAL TEXTILES

Medical textiles are classified under four main categories, namely:

Hygiene products: Used for bedding cloth, surgical gowns, wipes, cloths etc.

Implantable materials: This includes sutures, artificial joints, artificial ligaments and vascular grafts.

Non-implantable materials: Wound dressing, plasters, bandages etc.

Extracorporeal devices: Artificial lungs, liver and kidney.

<u>MEDICAL TEXTILE MATERIALS</u>

1.non-woven

2.Polyester

3.Rayon

4.Polyethylele

5.Glass

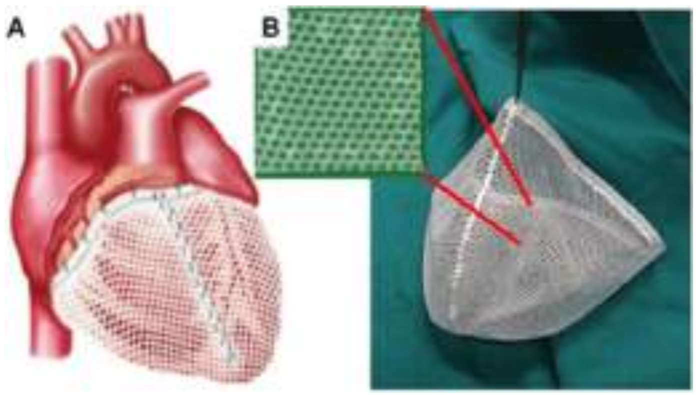
6.Carbon

7.Silicone.

<u>NON -WOVEN</u>

<u>KNITTED</u>

<u>ARTIFICIAL KIDNEY</u>



Tiny instrument, about the size of a two – cell flashlight.

Made with hollow hair sized cellulose fibers or hollow polyester fiber slightly latest than capillary vessels.

Fabric which is used to remove waste products from patient's blood.

ARTIFICIAL LIVER

Made with hollow viscose to separate and dispose patient's plasma and supply fresh plasma.

ARTIFICIAL HEART

An 8 – ounce plastic pump lined with deco velour to reduce damage to blood and is a chambered apparatus about the size of a human heart.

Silastic backing makes the fabric imperious to emerging gas that is not desirable in the blood.

CONCLUSION

Medical applications rely upon proper antimicrobial execution, necessities for application and anticipated advantages of utilitarian clinical materials. A few significant antimicrobial operators and clinical material improvements are being investigated, including quaternary ammonium salts, silver, and different metals. In the assembling of bio-absorbable filaments for a wide scope of clinical applications, including wound dressings, stitches, nonwoven felts and networks, regular polymers play an indispensable role. They are made of polymer chains cross-connected and are corrupted by the hydrolysis of bonds. Some of the manufacturers are investigating better assembling methods, while others are instructing purchasers on the best way to think about articles of clothing with the goal that they contaminate less. Retailers could assume a significant function in enhancing that message. The 100% recycling process of medical textile will be a novel dimensional effort for the upcoming future of the world's economy as well as environment.

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TEXTILE FINISHING TECHNIQUES

VALERIAN FLOWER EXTRA MADE OUT OF BED MATTRESS

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ABSTRACT

Research suggests valerian root may help improve sleep quality, reduce anxiety, improve symptoms of OCD, and reduce hyperactive behavior in children. It may also offer a few other benefits. Valeriana officinalis, commonly known as valerian, is an herb native to Asia and Europe that now grows wild in many other areas of the world, including the United States and Canada .People have used this perennial plant as a natural medicine since as far back as the time of ancient Greece and Rome .Unlike the plant's delicately scented flowers, valerian roots have a very strong odor that many people find unpleasant

KEYWORDS: Valerian Follower Extract, anti-inflammatory, anti-cancer, flavonoids,

INTRODUCTION

This sleeping bed gives relaxation, comfort, anti-inflammatory, anti-cancer, redness, swelling , and pain in body to made. It is mostly concentrated on hospitals , and adults, it not caused infection on body. It is made on natural resources to manufacture .This type of bed is very useful for every one daily life for taking rest on bed , the valerian Research suggests valerian root may help improve sleep quality, reduce anxiety, improve symptoms of OCD, and reduce hyperactive behavior in children. It may also offer a few other benefits.

METHODS AND METHODOLOGY

A process for preparing a pharmaceutically-active extract of the root of Valeriana officinalis L. Comprising the steps of: Adding the roots to an alcoholic extraction solvent to form a mixture, wherein the alcoholic extraction solvent comprises between approximately 50% (v/v) to approximately 100% (v/v) ethanol in a remainder of water, and Heating the mixture to a temperature of between approximately 70° C. To approximately 80° C. For a period of at least two hours. Wherein valerianic acid is present in the extract, the content of valepotriates and aldehyde containing valepotriate decomposition products in the extract is substantially reduced with respect to the content of valepotriates in the root, and the content of valerianic acids in the extract is not substantially reduced with respect to the content of valerianic acids in the root; and Wherein the pH of the mixture is maintained above approximately 5.0. Process for preparing a pharmaceutically-active extract of the root of a plant of the family Valerianic, specifically, Valeriana officinalis L., is described. This process comprises the steps of adding the roots to an alcoholic extraction solvent to form a mixture, wherein the alcoholic extraction solvent comprises between approximately 50% to approximately 100% (v/v) in a remainder of water, and heating the mixture to a temperature of between approximately 70° C. To approximately 80° C. For a period of at least approximately two hours. By this process valerianic acid is obtained in the extract, and the extract has a content of valepotriates and valepotriate degradation products or derivatives that is substantially reduced with respect to the content of valepotriates in the roots, and has a content of valerianic acids that is not substantially reduced with respect to the content of valerianic acids in the roots. Also preferably, the content of volatile oils in the extract is also not substantially with respect to the content of volatile oils in the roots. A pharmaceutically-active extract of the root of a plant of the family Valerianic is also described. This extract is obtained by a process comprising the steps of adding the roots to an alcoholic extraction solvent to form a mixture, wherein the alcoholic extraction solvent comprises between approximately 50% (v/v) to approximately 100% (v/v) in a remainder of water, and heating the mixture to a temperature of between approximately 70° C. To approximately 80° C. For a period of at least approximately two hours. This extract may be used in the formulation of an ingestible form, preferably exhibiting sedative and/or muscle relaxant, and/or anxiolytic activity.

<u>REDUCTION OF PREMENSTRUAL SYMPTOMS</u>

Experiencing symptoms of premenstrual syndrome (PMS) is common in 90% of people who menstruate. Some people have PMS severe enough that it affects their ability to live a normal life around the time of their period. Reduction of Hot Flashes in Menopausal Women: One study showed that taking valerian root helped reduce both the severity and frequency of hot flashes in people going through menopause. Hot flashes cause sweating, rapid heartbeat, and sudden warmth that some find uncomfortable. Hormonal changes cause hot flashes.

Up to 80% of people experiencing menopause will have hot flashes, as will 90% to 100% of people who have had their ovaries removed. They may disturb your sleep if they happen at night and can cause other disruptions to your life.

CONCLUTION

Researchers do not yet know exactly how valerian root functions to help people sleep better. They believe it is a combination of different factors. One is that valerian increases the amount of gamma-aminobutyric acid (GABA) in the brain. As a neurotransmitter, GABA inhibits unwanted nervous system activity. Studies have shown that increased levels of GABA in the brain lead to falling asleep faster and experiencing better sleep. Anxiety and Stress Management.

METHOD FOR PREPARING PAPER THROUGH WASTE TEXTILE FIBERS

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ABSTRACT

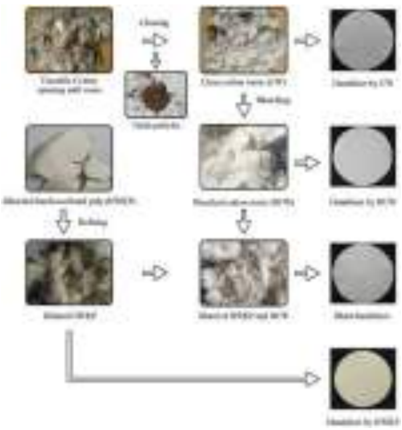
Over hundreds of years, other plant fibers ware used to make paper pulp, but cotton has with stood the test of time. Infact a case could be made that cotton is the unifying thread that runs through the long history and paper making across culture and centuries. Cotton waste results from the mechanical processing of raw cotton in yarn mills. Recycle paper mill constitute 30% of total pulp and paper mill segment in India. With 85% average efficiency of recycle paper mill 15% waste is produced annually. It has been attempted to exploit unusable cotton spinning mills waste (filter waste derived from human idification plant) to convert into paper. Hand sheet of 70g/m2 and 80g/m2 were successfully produced hardwood kraft pulp (HWKP). HWKP is typically used to produce commercial grade papers. That will have a wide range of potential appearance from newsprint, tissue paper to commercial – grade writing and printing papers.

KEYWORS: Cotton waste, recycle paper, paper pulp.

INTRODUTION

Cotton fiber are one of the most durable fibers for making paper and are made from LINTERS and RAGS. Cotton LINTERS are the young cotton fibers closet to the seed. It can be made into any type of paper from thick, absorbent sheets to think, rattley ones; it’s the primary fiber used for machine made cotton content paper. Cotton linters are relatively short with thick walls, when compared to cotton rag or linen. Cotton RAGS is 100% staple cotton that is called rag. Because it’s made from new garment cutting staple cotton is a much longer fiber then linters and make a stronger. Hard sheet of paper that shrinks for water color and book papers. Crating paper from cotton starts with scraps, specially textile waste from large clothing manufactures. Fashion trends often delicate what kinds of scraps may be common, chency says that finding bliss of denim and T shirt isn’t difficult. Then using a combination of head, water and time those scraps are transformed into pulp which becomes paper.

METHODOLOGY



A feedstock treating

Described feedstock treating, refer to and waste textile fiber is sorted according to fiber composition, and the non-fiber class hard foreign material removed in waste textile fiber, the waste textile fiber sorted out is adopted opener shredding removal of impurities, and shredding becomes the fiber of dispersion, after then the fiber of dispersion being carried out cleaning, adopt disc mill, grinding into fiber length is 0.6mm-6mm,and diameter is the fiber of 20µm-100µm, and mill revolution is that 4000-15000 turns.

B fiber modification

By the fiber obtained through step a, be diluted to the fiber solution of 5wt%-8wt% concentration, adopt the NAOH solution of 1.2%-3.6 concentration to fiber solution constant temperature modification 1-3 hour under 65-96 DEG c condition, then be natural to fiber solution modification, then PVA solution added of through NAOH solution process and be uniformly mixed in neutral fiber solution after washing, be prepared into fiber solution dispersion wherein PVA solution concentration is 0.5wt%-3wt%.

C river bank stability

Described river bank stability, refer to that adopting beater to carry out uniform stirring the fiber solution dispersion obtained through step b and paper pulp fiber becomes mixed serum, mixed serum concentration is 0.6wt%-4.0wt%, and where in the fiber solution dispersion accounts for the oven dry stock mass percent of fiber in mixed serum is 20wt%-100wt%.

D paper sheet formation

To the mixed serum obtained through step c wet paper is shaped as through online filtering means dehydration, online slurry is dense is 0.02%-3,0 in net, negative pressure is 40-100pa, speed is 300-100 m/mm, and where in at shaping dewatering period, wet web dryness reaches 1.8%-5.5%, at high pressure difference dewatering period, web dryness reaches 12%-40%.

E hot-pressing processing

Described hot-pressing refers to the wet paper after paper sheet formation, is 100-280 DEG C through temperature, and pressure is 0.2-1.2KN/cm process.

MULTI- INDUSTRY USE

Cotton waste (mainly comber) is used in the paper industry for making bond or currency paper and handmade art papers. Cotton waste used in currency mills to produce currency notes to check count feiting them, reduces the government expenses of importing special papers. Usage of cotton waste in currency makes to last long.

CONCLUSION

Cotton fibers are mainly grown and produced in developing countries. Generally, these countries do not have outstanding wood resources for paper industry and they are importing pulp and papers for local consumption, so, high quality crops residues, such as cotton linters, are valuable products for local paper industry. Today, only a part of available linters is consumed by industry. This material allows producing special grades papers and quality writing and printing papers.

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WASTE WATER TREATMENT BY COAGULATION USING MORINGA OLEIFERA

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ABSTRACT

The increasing demand for potable drinking water has necessitated a need for an eco- friendly method of treatment. The moringa oleifer is therefore, an important commodity plant which has been traditionally used for the treatment of water in the tropical areas. Moringa oleifer seed powder and leaves to evaluate the quality parameters such as pH turbidity, conductivity, total dissolved solid (TDS), chemical oxygen demand (COD), biochemical oxygen demand (, ammonia nitrogen (NH3-N), nitrogen (NO3-N). The result obtained showed that conductivity TDS and COD increase as the moringa oleifer leaves and seeds powder dosage increased.

Keyword: Moringa oleifer leaves and seeds other chemicals.

INTRODUCTION

In recent times, the consumption of water for domestic and industrial use has been on an increasing trend with a rise in demand. In many parts of the world river water, which can be highly turbid, is used for drinking purposes and industrial use. This turbidity in this water is conventionally removed by treading the water with expensive chemical, many of which are imported at great expend. There is therefore, ab needs for a plant– based alternative in treating this water at a lower cost using an environmentally friendly approach. Moringa oleifer is an example of these plant – based material usually grown in developing countries with a reported use in cleaning turbid river water. The use of moringa seed and leaves as a natural Coaglent there for has no effect on measured parameters and was found to be most efficient at high turbid water.

MATERIAL AND METHEDOLOG

Using natural coagulant

Moringa oleifer seeds

Moringa oleifer leaves

Chemicals added.

METHEDOLOGY

Collect seeds, leaves from the nearby area. Remove the hulls and wings from the kernels place the crushed seeds in the oven dry using a pen at a temperature of 104 c° for 7 h.

An experimental investigation of wastewater using moringa oleifer seeds and leaves was conducted using test jar apparatus, where powder of moringa oleifer was added to the prepared beaker by adjusting the quantity of dosage, pH stirring time , and rotating speed of the test jar as shown in the removal percentage of color, COD, and turbidity were determined based on the opportunity parameters.

The color removal percentage of waste water was determined using a UV/ Vis spectrophotometer at a wavelength of 450 nm maximum absorbance , and turbidity was determined by pH meter. On the other hand, COD was determined using a closed reflux method.

COAGULANT PREPARATION PROCEDURE

Moringa seeds are unfortunately not used by population in Ethiopia , given their natural coagulant properties , which could be used very easily for sanitation and health at the household level.
The average weight per seed is 0.3 g and leaves add to purify on polluted liter, one seed is needed.

SUMMARY AND CONCLUTION

The moringa is a multipurpose tree with a significant economic and societal value that is grown in almost every developing country. The major one in the country . It's viewed as a sustainable, effective, and appropriate water treatment technology.

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EFFECT OF SOLAR DRYING ON THE QUALITY AND ACCEPTABILITY OF JACKFRUIT LEATHER

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ABSTRACT

This study investigated the applicability of solar drying, a popular method in the tropics, in Processing of jackfruit leather. The effect of solar drying on the quality and consumer acceptability of jackfruit leather was compared to cabinet and convection oven drying methods commonly used in the preparation of good quality fruit leathers. Results show that the moisture content of solar dried Leather (18.50 %) was not significantly different ($p>0.05$) from that of cabinet dried leather (18.85 %). However, the moisture content of the leather dried using these methods was significantly higher Than the oven dried leather (14.79 %). Solar dried leather had significantly lower color readings Compared to cabinet dried leather. The color loss in oven dried leather was not significantly different from solar dried leather ($p> 0.05$). Instrumental results of texture showed that all the leathers were Not significantly different ($p> 0.05$). Solar dried leather was disliked and received significantly Lower scores ($p< 0.05$) on all sensory attributes evaluated. Although solar drying can be used to Produce jackfruit leather in a relatively short time, other studies maybe needed to improve its Sensorial quality.

INTRODUCTION

The Jackfruit (Artocarpus heterophyllus lam), which is believed to have originated from India is Largely cultivated throughout many countries in the Middle East such as India, Burma, Ceylon, Malaya and Southern China [1 – 3]. This fruit also grows in African countries such as Uganda and Kenya; as well in Brazil, Jamaica and the Bahamas . The interior of the fruit contains large Fleshy banana flavored sweet bulbs which may be crispy or soft and yellow to brownish when ripe . Jackfruit pulp is rich in vitamins A, B and C and minerals such as calcium and iron [2 – 4]. . The

pulp is a source of energy and is also reported to have laxative effects as a result of its dietary

Fiber content .The Pulp of ripe jackfruit can be eaten fresh, made into various local delicacies including Chutney, jam, jelly or can be preserved as candies and fruit leather among others . In

Uganda, However, jackfruit is mainly eaten in its fresh form. In this form, the fruit is not very easy to eat due to difficulties in separating edible bulbs from the rind .The fruit also exudes copious amounts of Sticky white latex which is not only sticky on the hands but also permanently stains clothing . The Fruit's bulky nature also makes it difficult to transport and store. Although it is available almost all Year round, there are peak seasons during which the fruit mainly rots away in gardens or in the Market due to its perishability nature. With post-harvest losses of fruits and vegetables in Uganda as High as 30-40%, this invariably results in loss of potential income and nourishment. There is Therefore a need to diversify utilization and reduce loss of jackfruit through processing into a variety of convenient and shelf stable acceptable products like leathers.

MATERIALS AND METHODS

Raw materials

Fresh ripe whole jackfruits (Artocarpus heterophyllus lam) were purchased from Nakasero market in Kampala. The variety with thin, fibrous, and mushy edible pulp was used. This type was slather Because it is more readily available in Uganda.

Sample preparation

The fruits were cut in half longitudinally and the sticky central cores carved out using a sharp knife. Bulbs were scooped out by hand and the ends of the bulbs were cut to remove the seeds. The bulbs Were chilled prior to further processing so as to retard enzymatic softening as well as microbial Growth. The pulp was blended using a kitchen blender (Braun, type; 3 205K600, Germany) and the Mixture put in a pan where it was concentrated for 15 minutes in a water bath at 70˚C. The Concentration step evaporates off some water, which reduces the drying time . The Concentrates were allowed to cool to room temperature by natural convection prior to further

Processing. The concentrates were then formed into sheets using fabricated stainless steel metallic Trays (20 cm long x 20 cm wide x 3 mm thick) lined with wax paper.

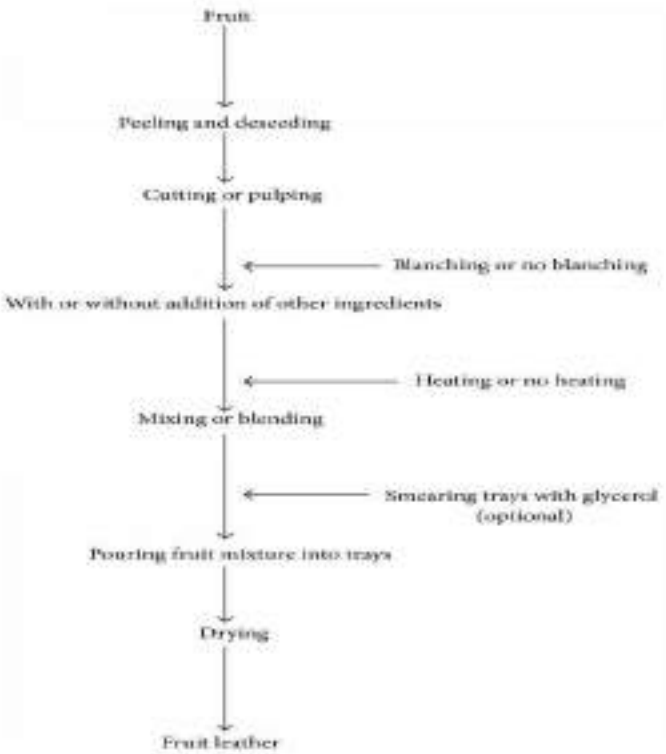
Drying the sheets

The sheets were dried in a solar dryer, convection oven dryer and electric cabinet dryer. Solar drying Was carried out in a greenhouse solar dryer for three days (average temperature of 36.7°C). Convection oven drying (Gallenkamp oven, size 2, SG93/08/850, United Kingdom) was done at 50°C for 18 hours. Drying in the cabinet dryer (ABM Carbolite, type; 4EKF63A-2, Greiffenberger, Germany) was done at 65˚C for 6 hours with an air velocity; 1.7 m/s per square Meter tray area . After drying the sheets were rolled and packed in water proof food grade Polythene bags at room temperature prior to subsequent analyses. The sheets were dried in Quadruplicates for each method and two experimental runs were performed.

Physico-chemical analyses

Moisture content of the fresh pulp, concentrated pulp, and dried leather was determined according to AOAC methods . Color was determined for the fresh samples, concentrated samples and the Dry jackfruit leather using a Lovibond Tintometer (Lovibond tintometer, L322/92E, Salisbury, England). Leather texture was measured with a penetrometer (Matest Treviolo Penetrometer, B057-10/ZG/0001, Italy). In this method, jackfruit leather samples of uniform thickness were held against A stationary, hard surface and the pointed fixed tip of the penetrometer was forced into the leather Samples at a constant force of 1.962 N. The extent of penetration into the leathers were taken in Terms of degrees (˚) and then converted to mm (1˚= 0.01mm). Higher values indicate increase in Softness of the leather. Determinations were carried out in quadruplicates.

Sensory evaluation Sensory evaluation, using a 9-point hedonic scale (1=dislike extremely, 5= neither like nor dislike, 9=like extremely), was carried out by 60 untrained panelists selected among students of the Department of Food Science and Technology, Maker University following standard procedures 23]. Panelists were presented with three samples (each for the three different treatments) and Commercial bottled water for cleansing the palate. Evaluations were carried out in well-lit booths. The panelists were also requested to complete a questionnaire that required demographic Information as well as their attitudes towards jackfruit consumption.



RESULT

Effects of solar drying on the physicochemical properties of jackfruit leather shows the physicochemical properties of the jackfruit leather dried using a solar dryer, a Convection oven dryer and a cabinet dryer. Results showed that solar drying significantly reduced the moisture content and color readings of the jackfruit leather compared to oven drying and Cabinet drying respectively. There were no significant differences in the texture of the leathers

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ARTIFICIAL INTELLIGENCE IN TEXTILE INDUSTRY

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ABSTRACT

The analysis of the state-of-the-art AI applications in the textile industry is presented in this research. There was an examination of the body of prior research. Three approaches to studying yarn for textiles are presented in this article. This paper presents some methods for inspecting textile fabrics as well as how artificial intelligence may be utilized to enhance the efficiency of systems that use artificial vision and neural networks for production. The preliminary findings show that the approaches presented are helpful for obtaining flaws in textile textiles at the industrial level. The numerous techniques for inspecting and analyzing yarn for use in textiles each have advantages and disadvantages with regard to their suitability.

Keywords: (AI) artificial intelligence, textile industry, industry 4.0, machine learning

INTRODUCTION

Artificial intelligence is when machines, particularly computer systems, simulate human intelligence processes. Expert systems, NLP, speech recognition, and machine vision are a few examples of specific AI applications. One of the oldest and most significant sectors of the global economy is textile manufacturing. Additionally, it is a sector of the economy that is always developing and evolving. Artificial intelligence (AI) has just been introduced, which has had a significant impact on the textile sector. In the future, artificial intelligence (AI) will play a bigger role in the textile business than it does today. In the textile business, artificial intelligence is applied in a wide variety of ways, including: Designing new textile items automatically is possible with the aid of artificial intelligence (AI). To achieve this, either brand-new designs from scratch or modified versions of current designs might be used. Automation of the manufacturing process can be aided by artificial intelligence (AI).

MATERIAL AND METHEDOLOGY

One of the most frequently discussed technologies in today's world (including the apparel and textile industries) is artificial intelligence (AI). It is actively being used to digitally revolutionize a number of industries, including finance, healthcare, and automobiles. Many experts believe that AI can assist address many of the long-standing issues that the textile sector is currently facing, despite the fact that its implementation may be contentious for some creative industries.

Optimize Textile Production: To increase precision and accuracy, textile mills can deploy AI-powered robots to automate laborious processes like material handling and cutting. This will increase production and reduce errors. To optimize production schedules, they can utilize AI to examine a lot of data from the textile manufacturing process.

Dyeing and Color Matching: Using AI, textile manufacturers can more precisely and accurately match colors and create dye formulas. Artificial intelligence (AI)-powered systems can forecast color fading, allowing companies to modify the dye mix and cut waste and expenses. AI can also streamline the dyeing procedure, using less water and electricity in the process.

Control Quality & Detect Defects: In textile factories, AI-enabled sensors, cameras, and ML algorithms can increase the precision and effectiveness of quality control procedures. They can more accurately and quickly than human quality specialists spot flaws including holes, stains, and uneven stitching.

Reduce Supply Chain Risks: Textile producers can forecast demand, enhance production schedules, and control inventory levels in real-time using AI-based data. Systems driven by AI can recognize and reduce supply chain risks by addressing possible problems before they arise.

Design textiles: Generative AI can help textile designers generate new patterns, textures, and designs more quickly and effectively. AI-enabled tools can also be used to study consumer preferences, which enables designers to produce products that are more likely to be liked by customers. AI in textile mills can spot locations where energy is being squandered and take action to cut back on overconsumption. This can assist textile businesses in lowering their energy costs, reducing their environmental effect, and complying with existing and prospective energy laws.

Virtual Factory Twins: Generative AI will significantly increase the creative potential of current AR/VR technology. Textile companies will be able to visualize realistic, immersive virtual factory twins and showrooms. They can model the entire production process to increase transparency, identify problems, and test out new concepts.

Manage Inventory: To reduce the likelihood of stockouts and overstocking, textile companies can use AI to evaluate sales data and forecast future demand. AI can be used by textile businesses to identify slow-moving goods, allowing them to modify their distribution and inventory strategies.

AI GENERATED FASHION DESIGNS

Numerous applications of AI are being made in the textile sector. The creation of novel fabrics is one of the most significant applications. AI allows engineers and designers to produce fabrics with distinct characteristics and textures. AI is also being utilized to improve manufacturing procedures. Engineers can find ways to increase efficiency and lower waste by utilizing AI to evaluate data from manufacturing plants. Better textile designs are also being made with AI. AI allows designers to produce patterns and designs that are more complex and detailed than ever. AI can also be utilized to develop designs that are more sensitive to the environment of the wearer or that alter depending on the wearer's body. temperature. Although AI is still in its infancy in the textile sector, it is already obvious that technology has the power to fundamentally alter how textiles are created and developed.

SUMMARY AND CONCLUTION

Artificial intelligence (AI) is being utilized in the textile sector to generate patterns, choose colors and designs, and even 3D print cloth. AI is also being utilized to develop stronger, longer-lasting, and more distinctive textile fibers and fabrics. Future textile goods will continue to be developed with the help of AI. The textile sector is already finding artificial intelligence to be of great help, and this will only continue in the future. Businesses may increase operational efficiency and accuracy with AI-powered equipment, which boosts profitability. Additionally, AI can assist companies in staying current with the most recent trends and advances in the textile industry. ensuring that they stay at the forefront of this quickly evolving business.

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USING SUSTAINABLE PRODUCTS TO MAKE NATURAL DYE

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ABSTRACT

We are nowadays talking more and more about natural dyes . Nature offers us multiple possibilities of colors to dye fabrics . In Natural dyeing each other carries subtle and harmonious shades . Indeed, of natural dyes are not harmful to the environment . Since , they come 100 % from natural and renewable sources . They are obtained from fruits , plants, minerals and insects .

KEYWORDS: dyeing , extractions of natural dyes , color fastness .

INTRODUCTION

Then the textile to be dyed are added to the pot , and held at heat until the desired color is achieved. In combination with metal salt mordants including tannin from oak galls and a range of other plants such as plant-derived oxalic acid , and ammonia from stale urine.

In combination with metal salt mordants—including tannin from oak galls and a range of other plants/plant parts, pseudo-tannins, such as plant-derived oxalic acid , and ammonia from stale urin. The discovery of man-made synthetic dyes in the mid-19th century triggered a long decline in the large-scale market for natural dyes. There are some technical issues and disadvantages related to the application of natural dyes which reduced its applications that are Mostly applicable to natural fibers (cotton , linen , wool and silk). Poor color fastness properties, Poor reproducibility of shades, no standard color recipes and methods available. Use of metallic mordants, some of which are not ecofriendly.

Cellulose fibers: cotton, linen, hemp, ramie, bamboo, rayon.

Protein fibers: wool, angora, mohair, cashmere, silk, soy, leather, suede.

The types of natural dyes currently popular with craft dyers and the global fashion industry include:

Colors in the range of reds, browns, and oranges are the first basic colors in a number of ancient textile industries ranging from the Neolithic to the Bronze Agethe Levant, Egypt, Mesopotamia and Europe, followed by evidence of blues and then yellows, with green appearing later. Turkish carpets are recognized for their beauty made with natural dyes.

MATERIALS AND METHODOLOGY

MATERIAL

Cutting board ,Vegetables or plants (we used beets, spinach, turmeric and red cabbage) etc. .,Knife, Water, Large bowl or measuring cup, Salt, Condiment bottles, White t-shirt or other dyeable material, Rubber bands, Baking sheet with rack.

METHEDOLOGY

To make the dye wearing gloves, chop up raw ingredients and place in a blender using a ratio of two cups of very hot (almost boiling) water to every two cups of raw material. Blend mixture until it becomes a very fine slurry. Dissolve 1 tablespoon of table salt in the liquid. Use rubber bands to create a pattern on your shirt (or other cotton item such as socks, bag, onesie, etc.) Pinch, pleat or fold fabric to make design. Mix 1 cup of salt with 16 cups of water and bring to a boil (or ½ cup of salt with 8 cups of water). When done simmering, run under cool water. Wring out a bit of the excess water .

CONCLUSION

Natural dyes do not create any side effects. Dyes are taken into the vegetables, plants, animals. Dyes are used to print in the textile industry and also used in home furnishing such as Turmeric. Turmeric is an anti-bacterial agency. So, it doesn't create any cause.

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CAD MODELLING OF INDIAN JEWELLERY

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ABSTRACT

The present work aims to develop a knowledge-based parametric CAD modelling system to create Indian traditional filigree jewelry designs. Today, developments in CAD technologies are towards reducing the time and efforts of designers required in modelling. Indian traditional Filigree jewelers is delicate metal craftwork representing twisting or curling of pliable wire and shows the beauty of local craftsmen's traditional workmanship involved in making this type of decorative embellishments that result in a very precise and delicate model. Traditional craftworks involve much skill, effort, and time, so upcoming generations are not interested in their respective traditional works. The traditional knowledge base of Filigree jewelry is incorporated in the CAD system's programming environment by defining some shape grammar rules and logical rules to control jewelry attributes. Parametric modelling has great potential to develop customized CAD tools for automation in generating 3D models of handicraft products in a virtual environment. By using knowledge base rules, geometrical models can be designed beyond a conventional design. This knowledge-based jewelry modeler is developed using the Microsoft Visual Basic Programming environment in SolidWorks API.

KEYWORDS: Indian traditional jewelry, CAD modelling.

INTRODUCTION

Traditionally, the Indian jewelry designing process involves two specialized tasks: drawing-by-hand and manufacture-by-casting. These tasks are regarded as ancient traditions passed on through generations. These tasks involve much skill, effort, and time, so upcoming generations of jewelry makers are not interested in their respective traditional works. They feel a lot of anxiety due to the growing expectations in terms of novelty in designs and high-quality jewelry. Their lack of indigenous knowledge in this craft sector has let down the interest in producing traditional jewelry. As a result, the traditional jewelry business is at the edge of fall down.

The present work aims to develop a CAD tool to produce Indian traditional filigree jewelry designs using knowledge-based parametric CAD modelling. A knowledge-based approach encourages the virtual jewelry designing to provide parametric and dynamic modelling through which geometric manipulations can be carried out to alter designs in a CAD system. This will help to cut down the jewelry designing time and as well as production cost. Furthermore, this system provides a way to automate craftsmanship and extend CAD system features to use it beyond limits. Such CAD customization supports the creative jewelry design process and allows the designer to create novel 2D and 3D virtual designs; to prolong this Indian jewelry sector.

MATERIAL AND METHEDOLOGIES

The geometry of motifs is in the form of a planar map created by simple curves and lines and can be defined parametrically by a set of point coordinates. Motif geometries used in Filigree jewelry designing are programmed in the CAD system by parametric mathematical definitions to implement the concept of parametric modelling which enables user to alter the motif shapes with the change in mathematical parameters. This sort of coordinate geometry information is fundamental to the motif's primary position in Filigree jewelry design work. Parametric mathematical definitions of spiral shaped motif, heart shaped motif, pear shaped and teardrop shaped motif which are most commonly used geometries in Filigree jewelry designs (as shown in Figure 1) are represented in table 1. Parameters that affect the geometry of Archimedean spiral are r, n, t, and θ. The r is the radius of the circumscribed circle to which n turns of spiral are placed at a fixed space between turns. The value θ varies from 0 to 2π for a complete turn. The modelling of these shapes using parametric definitions is carried out by defining functions in Solid works API in the VBA programming environment. Many functions and procedures are called in the programming environment to generate the sketch of the shape required in a parametric way. Traditionally in Filigree jewelry, motifs are generated in the following sequence: Firstly, twisted wire strand is created by twisting two or three plain wires together using the rotating wheel machine called “Charkha.” Further, twisted wire strand is crimped into a motif shape, filled in a frame usually made of single wire and with a theme like leaves, rosettes, flowers, animals, especially butterflies and birds and then soldered expertly. Parametric way.

The CAD API programming algorithm includes the series of modelling steps employed to generate the desired motif's shape by accessing the modelling parameters information through a user interface. Using SolidWorks application programming interface, a user follows the steps listed below for the modelling of motifs as:

1. Start the SolidWorks Part modelling.
2. Run Filigree Jeweler user interface.
3. Select the motif shape from the Jeweler shape database.
4. Input the parameters as required for the jewelry motif.

5. The modelling procedure starts automatically according to input parameters and modelling steps programmed to create the motif designs. The complete modelling procedure and information flow in the paradigm.

CONCLUSION

The integration of handicraft and CAD applies inherited knowledge from ancestors to modern art and crafts to generate new ideas with community culture as the knowledge base and designs show the community's identity. This CAD paradigm provides the capability of creating a wide range of filigree jewelry using the knowledge-based parametric modelling concept. The mathematical approach enables the designers to explore possibilities of novelty in designs by using parametric curves. A knowledge-based system applies design knowledge, design rules, governing rules, and experiential knowledge for product development. Generating geometric shapes by using parametric mathematical equations enables the designers to explore possibilities of creating a wide range of shapes. This jewelry generation method will provide a vast library of interesting shapes that can enhance this jewelry design class. Using this tool, it is also possible to make many more motifs and contemporary design styles with a lot of variation. This parametric jewelry modelling concept is implemented to eliminate the formal jewelry modelling approach by providing the maker's hand with the jewelry .

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FIBER'S PRODUCTION AND MANAGEMENT IN THE TEXTILE INDUSTRY

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ABSTRACT

Fiber production and management in textile industry is an interactive model-based system for the production of various fibers in the Indian textile industry. The production of textile industry is characteristic by the economic activity of the fibers, yarns, fabrics, clothing and textile goods for home furnishing, as well as technical and industrial purpose. The important contributor to economic growth and employment generation includes the organisation and management of textile and fashion related supply and demand chains. The textile industry in a growing market in globally with the competitors being China, the European Union, the US and India. The textile management is the conversion of raw materials into consummate products, raw material and control. The adaptation to evolving consumer preferences, sustainability imperatives and technological advancements are crucial for success in this dynamic sectors.

INTRODUCTION

World textile production management involves the coordination and oversight of processes related to the manufacturing of textile on a global scale. The industry encompasses the entire lifecycle of textile products, from raw material sourcing to manufacturing, quality control, distribution and beyond. Effective textile production management requires a deep understanding of supply chain dynamics, production technologies, sustainability considerations and market trends. It plays a pivotal role in ensuring the efficient, cost effective and sustainable production of textiles that meets consumer demands while adhering to environmental and ethical standards. Fiber production is a complex and critical stage in the textile industry, influencing the quality performance and sustainability of textile products. Advancement in the fiber production technologies and materials continue to shape the industry, enabling the creation of innovative and eco-friendly textiles.

METHEDOLOGY

Fiber production in the global market encompasses a wide range of materials used in various industries, including textiles, construction, automotive, aerospace and more. As of my last knowledge update in September 2021, I can provide an overview of some key fibers and trends in the global fiber production market. In the global textile industry, fiber production and management methodologies encompass a wide range of practices to ensure competitiveness, efficiency and sustainability. Here the methodologies specific to the global market:

Cotton

Cotton is one of the most widely used natural fibers in the textile industry. It has been a dominant fiber for centuries and its production is spread across several countries, with major players including China, India, US, and Pakistan.

Synthetic

Synthetic fibers like polyester, nylon and acrylic have gained significant market share due to their versatility and effective, polyester in particular has been substantial growth in applications such as clothing, home furnishings and packaging materials.

Natural fibers

Besides cotton, other natural fibers like wool, silk and hemp have found niche markets. Wool for example is used in high end textiles, while hemp has been a resurgence in popularity due to its eco-friendly properties.

Technical Fibers

Fibers used in specialized industries, such as aramid fibers and carbon fibers have seen increased demand in application like aerospace, defense and automotive manufacturing.

Sustainability

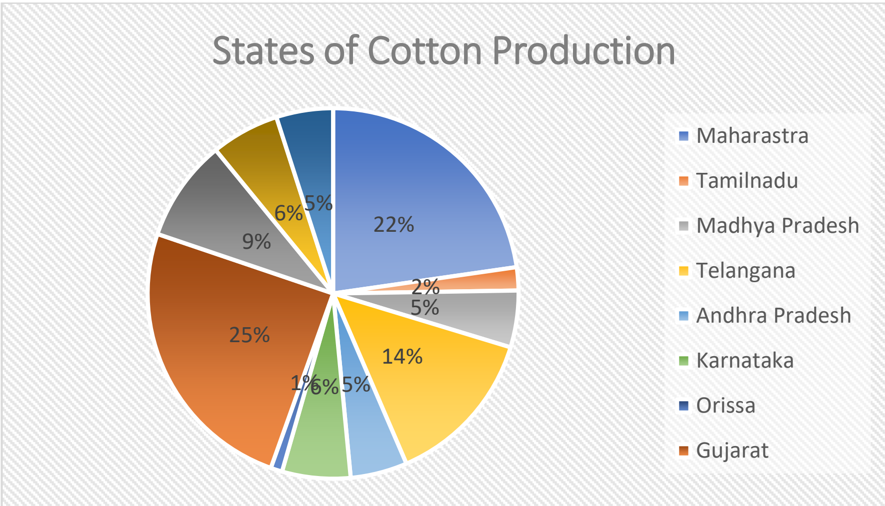
Sustainability has become a significant trend in the fiber industry. Consumers are increasingly concerned about the environmental impact of textiles, leading to the development of ecofriendly fibers and recycling initiatives.

Smart Textiles

The integration of technology into textiles has opened up new opportunities. Smart textiles, including fabric embedded sensors or conductive materials, are used in applications like wearable technology and medical devices.

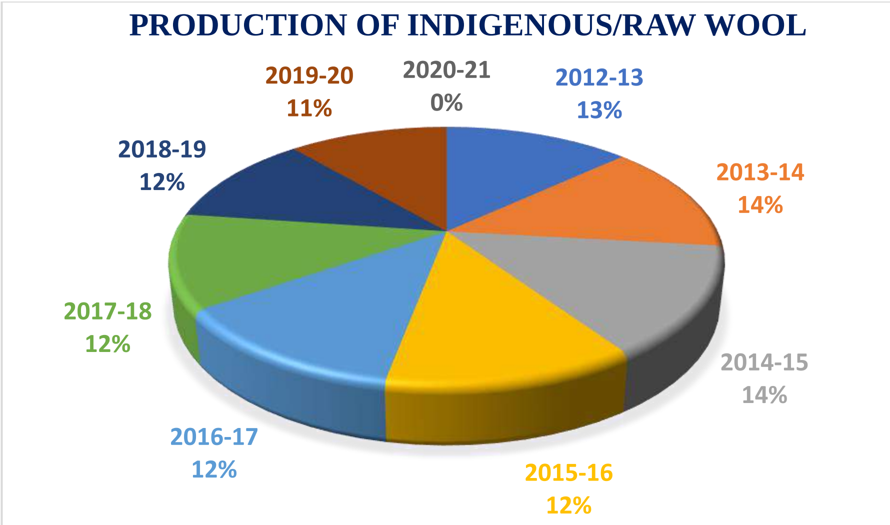
Cotton Production

Cotton is a major cash crop and its production is significant for the textile industry worldwide. India is the country to grow all four species of cultivated cotton Asian cotton, Egyptian cotton and American Upland cotton, represents94%ofthehybridcottonproductioninIndia.The top cotton producing countries historically include China, India, US, Pakistan and Brazil. In the initial time frame, the cotton industry in India was concentrated in Rajasthan, Maharashtra, and Gujarat, where cotton is grown extensively. The availability of raw materials, market, transportation, labor, and humid climate, among other important factors have aided tremendously. The states of cotton production are,



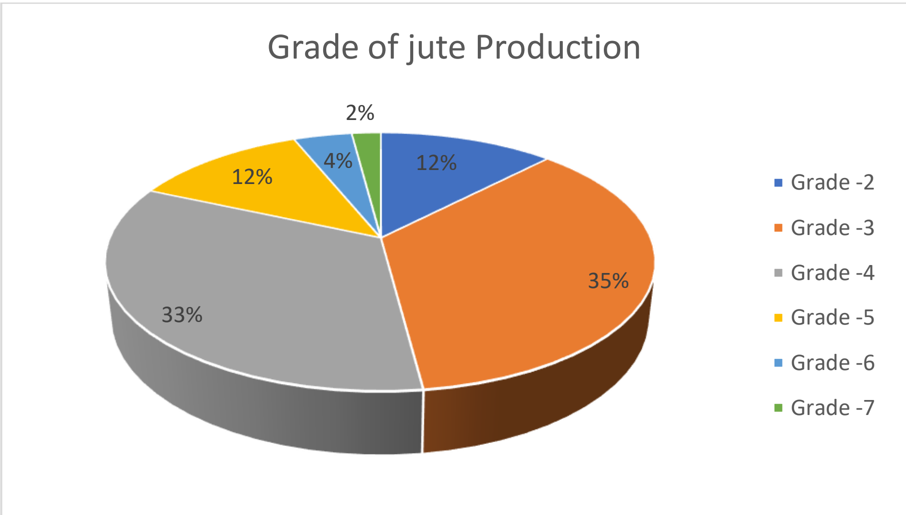
Wool Production

Wool production is more or less constant in past few years and notenoughtomeetthetotalrequirementofrawwoolforwoolenindustry.ThebulkofIndian wool is of course quality and is used mostly in the hand-made carpet industry. Since Indigenous production off inequality wool required by the organized mills and decentralized hosiery sector is very limited, India depends almost exclusively on import. The production of fine apparel grade wool is not enough in the country hence a large quantity of wool from Australia, New Zealand, China, Middle East and other countries is being imported. The production of Indigenous raw wool is given below,



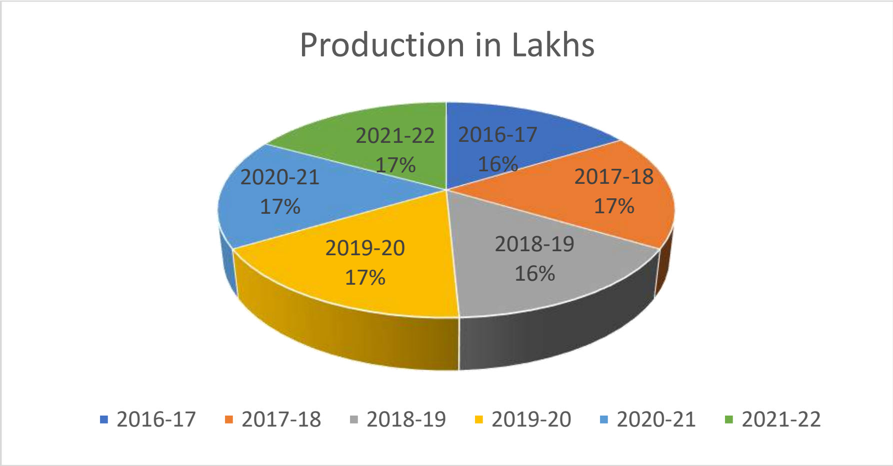
Jute Production

The major producers of jute globally include Bangladesh and India. These two countries have traditionally been the leading contributors to global jute production. Jute is a natural fiber that is commonly used in the production of sacks, bags and other packaging materials. These two countries have favorable agro- climatic conditions for jute cultivation and jute has been an important crop in their agricutural landscapes. The demand for jute and jute products has fluctuated over the years influenced by factors as the demand for eco- friendly and biogradable materials, as well as trends in the packaging industry.



Silk Production

China is the world's largest producer of silk by a signifiacant margin. Other countries India, Uzbekistan, Brazil and Thailand also contribute to global silk production, but on a much smaller scale compared to china. China's dominance in the silk industry is due to its long history of sericulture and the favorable condition for silkworm cultivation in many parts of the Zhejiang, Jiangu and Guangdong. India while not producing as much silk as china is also a significant player in the silk industry. The country is known for varous types of silks, including Mulberry, eri and tussar silk. Uzbekistan, Brazil and Thailand are amoung the other countries that contribute to global silk production. Each of these countries has unique characteristics in terms of the types of silk produced and the methods of sericuture.



CONCLUTION

The fiber production and management play a pivotal roles in the textile industry, significantly influencing the quality, efficiency and sustainability of the entire value chain. The textile industry relies heavily on the availability and characteristics of various fibers, making their production and effective management crucial for the success of the industry.efficient management practices from sourcing raw materials to manufacturing processes, contribute to reducing waste, optimizing resources and enhancing overall sustainability. The adoption of circular economy priciples, recycling initiatives and the ecological footprint of fiber production in the textile industry.

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BUILDING A MARKETING STRATEGY: TOOLS AND RESPONSIBILITIES

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ABSTRACT

Retail is a growing industry, but the need for cheap, fast delivery has a high environmental impact. Several brands are leading the way in innovation to reduce waste, improve recycling, and encourage recycling. But if we are to make fashion more sustainable, consumers and the industry must work together.

Retail is a growing industry, but the need for cheap, fast delivery has a high environmental impact. Several brands are leading the way in innovation to reduce waste, improve recycling, and encourage recycling. But if we are to make fashion more sustainable, consumers and the industry must work together.

KEYWORDS: industry, process, waste recycling, sustainability

INTRODUCTION

As the demand for clothing and footwear increases worldwide, the sales organization is growing exponentially. Over the past 15 years, clothing production has doubled, accounting for 60% of all textile production. [1]One of the main ways in which this growth is occurring is the rise of the fast-paced industry. New trends in popular culture and fashion trends are quickly available from thrift stores. In recent years, the designer's brand calendar can include up to five collections a year, and in the mass market, new sales are produced every 2 weeks. As with many products today, mass production and consumption are often accompanied by mass destruction, and this is no different.

In general, styles change quickly, and buying a new style car can trash a lot of short-lived items. . Since 73% of clothing ends up in landfill and less than 1% is recycled into new clothing, there are many costs associated with non-renewable materials as well as economic ones through recycled clothing . Currently, it is estimated that £140 million worth of clothing is sent to UK retail stores each year. [2]Although a large proportion of recycled fibers are recycled into cleaning products, industrial towels, and textiles, they are still only 12% of the total discarded items.

The world is increasingly concerned about the environmental and social costs of fashion, especially ephemeral goods. Great fashion is often produced with cheap labor , but working conditions can be poor. Sweatshops can also be found in countries with stricter laws. The transport of goods from the production sites to the points of sale helps to increase the carbon footprint of the textile industry; It was reported that there were 1.2 billion metric tons of CO_2 in 2015. [1] Textile dyeing and finishing is estimated to contribute to 20% of the world's water pollution, [3] and microfiber absorbs at washing time about half a million metric tons of plastic pollution every year. [4] There is a particular problem with water tracing in fashion. Water is used in clothing production, including growing crops such as cotton and weaving, manufacturing, washing and dyeing. The production of denim clothing alone uses 5,000 L of water [5] for one pair of jeans. When you add this to the overuse of water, chemicals, and energy in doing laundry and putting it in landfills or incinerators, it has a huge impact on the environment.

As the demand for high-speed systems continues to grow, so does the industry environment. The negative consequences can be seen throughout the supply chain – from increased material consumption to the disposal of little-used clothing. As the dark side of fashion grows, so does the need for change – not only from regulatory bodies and the global industry but also from individual consumers. People want ethical clothing. Availability and style. But this is difficult to achieve.

Requirements for Continuous Use

Historically, sustainable brands sought a small market and were often part of the "hippy" style. But in recent years, sustainability has become more popular among designers and consumers, and the aesthetic appeal has evolved to become more desirable to a wider audience. As a result, the customer must not only shop the brand's sales but also buy desirable modern clothes.

But the difficulty for the industry is to address both sustainability and cultural issues while still being economically viable and sustainable. Fair wages, good working conditions, sustainable products, and good quality construction that is built to last must be taken into account, along with fair standards and trademarks, which increases the cost of the final product. The consumer is often faced with many different considerations when making a purchase; some of these conflict with each other and can lead the customer to prioritize value for money.

Many consumers who value sustainability in their clothing but cannot afford the high cost of sustainable clothing will often turn to new styles and trends to buy secondhand. However, there is no need to look put together with second-hand clothes, as can be seen in the growing trend of finding vintage luxury items. Old clothes are the opposite of the whole idea of "immediate" and are sought after as a way to express individuality with the added value of saving something precious from the trash. Once bought at auction, there are now many places online to shop for antiques. Celebs, celebrities and fashionistas alike have gotten into this vintage style, making it an almost pre-loved item. [6]That is, the attitude of consumers is changing so that old clothes are more desirable (as time, they sell better) than new products because of their uniqueness, which are of good quality, against the mass production organization of the market.

Make Round Trips

Ideally, the life cycle of a garment would be a series of circles so that the garment can continue to move on to the next life - redesigned, refurbished, and never worn - it ends the waste thinking. Although the popularity of grapes is growing, this is only one part of the commercial model business, and the fact is that the line "build, make, spend," with all its problems and the environment , still going forward.

Achieving sustainability in clothing manufacturing is a huge and difficult challenge. It is often said that "more than 80% of a product's environmental impact is determined at the design level," 7 which means that designers are now looking to solve the problem. But the responsibility should not lie with the design alone; including all partners in the supply chain. Designers develop the concept, but the marketing process also includes graphic designers and clothing technologists, as well as manufacturers: textile manufacturers and garment factories. Finally, the consumer must not only dispose of, reuse or recycle the clothing, but also wash and care for the clothing in a sustainable way and ensure the durability of the item. All these partners must work together to achieve a more sustainable line.

The challenge of sustainability relates to denim, which, as previously mentioned, is one of the most problematic materials. Traditionally an expression of individuality and freedom, denim jeans are produced worldwide in 1.7 billion pairs in the year 8 thought multi-market channels and medium and high-end designers, and now it is ready to move. Given the growing demand, some denim experts are looking for ways to improve their products.

Reusing and recycling can play a role here, and designers and brands like Levi Strauss & Co. and Jeans Mud responsibility for the future life of their clothes. They offer return services, repair services, and opportunities to recycle new fibers at the end of their life. Many brands have embraced the old-fashioned style as well. Levi's "Authorized Vintage" line, which includes vintage pieces, not only represents exclusive consumption but also makes it more popular with the consumer due to its prominent position. Everything comes from the company's warehouse, and every change is "an opportunity to restore our history."

Mud Jeans in particular is working towards a circular business model by using a more thoughtful, "timeless" approach to their collections rather than focusing on eras and categories that are more seasonal. In addition, they offer a rental service that allows you to return the jeans for a different style and a return service at the end of life for reuse in new fibers . The different elements that make up clothes, such as the basic fabric (denim in the case of Mud jeans) and buttons, are limited so that the company can avoid the installation and reduce the risk. This example of the reduction of basic materials is used by brands that do not specialize in denim, for example the production of Adidas as a resource Recycled plastic made from virgin thermoplastic polyurethane. The challenge with clothes, like shoes, is that they are made of many different materials that are difficult to separate and classify for reuse. These business models have a long way to go to be truly circular, but some companies are leading the way, and their transparency is very important for other companies looking to follow suit.

When a product is purchased, its future is in the hands of the customer, and not everyone knows how to reuse the options available to them if the way they care for their clothes can harm the environment. Companies are helping to inform them. In 2009, Levi Strauss & Co. launched the "Care Tag for Our Planet," which provides accurate washing instructions to save water and energy and guidance on how to donate clothes when they are no longer needed. Mud Jeans is following a similar approach by highlighting the need to leave a regular washing routine unnecessary and even recommending "air washing".

At the same time, designers are moving away from the traditional production cycle of the seasons and into a more seasonal calendar. Due to the 2019 coronavirus disease (COVID-19), the creative director of Gucci, Alessandro Michele, announced (May 2020) that the Italian brand will end the five regular shows a year and will be "only twice a year" . reduce waste. This is a bold decision because it goes against the trend that has encouraged artists for many years to collect large collections every year, but soon more awards and prizes will follow.

Understanding

The discussion of ever-changing trends has increased customer demand for transparency in the supply chain and the lifecycle of clothing Customers want to be informed. They don't believe in advertising and "lock-in" by fast-moving companies that want to showcase their brands. They want to know the origin of the product and its environmental and social impact.

Some companies are responding by seeking a better understanding of the environmental impact of their products. In 2015, denim specialist Levi Strauss & Co. clothing life cycle to assess the environmental impact of a key product range from its scope. The areas identified for high water use and environmental pollution are textile production and laundry care; the consumer sector only accounts for 37% of energy, [13] Fiber and textile production accounted for 36% of energy use, with the remaining 27% spent on clothing production, transport, logistics and packaging. [14] This lifetime research has resulted in innovation in waterless finishing techniques that use 96% less water instead of traditional fabric finishing. [15] As previously mentioned, the transparency here encourages the business in general to do the same. Other companies have also introduced dyeing processes that require less water, and much of the work is focused on improving textile recycling.
But this discussion is not just about production. Some high street retailers operate a "take back" program where customers are invited to return unwanted clothing, either for a discount on future purchases or as a way to get rid of unwanted clothing. Not only would it encourage consumers to buy more without feeling guilty, but the end result of these returned garments could also be clear. Without further clarification, the consumer cannot make fully informed decisions regarding the end of life of their clothing.

METHODS

Money should never succeed when it comes to consistency; it's about mutual responsibilities. Professionals in the retail industry often feel that it is in the hands of the customer - they have the power to buy, and their decisions determine how the business will respond. One theory is that the consumer must buy less and cannot force the retailer to buy less. However, if a life cycle is to be fulfilled, the participants in the cycle must also be held accountable, and the need for business regulation is ever increasing.

With the world's demand for new clothes, there is an urgent need to find new products and find new markets for modern clothes. Meanwhile, sustainable clothing reduces the impact of production and manufacturing, and designers and brands can make efforts in the recycling and use of clothing. But the environmental impact will remain high if we continue to buy more new clothes.

If we want sustainable business development in the future, consumers and professionals must participate. Although more transparency and sustainability are being pursued and some brands are at the forefront, the widespread use of clothing has become established in society, making it difficult to say how to return or slow down. In addition, the livelihood of millions of people depends on this continuous cycle of jewelry production. Methods to reuse, recycle, reuse and reproduce clothing and textiles are available in the short term, and the real impact will come from creating new circular business models based on the life cycle of clothing and design in the first concept . If we want to increase the value from each item of clothing, it is important to give them a second, third and fourth life.

CONCLUTION

The author is one of the founders of the International Society for Sustainable Fashion.

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PERPETRATION OF BAMBOO FIBRE

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ABSTRACT

Fibers can be utilized in a variety of ways, the most popular of which is as reinforcement. Bamboo fiber has gained popularity over other natural fibers due to its renewable short natural growth cycle and quantity of bamboo resources. Bamboo fiber is used in the textile, papermaking, construction, and composites industries because of its remarkable mechanical qualities despite its complex natural structure. However, bamboo fibers' limited use in engineering applications is due to their propensity for corrosion and ease of moisture absorption. Therefore, it is crucial to have a better grasp of bamboo fiber. The extraction and treatment methods used for bamboo fiber, as well as their impact on pertinent properties, are highlighted in this paper's assessment of all prior research on the mechanical characterization of bamboo fiber. The bamboo fibers' chemical make-up and offered hereafter after extensive investigation. The use of bamboo fibers in numerous fields has been discussed, with an emphasis on current applications and potential future uses. For upcoming studies on bamboo fiber, this study can be used as a guide.

KEYWORDS: sustainable fiber, bamboo fiber, popular fiber

INTRODUCTION

Bamboo fiber is a textile material that is made from the pulp of bamboo plants. It is a sustainable and eco-friendly alternative to traditional textile materials like cotton and polyester. Bamboo fiber is naturally antibacterial and moisture-wicking, making it a great choice for clothing and other textiles. Bamboo fiber is used in a variety of applications including clothing, bedding, towels, and even flooring. It is a versatile material that is becoming increasingly popular due to its sustainability and eco-friendliness. It is a sustainable and eco-friendly alternative to traditional textile materials like cotton and polyester. Bamboo fiber is naturally antibacterial and moisture-wicking, making it a great choice for clothing and other textiles.

MATERIAL AND METHODOLOGY

The process of making bamboo fiber involves crushing the bamboo plant and then using natural enzymes to break down the bamboo into a pulp. The pulp is then washed and bleached before being spun into a fiber. The resulting fiber is soft, durable, and eco-friendly.

NATURAL ANTI-BACTERIA

It is a common fact that bamboo can thrive naturally without using any pesticide. Scientists found that bamboo owns a unique anti -bacteria and bacteriostatic bio-agent named “bamboo Kun". This substance is combined with bamboo cellulose during the process of being manufactured into bamboo fiber.

Bamboo fiber has particular and natural functions of anti-bacteria, bacteriostatic and deodorization. It is validated by Japan Textile Inspection Association that even after fifty times of washing bamboo fiber fabric still possesses excellent function of anti-bacteria. Its test result show over 70% elimination rate after bacteria being incubated on bamboo fiber fabric. Bamboo fiber’s natural anti-bacteria function differs greatly from that of chemical antimicrobial .The later often tend to cause skin allergy when added to apparel.

BAMBOO FIBER GIVES YOUR SKIN A CHANCE TO BREATH FREE

What is notable of bamboo fiber is its unusual ability to breathe and its coolness. Because the cross-section of the bamboo fiber is filled with various micro-gaps and micro-holes, it has much better moisture absorption and ventilation. With this unparalleled micro-structure, bamboo fiber apparel can absorb and evaporate human sweat in a split second. Just like breathing, such garments make people feel extremely cool and comfortable in the hot summer. It is never sticking to skin even in hot summer. According to authoritative testing figures, apparels made from bamboo fibers are 1-2 degrees lower than normal apparels in hot summer. Apparel made from bamboo fiber is crowned as Air Conditioning Dress.

THE APPLICATIONS OF BAMBOO FIBER

Bamboo fabric is made from natural bamboo fiber yarns that have extremely good moist permeability, moisture vapor transmission belongings, tender hand, higher drape, smooth loss of life and first-rate shades. It is a newly founded, exceptional potential inexperienced fabric.

Bamboo intimate apparels

It encompasses sweaters, tub-suits, mats, blankets, towels have cushy hand, unique luster and vibrant shades, right water absorbance. Bamboo fiber has a completely unique feature of anti-microorganism, that's appropriate to make underwear, tight t-blouse and socks. Its anti-ultraviolet nature is appropriate to make summer time season clothing, particularly for the safety of pregnant girls and younger youngsters from damages of ultraviolet radiation.

Bamboo non-woven fabric

It is made through natural bamboo pulp, which has comparable houses as viscose fibers have. However, bamboo has extensive potentialities with inside the area of hygiene substances inclusive of sanitary napkin, masks, mattress, meals packing baggage because of its anti-microorganism nature.

Bamboo sanitary substances

It consists of bandages, masks, surgical clothes, nurse swears and so on. The bamboo fiber has an herbal impact of sterilization and bacteriostatic and consequently it has incomparably extensive foreground on software in sanitary cloth inclusive of sanitary towels, gauze mask, absorbent pads, and meals packing and so on. In the scientific scope, it is able to be processed into the goods of bamboo fiber gauze, running coat and nurse clothes etc. Because of the herbal antibiosis feature of the bamboo fiber the completed merchandise wants no including of any synthetic synthesized antimicrobial agent. Therefore, bamboo fiber merchandise will now no longer motive pores and skin allergic reactions and on the identical time it has an aggressive benefit with inside the market.

Bamboo rest room series

It enjoys right moisture absorption, tender sense and first-rate shades in addition to anti-microorganism belongings that are very famous in domestic textiles. Bamboo towels and tub tub gowns have a tender and cushy hand feeling and extremely good moisture absorption feature. Its herbal anti biosis function maintains bacterium away a good way to now no longer produce awful odor.

Bamboo decorative series

It has the capabilities of antibiosis, bacteriostatic and ultraviolet-proof. They are very wonderful for usage with inside the decorative industry. Along with the badly deterioration of surroundings pollutants and the destruction to the ozonosphere ultraviolet radiation rays are an increasing number of turning into a trouble for human beings.

Long-time publicity to extremely violet radiation will motive pores and skin cancer. Wallpapers and curtains crafted from bamboo fiber can soak up ultraviolet radiation in diverse wavelengths as a result they reduce the damage to the human body. More important, bamboo decorative merchandise will now no longer pass moldy because of damp. Curtains, tv covers, wall papers and couch slip covers can all be crafted from bamboo fibers.

SUMMARY AND CONCLUSION:

Bamboo fiber is a sustainable and green fabric fabric this is crafted from the pulp of bamboo plants. The manner of creating bamboo fiber includes crushing the bamboo plant and the use of herbal enzymes to interrupt down the pulp right into a fiber. The ensuing fiber is soft, durable, and moisture-wicking, making it a high-quality preference for garb and different textiles. Bamboo fiber is likewise certainly antibacterial, making it a very good alternative for human beings with touchy skin. Overall, bamboo fiber is a flexible and green fabric this is turning into more and more more famous withinside the fabric industry.

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COMPUTER COLOR MATCHING

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ABSTRACT

The reflection of emotions is conveyed through color, which possesses a unique influence over human behavior. As a result, color holds significant value as a fundamental element in various social industries, including fashion, graphic design, and printing. Achieving the ideal and uniform color application across all media types is a formidable task, and this is where color matching systems play a crucial role. The acronym CCM denotes Computer Color Matching, which refers to an electronic system that analyzes colors and converts them into digital codes that can be subsequently decoded on various devices. This system operates on the fundamental principle that color is a manifestation of light reflection.

KEYWORDS: Computer Color matching, Reflection, Graphic design.

INTRODUCTION

Computer Color Matching System (CCMS): Based on recipe computation and utilizing the Spectro photometric characteristics of dyestuff and fibers, Computer Color Matching (CCM) is an instrumental color formulation. Typically, a fabric sample swatch or Pantone code for a particular color is sent to the clothing maker by the garment customer. The fabric sample is then given by the manufacturer to the lab dip section for color matching. They manually assess the sample's hue after receiving it. It is a difficult, time-consuming, and important task that calls for the knowledge and experience of the team members creating the lab dip. However, they can use the computer color matching system (CCMS) to save time and money. The process of color matching is to find and approve colors that match on-screen and off-screen. This ensures that colors that you see on-screen are accurate once the design is printed.

METHEDOLOGY

CCM machine consists of a mild source, a spectrophotometer, and software program that could interpret the information generated by means of the spectrophotometer.

Light source: The mild source is one if the important components of the CCM gadget. It must be capable of produce a light that is similar to the mild that illuminates the item being measured. for example, if the object being measured is viewed under herbal light, the mild source must replicate herbal light. The light source affords a steady and dependable mild that is directed towards the item being measured.

Spectrophotometer: The spectrophotometer measures the coloration of the item through reading the mild meditated from it. The spectrophotometer acknowledges the quantity of mild absorbed and reflected. The preserved records of absorption and mirrored image of light is converted into virtual code that can be interpreted by way of the software program. The spectrophotometer can perceive diverse attributes of shade, along with hue, saturation, and brightness. these attributes are used to create a digital shade code that may be used to reproduce the color correctly.

Components of laptop color Matching system

Software program: The software program is the coronary heart of the computer coloration matching machine. It receives the digital code generated with the aid of the spectrophotometer and makes use of it to create a color system that can be used to produce the equal colour on distinct devices. The software can create a shade component for diverse printing methods, which includes offset, flexography, and digital printing. The method takes into consideration the form of ink, the form of paper or cloth, and the printing technique used to ensure that the shade is as it should be reproduced on the media kind.

Functions of Computer Color Matching System:

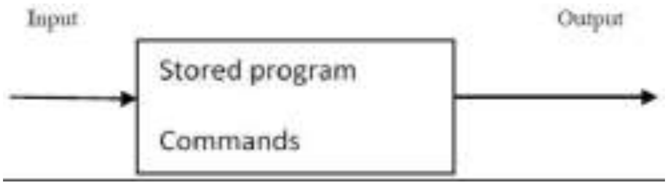
The following works can be done by using CCMS -

- Color match prediction.
- Color difference calculation.
- Determine metamerism.
- Pass/Fail option.
- Color –fastness rating.
- Cost Comparison.
- Strength evaluation of dyes.
- Whiteness indices.
- Reflectance curve and K/S curve.
- Production of Shade library. Etc.

Advantages of Computer Color Matching System (CCMS)

Computer Color Matching System (CCMS) has lots of great advantages in Textile Industry. See some examples below –

Customers get the exact shade wanted with his knowledge of degree of metamerism.
Customers often have a choice of 10-20 formulation that will match color. By taking costing, availability of dyes, and auxiliaries into account, one can choose a best swatch. 3 to 300 times faster than manual color matching. Limited range of stock color needed.



Wavelength of light absorbed nm	Absorbed light	Visible Colour
400 – 435	Violet	Yellowish Green
435 – 480	Blue	Yellow
480 – 490	Greenish Blue	Orange
490 – 500	Bluish Green	Red
500 – 560	Green	Purple
560 – 580	Yellowish Green	Violet
580 – 595	Yellow	Blue
595 – 605	Orange	Greenish - Blue
605 – 750	Red	Bluish green

Application of computer Color Matching system in textile:

The computer shade matching device is utilized in numerous industries to make sure that the color is accurately reproduced across all media kinds. as an instance, within the fashion industry, colour accuracy is crucial in fabric production. The coloration of the material must be constant throughout all batches to make certain that the very last product is uniform. The pc coloration matching gadget is used to create a shade component that can be used to dye the material to the preferred color correctly.

Within the graphic design industry, the CCM system is used to make certain that the color of the design is as it should be reproduced on various media types. for instance, a layout created on a computer display have to be published with the identical coloration accuracy on paper. The laptop color matching gadget is used to create a coloration formulation that may be used to print the design with the identical color accuracy on unique media kinds.

Inside the printing enterprise, the pc color matching gadget is used to make certain that the color is as it should be reproduced on unique printing techniques. as an instance, a design created for offset printing should be published with the same shade accuracy on digital printing. The computer coloration matching device is used to create a color component that can be used to print the layout with the identical shade accuracy on extraordinary printing strategies.

Functions of computer color matching system are described below:

- **Color Match Prediction**

The main function of CCMS is to prognosticate the color of a sample. In lab dip section it's necessary to match the shade of the sample. CCMS makes it easy to match the shade snappily. It also makes easy the work of a cloth mastermind who's responsible for it.

- **Color Difference computation**

We know that; when a sample is put in sample holder of a spectrophotometer meter it analyzes the color of the sample. It also calculates the color difference of the sample and dyed sample which is be painted according to the form of the CCMS.

- **Determine Metamerism**

CCMS also show the metamerism of the sample color.

- **Pass/ Fail Option**

The sample which is be painted according to the form of the CCMS is it matches with the buyers sample that could be calculate by this system. If the dyed sample fulfill the conditions also CCMS gives pass decision and if can't also it gives fail decision. So, pass- fail can be decided by CCMS.

- **Color Fastness Rating**

Color fastness can be calculated by CCMS. There's different color fastness standing(1-5/1- 8). CCMS dissect the color fastness and gives result.

- **Cost Comparison**

Cost of the produced sample can be compared with others. It also helps to choose the right colorings for dyeing.

- **Strength Evaluation of colorings**

It's important to estimate the strength of the colorings which will be used for product. All of the colorings haven't same strength. colorings strength goods the attention of colorings which will be used for dyeing.

- **Sanguineness Indices**

Sanguineness indicators also maintained in CCMS.

- **Reflectance wind and K/ S wind**

Reflectance wind also formed for specific shade by which we can determine the reflection capability of that shade.

- **Production of Shade Library**

Computer color matching system also store the form of the dyeing for specific shade. This shade library helps to find out the different documents against that shade. It's done both for the shade of sample and bulk dyed sample.

- **Color Strength**

Computer color matching system also determine the color strength of the sample.

RESULT

After finishing the pattern dyeing it needs to evaluate the dyed sample with the client sample. for that reason, dyed pattern is entered to the spectrophotometer to compare the pattern with the consumer pattern. Then CCMS gives the bypass fail effects. If the dyed pattern fit with the buyer pattern than CCMS offers bypass consequences. After that, dyed samples send to the customer or client. upon getting the approval from the customer producer goes for the majority production. If the dyed sample does not fit with the client sample than the CCMS analyses the color difference and accurate the recipe. Then every other pattern dyeing is executed for matching the shade of the pattern.

DISCUSSION

The manufacturer sends a cloth sample to the lab dip department for color matching. It is a difficult, time-consuming, and critical task. As a result, they can save time and money by using the computer color matching system. Pattern dying is done to match the shade of the pattern. To achieve the best and most consistent color application across all media types, the color matching system is essential.

CONCLUTION

Clients get the precise color wanted together with his knowledge of diploma of metamerism. Customers often have a preference of 10-20 system with a purpose to fit color. By using ,taking costing, availability of dyes, and auxiliaries into account, one can pick a great swatch.3 to three hundred instances faster than manual shade matching limited range of stock shade wanted. The computer color matching system is an essential component in various industries. It ensures that the color is accurately reproduced across all media types, which is crucial in maintaining consistency and uniformity in the final product.

GARMENT TECHONOLOGY

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ABSTRACT

Garment technology is a multifaceted field within the fashion and textile industry that encompasses an array of processes and innovations aimed a optimizing the design, production and distribution of clothing. This abstract provides an in-depth exploration of garment technology, highlighting its key components and significance in the modern fashion landscape.

INTRODUCTION

Garment technology, also known as fashion technology, stands at the intersection of fashion design, engineering, and manufacturing. It leverages technological advancements to enhance various aspects of the garments production cycle, from conceptualization to consumer delivery. This abstract delves into the following aspects of garment technology.

DESIGN AND INNOVATION

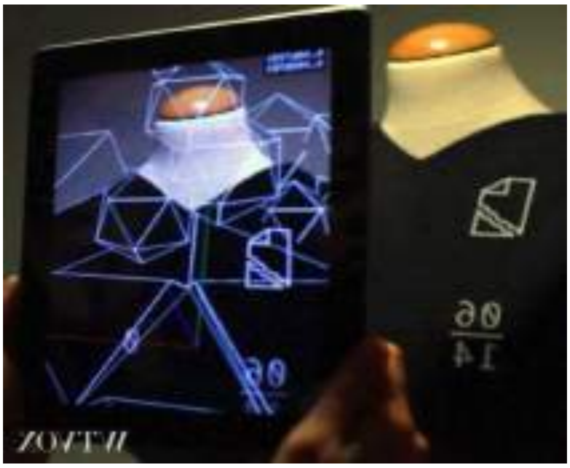
The role of design innovation in shaping the future of technology is significant. It is driving the development of new technologies that are changing the world and improving the lives of people around the globe. Garment technology begins with the creative process, where designers employ computer- aided design (CAD) software to visualize and refine their concepts. These digital tools enable precise rendering of clothing designs, streamlining the transition from idea to prototype. Pattern making software complements this stage, facilitating the creation of accurate templates that guide the cutting and sewing processes.

3D Printing in Fash

The rise of 3D printing in the fashion industry and widespread adoption is not a wonder anymore. The main value of 3D printing in fashion is its availability and accessibility to the general public, and thus, openness to the mass market.3D printing enables professionals to transcend any boundaries of design, as it gives them a chance to turn the most improbable projects into reality. 3D printing makes it possible to combine different materials into one piece of cloth, for instance, waterproof textile with a flexible one, and so on. The choice is unlimited and it depends on the creator's imagination. Another important trend to pay attention to is the customization of garments. 3D printing allows brands to create apparel depending on people's individual body types, size, height, etc.

From CAD to Machine Learning

The advent of personal computers allowed modern designers to take creativity of patterns and styles to a next level. Compared with the use of traditional tools, PC's have brought massive advancements. The adoption of CAD software alone has allowed designers to draw and imagine new styles. Then, more recently, additive manufacturing has triggered a revolution in the use of bioengineered materials, such as leather made from microbes. But, if desktops running CAD software looked innovative compared to the tools we have over the last 50 years, wait to see what's coming.



Dressing Your Digital Self

Technology, in the shape of digitization, has pushed consumers towards a digital-self. Towards a social image constructed via daily interactions, exchanges, and media consumption on the internet. Social media has become a tool for showcasing lifestyles, express fashion tastes and promote digital selves. However, the advent of social media, with the aid of Artificial intelligence (AI), has created a field of global data mining pools .From there, marketers investigate any imaginable subject, on any possible consumer segments. AI is used by fashion brands to examine consumers preferences and deliver customized services.

A Salient AI Designer

But, above all, Artificial Intelligence can play a complementary role in fashion design. With the help of AI, fashion designers can predict upcoming trends, dictated by the current fast-changing environment of fashion, while minimizing the environmental impact. And, eventually, one day, a salient AI will be at the core of new fashion designs. The use of technology in fashion brings more value than meets the eye. New innovations are launched every night, but fashion start-ups from all over the world.

<u>MATERIALS AND SUSTAINABILITY</u>

The choice of textiles and materials is pivotal in garment technology. Innovations in fabric technology have given rise to materials with specialized attributes, including moisture-wicking, thermal regulation, and eco-friendly properties. Sustainability is an increasingly critical focus, with efforts to develop textiles that reduce environmental impact and promote ethical practices in production.

3D Virtual Sampling

In the past, physical samples have been a necessity in the design and buying and selling lifecycle. These samples provide both designers and the retail buying team an accurate representation of the product, but one finished style can require 20 or more samples before production. However, as 3D technology evolves, virtual sampling already enables a digital full line review which reduces waste in both design and product development.

Alternative Textiles

Materials commonly used in clothing take considerable resources and often degrade slowly. The creation of one cotton shirt requires the same amount of water as one person drinks in 2.5 years. Synthetic materials like nylon and polyester use less water during production but emit dangerous greenhouse gases. However, the development of sustainable technologies for fashion and textiles that are recyclable, regenerative, reusable and responsibly sourced are providing alternatives. Some eco-friendly textile alternatives include recycled fibers and fibers extracted from agricultural waste products such as leaves and rinds. These new textiles offer options that produce less waste during production, are long-wearing, and biodegradable. Natural fibers like hemp, bamboo, and ramie are widely used as cotton alternatives. Brands like COS and H&M choose cupro, as it is produced from cotton linter, waste from a cotton plant, through a closed-loop technology. Designers like Stella McCartney have pioneered closed-loop and sustainable business models using innovative materials such as bio-based fur. This 37% plant-based fabric consumes up to 30% less energy and produces up to 63% less greenhouse gas than conventional synthetics. Also, worth mentioning an innovative eco-friendly alternative to leather, Piñatex, made from pineapple leaf fiber by Ananas Anan, and muskin, the vegetable leather made from mushrooms.

Automation and Fashion on Demand

Fast fashion businesses and mass production models have contributed to vast amounts of waste and returns. Marketers pushed mass consumption on consumers and this mindset fueled this model over the 1990's and 2000's. But as the rise of e-commerce and social commerce over the last decade has created an entirely new business model, consumers are now in the driver's seat, and they care a lot about both personalized experiences and the planet. On-demand design and manufacturing will play a significant role in the future of fashion. Instead of producing clothes and then selling them, the items are ordered then produced. While today single and small batch production costs more to manufacture, automation and innovation in manufacturing combined with the money saved with reduced returns and guaranteed sales will offset these costs over time.

Making Fashion Circular

As consumers and retailers become more aware of the enormous amount of waste produced by the fashion industry new efforts are being made to avoid waste. Major brands including Burberry, Gap, H&M, Nike, and Stella McCartney have joined forces to support sustainable fashion by creating the Make Fashion Circular initiative. The circular economy concept aims to design waste out of the product and manufacturing system keeping materials and products in use for as long as possible. This is accomplished by incorporating renewable materials and recycling old clothes into new ones.

PRODUCTION AND MANUFACTURING

Modern garment manufacturing benefits from automation and robotics. Computerized cutting machines optimize fabric utilization, minimize waste, and improve precision. Advanced sewing machines offer diverse capabilities, from basic stitching to intricate embroidery. Mass production techniques, driven by assembly line principles, dominate the industry, while customized and small-batch production thrives in niche markets.

Automatic spreading machine with data capturing

The fabric is loaded onto the machine and then checked manually for creases or wrinkles. The machine then automatically lays the fabric down in layers, cutting it off at the end. The number of layers depends upon fabric thickness and how many garments are required.

Automatic cutting machine (CAM) – CAM systems are very common in the apparel manufacturing industry.

Automatic single ply cutting machine – For making custom made apparels, single ply of fabric need to cut. To speed up the cutting processes and automate the cutting process automatic cutting machines are very useful. In custom-made garment (Made to measure) manufacturing, single ply cutter is widely used.

Fabric cut planning Software (Fabric) – Fabric utilization in cutting can be improved by using the latest technology solution available for this purpose. Intello cut is one such kind of system for fabric saving and material cut planning.

Fabric inspection machine and fabric quality report – Now-a-days fabric inspection machine comes with digital data entry for measuring fabric defects and 4-point system data analysis and report.

Computerized Embroidery and quilting machine – In high fashion apparel manufacturing, embroidery designs are commonly found which includes hand embroidery as well as machine embroidery. For the first production, a wide range of design selection and quick design change computerized embroidery machine play a major role.

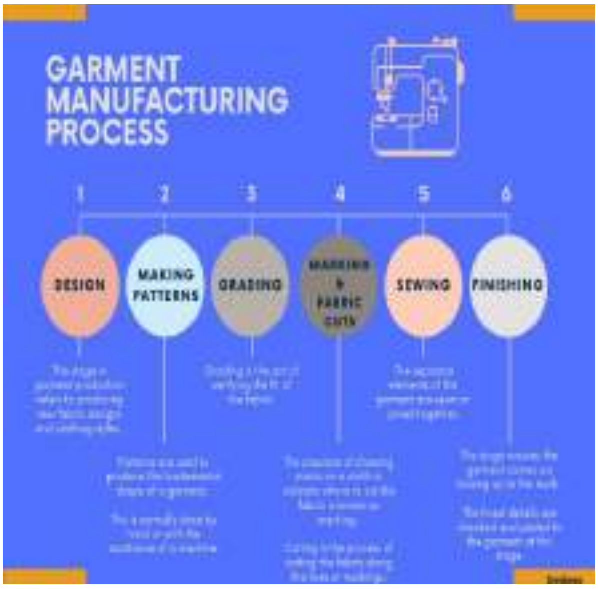
Technology Advancement in sewing machine – Sewing machine with computer panel and display are common now. Sewing operator can easily select stitch type, stitch number before sewing. A machine will stop automatically when a number of stitches are completed. There are many developments done in sewing machines.

Template stitching /Profile stitching/ Automatic workstation – Profile stitching machine are a semi-automatic machine. Profile stitching machine works like computerized embroidery machines. After loading the work into frame, operator don't need to handle the material. An operator can attend more than workstation at a time.

Digital Measuring Tape – By using digital tapes, measurement can be directly transferred to the computer (Excel sheet) wirelessly. Example, Datapro. Mobile applications are also available for digital measuring.

Image source: dataprotools.com

Barcode printing machine – Barcode printing machine is required for printing carton sticker.
Digital garment and textile printing – For the fast printing and giving the best print quality without limiting the number colors in a design digital printing solution is there. Sample approval lead time for the printed design reduces by using digital printing technology. Additionally, In the age fast fashion, consumers like custom prints in their t-shirts and seller need to print a single garment for a design. The digital textile print solution come into play. Examples - Kornit, Text jet, Color jet etc.



Quality Control and Testing

Garment technology encompasses stringent quality control measures. Automated quality assurance systems detect defects and ensure compliance with design specifications. Garments undergo rigorous testing for Colorfastness , durability, and safety standards, ensuring a high-quality end product.

Textile Testing & Quality Control (TTQC) is very important work or process in each department of export-oriented industry. Buyers want quality but not quantity. In every department of textile industry quality maintained of each material. Because one material’s quality depends on another’s quality. For example, if qualified fiber is inputted then output will be good yarn. Textile testing is checking the quality and suitability of raw material and selection of material. It is an important part for textile production, distribution, and consumption. Though it is an expensive business but essential too. There are some reasons for textile testing; such as, checking raw materials, monitoring production, assessing the Final Product, investigation of faulty material, product development and research. Quality controls is a process by which entities review the quality of all products in an industry. It refers to ways of ensuring the quality of a service or product. Actually, quality control is a system for verifying and maintaining a desired level of quality in an existing product or service by careful planning, use of proper equipment, continued inspection, and corrective action as required.

Quality Control in Garment Manufacturing Process

Quality is a relative term. It means customer needs is to be satisfied. Quality is of prime importance in any aspect of business. Customers demand and expect value for money. As producers of apparel there must be a constant endeavor to produce work of good quality. In previous article, I discuss about quality control system in garment industry. Now I will give a short description of Quality Control in Garment Manufacturing Process.

The various Steps of Garments manufacturing where in-process inspection and quality control are done are mentioned below:

In Sample making section

In- Marker making section

Inspection in fabric spreading section

Inspection in fabric cutting section

Inspection in fabric sewn section

Inspection in pressing & Finishing section

Quality Control in Sample Section:

Maintaining buyer Specification standard

Checking the sample and its different issues

Measurements checking

Fabric color, gsm, Fastness etc. properties required checking

Spi and another parameter checking

Quality Control in Marker Making:

To check notch or drill mark

Fabric width must be higher than marker width

Fabric length must be higher than marker length

Matching of green line

Check pattern size and dimension

Matching of check and stripe taking into consideration

Considering garments production plan

Cutting table length consideration

Pattern direction consideration

Quality Control in Fabric Spreading:

Fabric spreading according to correct alignment with marker length and width

Maintain requirements of spreading

Matching of check and stripe

Lay contains correct number of fabric ply

Correct Ply direction

To control the fabric splicing

Tension control

Quality Control in Fabric Cutting:

The dimension of the pattern and the cut piece should be same and accurate

Cut edge should be smooth and clean

Notch should be cut finely

Drill hole should made at proper place

No yarn fraying should occur at cut edge

Avoid blade deflection

Maintain cutting angle

More skilled operator using

Quality Control in Sewing Section:

Input material checking

Cut panel and accessories checking

Machine is in well condition

Thread count check

Special work like embroidery, printing panel check

Needle size checking

Stitching fault should be checked

Garments measurement check

Seam fault check

Size mistake check

Mismatching matching of trimming

Shade variation within the cloth

Wrong placement of interlining

Creased or wrinkle appearance control

Quality Control in Finishing Section:

Proper inspection of the garments including measurement, spot, dirt, impurities

Water spot

Shading variation check

Smooth and unfold in pocket

In secured or broken chain or button

Wrong fold

Proper shape in garments

Properly dried in after pressing

Wanted wrinkle or fold in lining

Get up checking

Collar closing

Side seam

Sleeve placket attach

Cuff attach

Bottom hem

Back yoke

Every part of a body

RESULT

The demand for textile will rise by manifold, as the global population will Stouch the 8.1 billion marks by 2025.By mid-century, this figure would reach 9.5 billion, making it a staggering 11 billion by 2100. Following this, the global apparel market will grow to US$2.1 trillion by 2025.Futuritic fashion involves incorporating cutting-edge technologies into the design process; Utilizing 3D modelling, printing, and virtual reality are among the innovative techniques employed; Streamline your clothing production management with Audaces360 multi-solution.

CONCLUTION

Garment technology is a dynamic and evolving field that plays a pivotal role in shaping the fashion industry's future. Its integration of cutting-edge innovations enhances design creativity, production efficiency, sustainability, and customer engagement. As technology continues to advance, garment technology remains at the forefront of fashion, contributing to a more sophisticated, sustainable, and consumer-oriented industry.

TEXTILE PRODUCTS MANAGEMENT AND MERCHANDISING

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ABSTRACT

Textile products management and merchandising are integral components of the fashion and textile industry, ensuring the successful flow of products from design to market. This paper presentation delves into the multifaceted world of textile products management and merchandising, shedding light on its vital role in the dynamic and ever-changing landscape of the fashion and textile sectors.

The presentation will highlight the challenges and complexities of managing the textile supply chain, with a focus on global sourcing, sustainability considerations, and the increasing importance of ethical practices. We will also discuss the impact of digital transformation and e-commerce on merchandising strategies, as well as the role of data analytics in decision-making.

Finally, we will explore the future of textile products management and merchandising in the context of rapidly changing consumer behavior, sustainability imperatives, and technological advancements. This presentation aims to equip industry professionals, academics, and enthusiasts with a comprehensive understanding of the intricacies and challenges of textile products management and merchandising in the 21st century.

INTRODUCTION

Textile Product Management and Merchandising Textile industry, often hailed as the backbone of, contributes significantly to the world economy. But behind those vibrant patterns and swatches lie meticulous planning, intricate processes, and strategic decision-making. Enter textile product management and merchandising.

Textile Product Management refers to the comprehensive process of developing, producing, and marketing textiles. Managers in this domain oversee the entire lifecycle of a textile product, from the initial ideation and design to the eventual production and distribution. They're responsible for ensuring quality, cost-effectiveness, and timely delivery. They also need to be in sync with the latest trends, technological advancements, and global market dynamics. On the other hand, Merchandising is more specific to the commercial aspect of textiles. Merchandisers play a pivotal role in determining what products make it to the store shelves, in what quantity, and at what price. They collaborate closely with designers, manufacturers, and retailers to ensure that the products not only resonate with consumer demands but also drive profitability. The synthesis of both these domains ensures that textile products are not just of superior quality but are also relevant, competitive, and profitable in the marketplace.

TEXTILE PRODUCT

A textile product refers to any material or goods produced from fibers through various methods like weaving, knitting, felting, or bonding. Textile products can be derived from natural fibers like cotton, wool, silk, or flax, or from synthetic fibers such as polyester, nylon, or acrylic. They encompass a wide range of items, including but not limited to clothing, home furnishings (like curtains, carpets, and upholstery), industrial materials, and even medical supplies.

MANAGEMENT AND MERCHANDISING

Management and merchandising are crucial concepts in the retail sector, primarily focusing on the organization, presentation, and sale of products.

MANAGEMENT

Definition: It involves the coordination of people, resources, and processes to achieve specific organizational objectives.

KEY ASPECTS

Strategic planning: Establishing long-term goals and determining resources.

Organizational structure: Designing a hierarchy or framework.

Staffing: Hiring, training, and retaining employees.

Directing: Leading and motivating the team.

Controlling: Monitoring performance and making necessary adjustments.

Merchandising:

Definition: It’s the practice of promoting the sale of goods, either by their presentation in retail outlets or by other promotional means.

Key Aspects:

Product Selection: Choosing the right products for the target audience. Presentation: Arranging products in an appealing manner.

Pricing: Setting competitive prices while maintaining profitability.

Promotions: Offering discounts, special offers, or bundling products.

Inventory management: Ensuring adequate stock levels.

Interrelation: Management and merchandising often intersect in the retail world. Effective management is necessary to orchestrate the multiple aspects of merchandising, ensuring that products are selected, priced, promoted, and presented in a manner that maximizes sales. On the other hand, effective merchandising strategies can lead to better management decisions, especially when it comes to inventory and sales forecasting.

TYPES OF TEXTILE PRODUCT MANAGEMENT AND MERCHANDISING

Textile product management and merchandising play crucial roles in the apparel and textile industry. These areas are responsible for planning, developing, sourcing, and marketing products.

There are several types of textile product management and merchandising:

Raw Material Sourcing and Management: This deals with sourcing fibers, yarns, and fabrics required for manufacturing. It involves understanding fiber types, fabric construction, and the latest trends in materials.

Product Development and Design Management: This focuses on the development of new designs and products based on market research and trend analysis. Designers and product managers collaborate to turn ideas into prototypes.

Production Management: It involves overseeing the actual manufacturing of textile products, ensuring the products meet quality standards, and are produced on time and within budget.

Costing and Pricing: This entails calculating the costs of producing a product and subsequently setting a price that ensures profitability while remaining competitive in the market.

Quality Control and Assurance: This segment ensures that the products meet or exceed a set standard of quality. It involves inspecting the materials and finished products for any defects or deviations from the specifications.

Supply Chain and Logistics Management: This area handles the flow of products from suppliers to consumers. It deals with warehousing, transportation, and distribution of textile products.

Retail Merchandising: This relates to how products are presented and sold in retail environments. Merchandisers decide on the product assortment, visual display, and promotional strategies in stores.

Marketing and Promotion: This area focuses on strategies to promote textile products to consumers. It includes advertising, public relations, and events.

Sustainability and Eco-Friendly Merchandising: With growing environmental concerns, this area focuses on the development, promotion, and management of eco-friendly and sustainable textile products.

E-Commerce and Digital Merchandising: With the rise of online shopping, this involves presenting and managing products on e-commerce platforms and utilizing digital marketing strategies

Each type requires a specific set of skills and knowledge, but they all share the primary goal of delivering quality textile products to consumers efficiently and profitably.

IMPORTANCE OF MANAGEMENT AND MERCHANDISING

The importance of textile product management and merchandising is multifaceted. Here's a brief look at their significance in the textile industry: Ensuring Profitability: Effective product management ensures that textile products are produced cost-effectively and are in line with market demands. Skilled merchandising ensures that these products are sold at the right price point, maximizing profit margins. Meeting Consumer Demands: Product managers identify and predict consumer needs, ensuring that products are both timely and relevant. Merchandisers ensure that these products are presented and promoted in ways that resonate with the target audience. Supply Chain Efficiency: Product management oversees the entire lifecycle of a product, from raw material sourcing to distribution, ensuring an efficient supply chain. Efficient merchandising, particularly in inventory management, ensures that stock levels align with demand, reducing wastage and storage costs. Brand Image and Reputation: Merchandising plays a crucial role in defining a brand's image. How products are presented, promoted, and sold can shape consumer perceptions. Product management ensures the consistent quality of products, bolstering a brand's reputation in the market. Trend Responsiveness: Being responsive to market trends is crucial in the ever-evolving textile industry. Both product management and merchandising help companies stay ahead of or in line with trends, ensuring that products are always relevant and in demand. Risk Mitigation: Effective product management can anticipate and mitigate risks related to production, such as supply chain disruptions or quality issues. Merchandisers can address market-related risks, such as changing consumer preferences or competitive pressures. Innovation: Product management often drives innovation, pushing for the development of new materials, designs, or production techniques. Merchandising can introduce innovative ways of promoting, presenting, or selling products to keep consumers engaged. In essence, textile product management and merchandising are foundational to the success and sustainability of any textile business. They ensure that products are not only high-quality and relevant but also effectively marketed and sold to consumers.

CLASSIFICATION OF TEXTILE PRODUCT MANAGEMENT ANDMERCHANDISING

Textile product management and merchandising can be classified into various categories based on different criteria. Here’s a basic classification of textile product management and merchandising

By Product Type:

Apparel: Ready-to-wear, haute couture, sportswear, etc.
Home Textiles: Bed linens, curtains, upholstery, etc.
Technical Textiles: Geotextiles, medical textiles, protective clothing, etc.
Accessories: Scarves, ties, handbags, etc.

By Production Process:

Woven
Knitted
Non-woven
Braided

By Fiber Type:

Natural Fibers: Cotton, wool, silk, etc.
Synthetic Fibers: Polyester, nylon, acrylic, etc.
Blends: Cotton-polyester, wool-silk, etc.

By Business Model:

Retail Merchandising: Involves selling products directly to consumers.

Wholesale Merchandising: Involves selling products to retailers or other merchants.

By Market Segment:

Mass Market: Targeted towards the general public.

Luxury or High-end: Targeted towards a specific niche of high-income customers.

Specialty or Boutique: Focuses on specific product categories or target demographics.

By Supply Chain Stage:

Raw Materials Procurement: Sourcing fibers, dyes, etc.

Production Management: Overseeing the manufacture of textile goods.

Distribution: Ensuring products reach retailers or end customers

Retail Management: Display, promotion, and sales of the textile products

By Sales Channel:

Offline Merchandising: Physical stores, showrooms, etc.

Online Merchandising: E-commerce websites, social media platforms, etc.

Direct-to-Consumer: Brands that bypass traditional retail channels

By Region or Market:

Domestic: Serving the home country's market.

International: Serving overseas markets.

This classification provides a broad understanding of the different aspects of textile product management and merchandising. Each category might have further sub-categories depending on specific business needs or market dynamics.

FUNCTION OF MANAGEMENT AND MERCHANDISING IN TEXTILE PRODUCT

Management and merchandising play critical roles in the textile industry. Here's a brief breakdown of their functions:

Management in Textile Product:

Planning: Deciding what is to be done, setting goals, and making provisions for the future.

Organizing: Structuring the workforce and resources to achieve organizational goals. This includes deciding the best structure, roles, and responsibilities.

Leading: Motivating the workforce, ensuring they have the resources needed, and dealing with any issues that arise.

Controlling: Monitoring the processes to ensure that they are on track and meeting the set standards.

Decision Making: Choosing the best course of action from various alternatives.

Resource Allocation: Making sure that human, financial, and material resources are used efficiently.

Merchandising in Textile Product:

Product Development: Researching and developing new textiles, designs, and products to meet consumer demands.

Trend Analysis: Keeping an eye on fashion and textile trends to predict future demands.

Sourcing: Finding and securing the best materials, trims, and accessories for products at the right price.

Costing: Determining the cost to produce an item and setting a price that ensures profitability while being competitive.

Order Processing: Handling orders from buyers, ensuring timely delivery, and managing inventory.

Vendor Relations: Building and maintaining relationships with suppliers and manufacturers.

Quality Control: Ensuring that textile products meet the required standards and specifications.

Marketing and Promotion: Presenting the product in the best light, both in stores and in marketing materials, to attract customers.

Both management and merchandising are essential for the smooth operation and success of any textile company. While management focuses on overseeing the entire operation and ensuring organizational goals are met, merchandising is more product-centric, ensuring that the right products are developed, sourced, and sold at the right price to the right audience.

OBJECTIVES OF MANAGEMENT AND MERCHANDISING IN TEXTILE PRODUCT

Objectives of Management in Textile Product:

Profit Maximization: Like any business, one primary objective is to generate profit, ensuring a return on investment and a positive cash flow

Optimal Resource Utilization: Efficiently use available resources such as raw materials, manpower, and machinery to achieve maximum productivity.

Quality Assurance: Ensure that the textiles produced meet or exceed industry standards and customer expectations.

Sustainability: Adopt eco-friendly practices in production processes to minimize environmental impact.

Innovation: Continuously research and develop new textile products or improve existing ones to remain competitive.

Employee Welfare: Create a safe and motivating work environment, ensuring job satisfaction and professional growth.

Risk Management: Identify potential threats to production or profitability and implement strategies to mitigate them.

Market Analysis: Regularly research and understand market trends, demands, and shifts to adjust production accordingly.

Objectives of Merchandising in Textile Product:

Customer Satisfaction: Ensure products meet customer demands in terms of quality, style, and price.

Trend Forecasting: Stay ahead of fashion and textile trends to offer products that cater to current and upcoming market demands.

Inventory Management: Maintain an optimal inventory level to ensure timely delivery without overstocking or stockouts.

Cost Management: Negotiate with suppliers and vendors to get the best possible prices, ensuring a good profit margin.

Product Assortment: Regularly update product offerings based on seasons, market demands, and trends.

Promotion: Use various promotional tools like discounts, advertisements, and displays to attract and inform customers about products.

Supplier Relationship: Develop and maintain good relationships with suppliers to ensure a consistent and high-quality supply chain.

Feedback Collection: Continuously collect feedback from customers to improve products and services. In essence, while management in.

CONCLUSION

In conclusion, textile product management and merchandising are dynamic fields that require a balance of creativity, analytical skills, and relationship management to ensure products not only get to market but also resonate with consumers. The future of this domain will likely be influenced by technology, sustainability, and global market dynamics.

TEXTILE FINISHING TECHNIQUES

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ABSTRACT

Textile finishing techniques play a pivotal role in transforming raw fabrics into functional, appealing, and market-ready products. This paper presentation explores the realm of textile finishing techniques, focusing on their significance in the modern textile industry. We delve into the evolution of these techniques, from traditional methods to cutting-edge innovations.

The presentation will highlight various aspects of textile finishing, including dyeing, printing, coating, and special treatments such as nanotechnology and antimicrobial finishes. We will discuss how these techniques not only enhance the visual appeal of textiles but also imbue them with advanced properties like water repellency, flame resistance, and durability.

INTRODUCTION

Fabric, as it comes out of the loom, generally does not possess properties like color, texture, smoothness and other desirable features and is known as greige/gray fabric. This does not mean that the fabric is gray in color; it simply means any unfinished fabric that contains impurities which should be removed before further processing. Consumers desire to buy a fabric that looks attractive and serves specific functions.

This process of imparting desirable properties to the fabric so that it can satisfy the consumer is called finishing. Most fabrics that reach consumer have undergone one or more finishing treatments. Finishing processes are undertaken by highly specialized companies called converters.

Textile finishing depends on:

- Fiber type
- Fiber arrangement in yarn and fabric and
- Physical and chemical properties of the fiber

The main objectives of textile finishing are to:

• Enhance the attractiveness and functionality of textile materials to make it more acceptable to the consumer

• Impart desirable characteristics to textile materials to enhance their suitability for specific end uses

• Improve the quality of fabric and make it more durable

• Set the fabric so that its shape and structure can be maintained

CLASSIFICATION OF FINISHES

Fabric finishing is the process that changes, improves or develops the appearance or desired characteristics in a fabric. Finishes for fabrics can be classified in different way Routine finishes: These are the finishes that are applied to almost all fabrics to improve their performance. Example: desizing, scouring and bleaching to name a few.

Special finishes

These are the finishes that are applied to impart specific properties to the fabric. Example: waterproofing. Routine and special finishes can be further classified according to the characteristics they impart to the fabrics. They can either be used to enhance the aesthetic appeal of the textile material or impart some functionality to them. Table 1 summarizes some of the most commonly used routine and special finishes

Mechanical Finish

These are the finishes that are applied using physical principles such as friction, temperature, pressure, tension and many others. Example: calendaring.

Chemical Finish

These are the finishes that are imparted with the use of chemicals. Example: mercerization of cotton. Permanent Finish: Finish that remains on the fabric for its life.

Example: crabbing of wool and durable press.

Temporary (renewable) finish: Finishes that remain on fabric for one or two launderings only and need to be renewed to achieve the desirable fabric property are temporary finishes. Example: sizing. Fabric finishes can also be segregated on the basis of fiber type. In the next section you would know about some of the routine fabric finishes.

PREPARATORY PROCESSES

As the fabric comes from the loom it involves careful examination of the fabric for any imperfections. The first inspection is called perching. These defects are usually repaired by hand. Some of these can be repaired quite inconspicuously. A few flaws may require more repairs such as holes or tears, broken yarns etc. This is done by the menders and is called mending. Burling is the process of removing any foreign matter such as burrs, loose threads, knots etc.

ROUTINE FABRIC FINISHES

Also known as basic or preparatory finishes, all the fabrics undergo these finishes to make them acceptable to consumers and prepare them for subsequent processes like special finishes and coloration. These include inspection, singeing, desizing, scouring, bleaching, stiffening, tentering and many more that are discussed below. It is not necessary that all the fabrics undergo each of these processes. The final list is decided by the finisher on the basis of the market requirement.

Singeing

Singeing is a process applied to both yarns and fabrics that consists of burning off the fuzz or fiber ends on fabric in order to obtain a smooth surface. Fabrics of natural and man-made staple fibers are singed when a clear smooth surface appearance is desired. For these fabrics, singeing is the first step in the total finishing operation. Before singeing the cloth is brushed to remove loose fibers, lint, and dust. The fabrics are singed in full width, under tension to keep the surface flat and free of wrinkles, creases, and curled selvages. In the most common method, the fabric is passed directly under an open gas flame. The fabric moves rapidly at a speed of 230 to 270 yards per minute to burn off the protruding ends. To prevent any damage from afterglow or sparks, the fabric immediately enters a water bath leaving the singer.

Desizing

Preparatory process for weaving includes application of sizing agents on the warp yarns prior to their placement on a warp beam for weaving. These stiffening agents must be removed before further processing as they have a waterproof property which impairs the wettability of the fabric and thus hampers application of subsequent finishes and coloration. Removal of the sizing material from warp yarns is called desizing.

Scouring

Scouring means washing. A gray fabric may have certain inherent impurities as well as acquired ones. Fabrics that are generally made of natural fibers must be scoured to remove foreign materials that might be present like natural waxes, dirt, processing oils and sizing compounds. For example, a cotton woven fabric may contain natural waxes and pigments (inherent) as well as dirt and oil (acquired) due to handling of hands and loom processing. These can be removed by scouring. For cotton, boiling water, soaps/alkaline builders as well as wetting agents, are all used proportionately to obtain clean fabrics. Protein fabrics are treated with neutral or slightly acidic chemicals since alkaline reagents can harm them. Man-made fibers may be scoured to remove temporary colors that were used for yarn and fabric identification.

Bleaching

Bleaching is chemical process of whitening the fabric by removal of natural coloring matter. Natural fibers have greater degree of unwanted color as compared to manufactured ones. Fabrics, yarns or fibers are bleached either to make them white or to prepare them for dyeing or printing. Bleaching is relatively durable when the bleaching method is appropriate to the fiber/fibers involved. Bleaches can be either oxidizing or reducing. Commonly used oxidizing bleaches include sodium hypochlorite, hydrogen peroxide, sodium perborate and potassium permanganate. Sunlight and ozone are also examples of oxidizing bleaches. Salient among reducing bleaches are sodium hydro sulphite, sodium bi sulphate and sodium thiosulphate. Treatment with bleach must always be followed by washing.

Sizing/Stiffening

This finish imparts firmness and body to the fabrics. Although a basic finish, stiffening may be done after coloration. Cellulosic fabrics can be stiffened with starch (temporary) or resins (permanent). Starch or other sizes gives weight to a fabric and can make an inferior product look attractive until laundered. It also prevents fabrics from soiling quickly. These days easy to use stiffening agents such as revive are available in the market. For stiffening of silk, gums are used.

Weighting

Weighting is a sizing technique applied to silk fabrics. After complete degumming, silk become soft and light (silk gum sericin, which is removed contributes 25% of the total weight). This loss in weight is compensated by treating silk with suitable organic and inorganic compounds. To make heavy or stiff materials, manufacturers resort to weighting the fabrics with metallic salts, such as stannous chloride. Weighted silk has body and density, but the fabrics are not as durable, for they are more sensitive to sunlight, air, and perspiration damage. However, as a malpractice, some silks are weighed above. This is harmful as it lowers the strength and luster of silk.

Mercerization

Mercerization is a chemical process applied to cellulosic textiles, especially cotton and cotton blends. It is a finish that contributes luster to cotton and increases the ease with which cotton accepts color and adds strength. The process is named after John Mercer who discovered the effect of caustic soda (alkali) treatment on cotton.

Calendaring

Calendaring is applied to cottons, linens and silk as well as to rayon and other man-made fiber fabrics. Pressing is the term used for wool fabrics. Basic calendaring and pressing are mechanical processes and must be renewed after each laundering or cleaning. The finish is similar to ironing but is done with much greater pressure. It gives a smooth surface to fabrics. Calendaring is done by feeding the fabric between large rollers. One of these rolls is somewhat soft while a second roll is firm and heated. The action is similar to the use of heated irons on fabric placed on a padded ironing board.

Carbonizing

Carbonizing is a chemical finish applied to wool fabrics. Wool yarns and fabrics frequently contain vegetable matter that was not completely removed during carding. To eliminate this, manufactures immerse the wool fabric in a solution of sulphuric acid or hydrochloric acid. It is then subjected to high temperatures for a brief time. The acid and heat react to convert the vegetable matter to carbon which is easily removed by a final scouring and if necessary, brushing. The fabric is then neutralized and rinsed.

Decating

Decating is a mechanical finish. On wool it is used to set the luster and develop a permanent sheen. On rayons, silks, and blends it softens the hand of the fabric and helps to set the grain in its proper relationship in the woven structure. Decating may be done wet or dry. If luster is desired, wet decating is used. The process involves exposure to heat, either hot water or steam, followed by cold water or a blast of cold air.

Fulling/Milling

Fulling is a mechanical finish applied to wool to produce a compact fabric. When wool is removed from the loom, it bears little resemblance to the fabric that the consumer purchases being loose and hard in texture. To make the fabric compact and soft manufacturers apply moisture, heat and friction. The fabric yarns shrink together, and the fabric softens to the desired texture.

Heat Setting

Heat sensitive thermoplastic fibers are generally given a heat-setting finish to ensure a stable fabric or as a means of producing a special shape. Though the process is mechanical the heat changes the physical characteristics of the polymer. Fabrics of 100% thermoplastic fibers or those of blends involving heat-sensitive fibers are heat-set. A major reason for heat setting is to introduce dimensional stability. The temperature, period of exposure, and the amount of force used to hold the fabric in the desired shape and size during setting affects the dimensional stability of the fabric.

Brushing

Brushing is a mechanical finish. It involves the removal of short, loose fibers from the surface of the fabric. Cylinders covered with the bristles rotate over the fabric, pick up loose fibers, and pull them away by either gravity or a vacuum. This finish is usually applied to fabric of staple fiber content to give a smooth and uniform appearance.

Shearing

Shearing is a mechanical process applied to some fabrics constructed from staple length fibers. It involves cutting or shearing off undesirable surface fibers or evening nap or pile. After singeing and subsequent processing, fiber ends or loose fibers may protrude from the fabric surface. Shearing cuts off these ends and permits a clear view of the weave. For pile fabrics, shearing evens the surface to give a uniform appearance. By manipulating shearing, it is also possible to cut designs into pile fabrics.

Optical Brightening

Modern day fashion demands bright whites to catch the eyes of the consumer. Most of the textile substrates have a yellowish tinge even after they have been bleached, blued etc. In order to remove this yellow tint completely optical brightening agents (OBA) are used to make white or light-colored fabrics appear brighter. These compounds are colorless dyes that absorb the invisible ultra-violet light and re emit it within the visible range (violet-blue light) causing more blue light to be reflected due to which the material appears brighter. Optical whiteners can be applied during the laundering process.

CONCLUTION

In conclusion, textile finishing techniques play a crucial role in enhancing the aesthetics, functionality, and performance of textile products. These techniques encompass a wide range of processes, from dyeing and printing to coating and mechanical finishing. They allow manufacturers to meet various consumer demands, such as colorfastness, water repellency, and wrinkle resistance. Furthermore, sustainable and eco-friendly finishing methods have gained importance in recent years to reduce the environmental impact of textile production. As technology and innovation continue to advance, the textile industry is likely to see further developments in finishing techniques, with a growing emphasis on sustainability and resource efficiency.

APPLICATION OF MODERN FINISHES IN TEXTILES - A REVIEW

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ABSTRACT

Recent years have seen a rise in the importance of functional finishes that address comfort and protection. In this chapter, we'll talk about finishes that cater to people's needs for thermal and sensory comfort, both physically and socially. Among those covered are coatings with odor-controlling properties, moisture management, and thermal regulation. For those who work or engage in other activities where risks might be present, finishes that enhance the protective properties of clothes are crucial. Among the topics covered are finishes with UV protection, antibacterial, liquid barrier, and flame resistant. One of the most recent methods for creating "smart" finishes that affect comfort and protection is the use of phase change materials (PCMs), which are also known as nanotechnology. Additionally, the chapter discusses the need for balance in order to achieve each form of comfort or protection and takes the health of the user into account.

KEYWORDS: Finishing, Textile Fabric, Anti-Bacterial, Anti Repellent, Functional, Chemical, Mechanical, Durable,

INTRODUCTION

In order to boost the value of finished textile products, several mechanical and chemical finishing techniques are applied during the basic textile finishing process. Following manufacturing, sizing, and dyeing is the pre-processing step of finishing. A fabric's finish determines how it will look, handle, function, and feel to the touch in addition to how it will look nice. Textile finishing is a crucial step in upgrading clothes. It happens after the clothing are designed and dyed. After finishing, the fabric has a silky feel and a lovely appearance. Additionally, it facilitates the clothing's ability to carry out particular functions like withstand fire or water and prevent creases.

Finishing

Textile finishing is like putting the final touches on clothes to make them even better. It happens after the clothes are made and colored. It makes the fabric feel nice and look beautiful. Finishing also helps the clothes do cool things like not catch on fire or get wet easily, and they won't get all wrinkly. Finishing costs money and special care, but it makes the clothes better and they will stay nice for a long time.

While traditional finishing processes, such as wet and dry finishing operations, are still employed on cotton and woolen fabrics, advanced textile finishing techniques may include functionalization utilizing nano-coatings, surface modification using enzymes, microencapsulation, etc. The finishing types have been discussed in the section below enhance the treated fabric's look and feel. There are more textile finishing techniques that provide the fabric unique qualities for specific uses.

Significance of Textile Finishing

The importance of textile finishing to the textile industry can be summed up by how well it improves the quality and usefulness of textile goods. The following list of factors illustrates the aesthetic need of Textile finishing-

1. Enhances aesthetics: Using textile finishing techniques like dyeing and printing, materials can be given more color and patterns, improving their visual attractiveness.
2. Increases functionality: Using finishing methods like coating, materials made of waterproof, fireproof, or breathable, increasing their functionality in a mixture of applications.
3. Increases tensile strength: Finishing methods like antimicrobial and stain-resistant finishing can help textiles last longer by preventing wear and tear.
4. Increases sustainability: By lowering water, energy, and waste generation, textile finishing processes can help make materials more environmentally friendly.
5. Promotes innovation: The sector is moving forward thanks to innovations in textile finishing techniques, which are opening up new avenues for the expansion of sustainable and high-performance textiles.
6. Increases value: Textile finishing can significantly increase

Function-Based Classification

The two categories that follow are function-based categories. It is they-

1. **Aesthetic Finishes**: This kind of finish alters or modifies the fabric's look or hand/drape characteristics.
2. **Functional Finishes:** This kind of finish modifies the fabric's inherent performance characteristics.

Classification embedded in the Finishing Technique

These are additional categories for finishes. It is they-

1. **Mechanical Finishes**: Dry finishes are another name for this category of finishes. This kind of finish entails giving a fabric surface a specific physical treatment to alter the cloth's look.

2. **Chemical finishes**: often known as wet finishes, are typically applied to fabric by padding, followed by curing or drying the cloth.

Classification based on Performance Level

Finishes can also be categorized based on performance levels. Based on their level of performance, textile finishes are categorized as follows. It is they-

1. **Permanent Finishes**: These finishes include a chemical modification of the fiber structure and remain constant over the course of a fabric's lifespan.
2. **Long-Lasting Finishes**: These finishes often survive the entire life of a fabric, lose some of their efficacy with each cleaning, and nearly disappear by the time the fabric has reached the end of its typical service life.
3. **Semi-durable Finishes**: Many are removable through home dry cleaning or laundering, and they typically withstand multiple launderings or dry cleanings.

Functional Finishes

Finishing and functional finishing are thus interchangeable terms that both contribute significantly to the commercial quality of textile outcomes. These criteria are completely based on the market, which growing more and more demanding and unexpected while is allowing for very quick responses. Functional finishing operations are carried out using several techniques depending on the category of textile substrate to be treated (staple, yarn, or fabric):

Treatments for Mechanical Finishing

The processes on open width dry fabrics, with or without the application of heat, and which give the fabric good dimensional stability (shrink proof and shape retention) as well as modify the "hand" of the textile product by changing its structure (at least its surface structure), are referred to as mechanical finishing processes.

Dry Finishing Scheduler

Friction, pressure, and heat can be used to create a look that is glossy, dense, and compact.

Embossing

This particular method of calendaring enables the etching of a straightforward design in fabric.

Seeding

The fiber end is dragged out of the cloth surface during this procedure, giving the cloth a much softer feel and a better insulating effect. A roller covered in abrasive substance is used to complete this operation.

Raising

An insulating effect is produced by the fiber end drawn out towards the fabric surface. Hook-needles are used for this operation, and they move in various directions on the fabric.

Shearing

The surface-level fiber ends of the fabric are cut using specialized cutting equipment.

Singeing

A flame is used to burn the fiber ends that have been tensed out to the fabric's surface.

Wet Finish

Using a wet calendar, the dry process and this one is very similar. The usage of steam is the only distinction.

Fulling

Wool's structure, bulk, and shrinkage are altered by the application of heat along with friction and compression.

Sanforising

By using mechanical forces and water vapor, the fabric is provided the best possible dimensional stability.

Decating

Thanks to the action of dry or hot saturated vapor, the shiny appearance of the textile material is removed, the surface is smoothed, and the fabric is given an ideal dimensional stability.

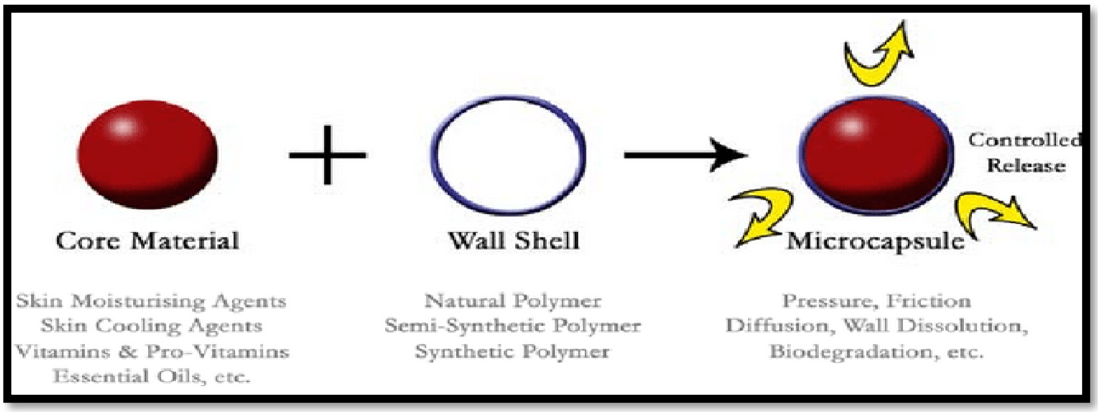
Finishing By Chemical Procedures

A cloth can acquire qualities that would be impossible to achieve mechanically by applying chemicals from various sources. Fabrics that have already undergone mechanical finishing procedures, such as calendaring, can be stabilized with chemical finishing treatments.

Incorporate characteristics into fabrics that would not normally exist, such as water and flame resistance.

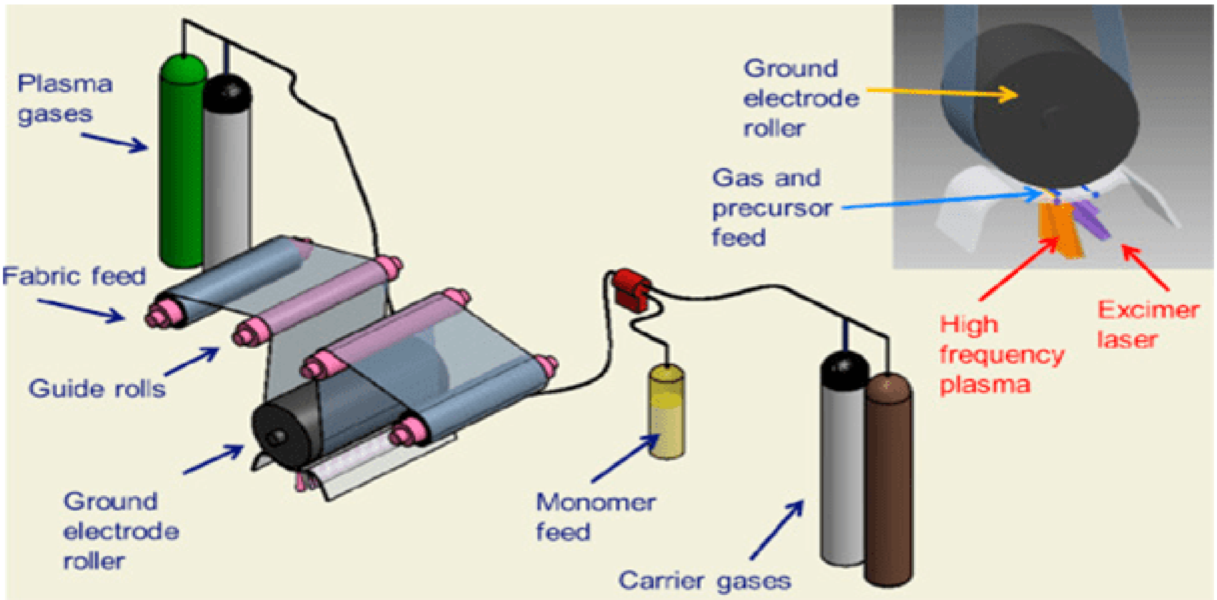
1. Microencapsulation

Microencapsulation is the technique of enclosing or coating very small droplets or particles of liquid or solid substance with a continuous polymeric film. This method produces a product known as microcapsules. Here both the fragrance component and the essential oil are flammable materials. How to increase the lifespan of an odor-emitting textile is the most challenging preparation assignment. This problem can be solved by micro-encapsulation. Normally spherical if they contain a liquid or gas and roughly the shape of the enclosed particle if they do not, microcapsules are tiny containers. It can be regarded as a unique type of packaging because each particle of material can be individually coated to protect it from the environment and release the volatile material from the contained capsule as needed. Microcapsules may now perform a wide range of beneficial tasks and have applications in a variety of technological domains because to this feature. For instance, the duration of storage for a volatile substance.



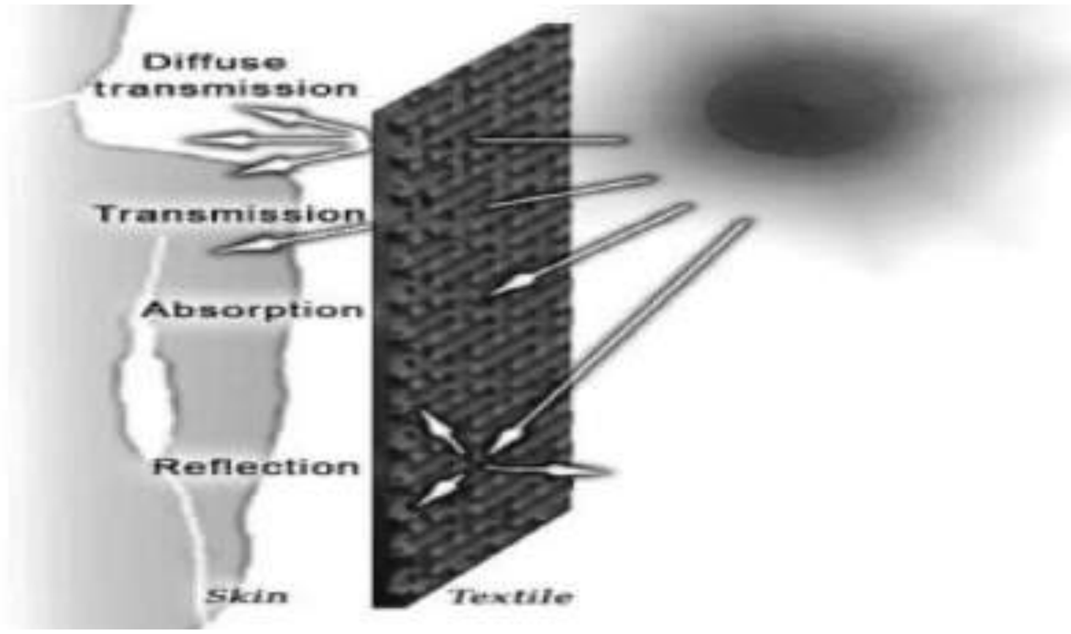
2. Plasma technology

In the plasma treatment process, a gas (such as air, oxygen, nitrogen, argon, carbon dioxide, and so forth) is ionized by the presence of two electrodes separated by a high-frequency electric field and injected into a reactor at a force of roughly 0.5 mbar. It is one of the most recent developments in textile finishing. The requirement to produce “cold plasma" with a temperature of less than 80 degrees Celsius justifies the necessity for a vacuum. This allows the treatment of fabrics with low melting points like polypropylene and polyethylene without causing any harm, with the same energy content that can be reached at atmospheric pressure at a temperature of several thousand degrees C. The elements that make up the plasma (ions, electrons, UV radiation, etc.), which are created by the breakdown of gas and have a high kinetic energy, attack the fabric as it travels between the electrodes. To eliminate any leftover organic particles and get ready for the upcoming introduction of free radicals and new chemical groups inside the molecular chain on the surface of the material, the surface of the fabric exposed to plasma action is transformed both physically (roughness) and chemically. The mechanical characteristics are unaltered, nevertheless, as the treatment is only applied to the topmost molecular levels.



3. UV protective finish

As the ozone layer continues to thin off, a UV protection coating becomes necessary. Because they can withstand the effects of dangerous UV rays and keep human skin in good condition, these finishes are crucial. In a reductive technique, a UV protection finish is applied during dyeing by both the padding and the exhaust methods. TiO2 and Zano, two nanometals oxides, are used as coating materials.



4. Clay finishing and composite fibers

Due to the nature of the clay microstructure, clay materials are being employed in textile finishing to benefit from their microstructural layer by layer capabilities in finishing technical textile materials into composite fabrics. In polymers reinforced with 2-5% nano clays, flame retardant, barrier characteristics, dimensional stability, and to some extent electrical properties were all greatly enhanced. Researchers are interested in the use of functionalized nano clays, particularly montmorillonites (MMTs), to enhance the mechanical characteristics of polypropylene thermoplastics. The main factors contributing to nano clays' commercial viability are their cheaper cost, wider application to the majority of synthetic polymers, including nylon 6,6 and 6,10 and the polyamide fibers polyethylene, polypropylene, and polyethylene terephthalate. On the other hand, research into or application of composites in the form of fiber, filament, or fabric has been underwhelming.

5. Water Repellency

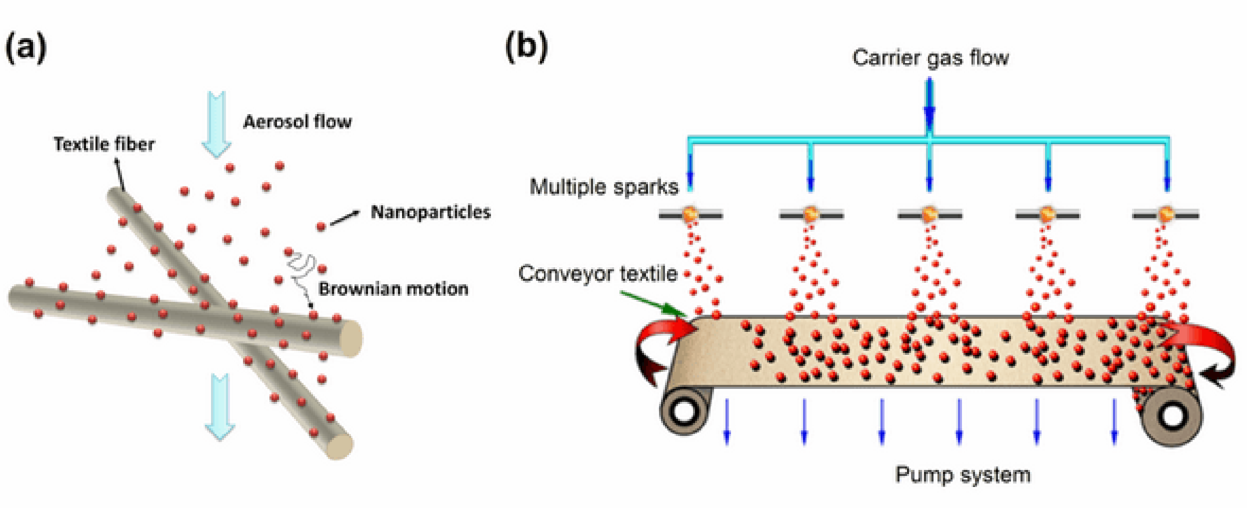
Water-repellent fabrics are those that prevent the absorption or penetration of water for a predetermined amount of time. These materials are more comfortable than waterproof ones because they are porous, allowing body perspiration to escape. While some fibers, like nylon and polyester, do not readily absorb water, others, like cotton and rayon, are more adept at doing so. As a result, it is frequently preferable to use the fibers of water-absorbing fabrics when producing goods like raincoats. The properties of clothing vary just as much as the times of water resistance do. Storm-resistant clothing may withstand water penetration for many hours while shower-resistant clothing is only effective in light rain and rain-resistant clothing in heavy rain.

6. Anti-microbial Finishing

Anti-microbial finishes are those that fight germs (such as bacteria, fungi, mildew, and viruses) by preventing their growth or by completely eliminating them. Humans may experience unpleasant side effects such as odor from sweat, eczema, irritation, allergies, infection, or disease. Leaching-type and chemically-bound type are the two primary anti-microbial finish types.

7. Nano finishing

The ability of metal nanoparticles and metal oxide nanoparticles to interact with light and microbes may have substantial desired impacts on textile materials. Investigating the subject is textile and fiber finishing. Special care must be taken during synthesis, application, consumption, and disposal of nanoparticles in order to use them without risk throughout their entire life cycle. While nano silver particles can offer antibacterial qualities, nano finishes comprised of metal oxides can offer flame retardancy, UV blocking, and self-cleaning properties. Nano silver is recognized to have a few drawbacks, including high cost, incompatibility with aqueous systems, and a propensity to stain fabrics.



8. Anti-Wrinkle Finish

Fabrics comprised of cellulose, regenerated cellulose, and mixes containing synthetic fibers have a higher propensity to wrinkle after washing, tumble drying, and wearing. The textile industry frequently employs wrinkle-free treatments to increase wrinkle resistance. The use of resins enables the improvement of particular characteristics of cotton or cellulosic fiber fabrics.

Ultimately, resins greatly improve the appearance of cloth by greatly enhancing crease recovery, decreasing piling, increasing dimensional stability, and removing creases. A carefully formulated resin is applied to fabrics will be of the wrinkle-free resin finishing process, cross-linking hydrogen bonds to strengthen stability.

<u>CONCLUTION</u>

Where the focus is concentrated is on the finishing procedure. The finished product has far higher value to today's consumers than the same-priced goods. For the industry to survive in the near future, it must therefore be the main focus. Finishes are assistance by Pretreatment given by Textile Manufacturers. Even so, every region of the world has its own distinct fashions and attire. Even still, there seems to be a global desire for products of higher quality and longer endurance.

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"A REVIEW ON THE IMPACT OF ARTIFICIAL INTELLIGENCE ON APPAREL PRODUCTION MANAGEMENT"

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ABSTRACT

AI integration has brought significant changes to garment production management, making the sector a hub of technological innovation. AI enhances efficiency, quality, and competitiveness, addressing dynamic market demands, complex supply chains, and sustainability needs. Real-world cases demonstrate how leading apparel companies use AI for better decision-making, quicker lead times, and customer-centric product design. However, ethical concerns like data privacy and effective human-AI collaboration are raised. This comprehensive review emphasizes AI's disruptive potential in garment production management, offering insights and guidance to stakeholders. AI adoption paves the way for a more sustainable, flexible, and customer-focused future in the apparel while ensuring operational excellence.

INTRODUCTION

The garment industry faces ongoing challenges due to shifting consumer preferences and production complexities. However, it is also at the forefront of a technological revolution driven by Artificial Intelligence (AI). AI is revolutionizing clothing creation, production, and distribution, offering tools to streamline processes, enhance supply chains, and predict consumer trends accurately. This transformation is improving the overall shopping experience for customers and positioning AI as a key driver of innovation in the garment sector.

Artificial Intelligence in Apparel Production

Artificial intelligence (AI) has enormous promise for the clothing sector since it can successfully address fit and fabric-related problems. While AI can help with human errors, it still has difficulties with accuracy and relevancy, especially when it comes to fact-checking because of the complexity and pervasiveness of false information. This opens the door to an important discussion about AI's functions especially, whether it should supplement or replace human abilities. This topic is crucial in the always changing context of AI integration in the apparel industry since it touches on the fields of original ideas and creativity.

The Need for AI in Apparel Production

Traditional clothing manufacturing methods have struggled with historical data reliance, manual processes, and a lack of insight into global supply chain complexities, leading to issues like overproduction and inventory excess. To address these challenges and meet evolving consumer demands, more flexible, data-driven, and responsive approaches are needed. AI is uniquely positioned to address these issues by analyzing large datasets, making real-time predictions, and automating decision-making. Its potential benefits include enhanced production scheduling, shorter lead times, improved product quality, and the ability to offer personalized fashion experiences at scale.

Artificial Intelligence in a Changing World:

Artificial intelligence (AI) has ushered in a transformative shift in how businesses worldwide approach innovation, problem-solving, and decision-making. AI fundamentally involves the development of computer systems capable of performing tasks traditionally requiring human intelligence, including problem-solving, pattern recognition, natural language understanding, and autonomous decision-making. The roots of AI can be traced back to Alan Turing's foundational work and the development of early computer systems in the mid-20th century. Recent decades have witnessed a significant AI breakthrough, driven by advancements in processing power, data accessibility, and algorithm sophistication. This progress has given rise to specialized AI subfields such as machine learning, deep learning, and natural language processing, each offering unique applications and capabilities.

AI in Context

The 21st century has witnessed widespread AI adoption, driving progress and productivity across sectors like healthcare, banking, transportation, and entertainment. In the fashion and apparel industry, AI has emerged as a powerful catalyst for transformation, impacting design, production, distribution, and retail. The industry faces challenges from rapidly shifting consumer preferences, intricate global supply chains, and sustainability goals. Traditional production management methods, rooted in historical data and human intuition, have struggled to adapt to these evolving demands.

AI's Relevance to Apparel Production Management

The garment industry has embraced AI due to its ability to address pressing challenges. AI's capacity to analyze vast datasets, identify trends, offer real-time forecasts, and automate decision-making aligns well with the complex requirements of clothing production management. AI, through sophisticated algorithms, machine learning, and neural networks, has become a valuable tool for enhancing production planning, reducing lead times, ensuring product quality, and delivering personalized shopping experiences. Moreover, AI plays a critical role in enhancing competitiveness and sustainability by accurately predicting demand, tracking fashion trends, and optimizing supply chains. In a world of rapid change and evolving customer expectations, integrating AI into garment production management is not just an option but a necessity. The following sections will explore the various uses, benefits, challenges, and potential applications of AI in this dynamic industry.

Historical Perspective

The intersection of artificial intelligence (AI) and garment production management signifies the coming together of the IT and fashion industries. While creativity, innovation, and the constantly shifting terrain of trends have always been associated with the fashion business, the integration of AI represents a considerable departure from its traditional processes.

Early Stages of Automation

The clothing industry's journey towards automation began with the invention of mechanical sewing machines in the late 19th and early 20th centuries, significantly reducing the time and labor needed for apparel production. However, early automation was predominantly mechanical and had minimal reliance on artificial intelligence (AI). As the garment industry grew in size and complexity throughout the 20th century, technological advancements continued to influence its evolution. The introduction of computer-aided design (CAD) systems in the 1960s provided designers with digital tools to create and visualize clothing designs, but these systems lacked the intelligence characteristics associated with AI, such as learning and decision-making abilities.

AI Emerges on the Scene

In the latter half of the 20th and the early 21st centuries, true AI integration into garment production management began to emerge. Advancements in technology, including larger datasets and more powerful computers, enabled the application of AI technologies such as machine learning and data analytics in the fashion sector. One of the initial applications of AI in the industry was demand forecasting. Traditional methods based on past sales data often failed to predict consumer preferences accurately, leading to issues like overproduction and excess inventory. AI-powered algorithms demonstrated remarkable ability in making more precise forecasts by analyzing factors such as consumer behavior and weather patterns.

AI's Expanding Role

In subsequent years, AI expanded its role beyond forecasting to encompass production scheduling, quality assurance, and supply chain optimization in the garment industry. Machine learning algorithms proved superior to human inspectors in areas such as inventory management, production planning, and product defect detection. Furthermore, the growth of e-commerce and digitalization in retail led to new AI applications. AI-driven recommendation systems now personalize the shopping experience by analyzing user preferences and providing tailored product recommendations based on individual tastes.

The Present and Beyond

AI has become a significant presence in the garment sector as we enter the third decade of the 21st century. It's tightly integrated with IoT devices, advanced robotics, and big data analytics, driving developments in smart textiles, sustainable fashion, and responsive production. This historical perspective highlights how AI is transforming traditional fashion processes and enabling unprecedented levels of customization, efficiency, and sustainability. Subsequent sections will delve into the various implications and applications of AI in garment manufacturing management.

AI Applications in Apparel Production Management

A new era of efficiency, accuracy, and adaptability in the fashion sector has been ushered in by the club of artificial intelligence (AI) and garment production management. This section explores the different ways that AI is being used in the garment industry, from quality control to demand forecasting.

<u>DEMAND FORECASTING AND INVENTORY OPTIMIZATION</u>

AI-Powered Predictive Analytics

Accurate demand forecasting is crucial for effective garment production management. AI, driven by machine learning, has revolutionized this aspect of the fashion industry. It leverages vast datasets, including sales history, market trends, seasons, weather data, and social media sentiment, to gain a deep understanding of consumer preferences and behaviors, enabling more precise forecasting.

Benefits of AI in Demand Forecasting

Precision: AI models can estimate demand very accurately, reducing the chance of overstocking or under stocking products. This accuracy is crucial in a sector where trends can shift quickly.

Dynamic forecasting: AI systems constantly adjust to shifting market dynamics to ensure that forecasts stay accurate even in the face of unforeseen occurrences or shifts in consumer mood.

Inventory reduction: AI assists clothes firms in optimizing their inventory levels by lowering forecasting mistakes, saving money on the costs of having too much inventory on hand, and freeing up funds for other initiatives.

Dynamic Pricing: AI is a key component of dynamic pricing techniques in addition to forecasting demand. To dynamically modify prices, AI systems examine current market conditions, rival pricing, and customer behavior. This guarantees that prices remain reasonable while optimizing profits.

Benefits of dynamic printing

Competitive Advantage Dynamic pricing allows apparel companies to stay competitive by responding quickly to changes in the market, such as fluctuations in demand or competitor pricing strategies.

Maximized Revenue-By setting optimal prices based on supply and demand, AI-driven dynamic pricing strategies maximize revenue potential.

Challenges and Considerations

While AI can significantly improve inventory management and demand forecasting, there are still some issues to take into account.

Data Quality: High-quality data are necessary for accurate predictions. To improve the efficiency of AI algorithms, apparel firms must assure the accuracy and cleanliness of their data.

Ethical Issues: In order to prevent unethical business practices or price discrimination against particular client groups, dynamic pricing algorithms should be implemented ethically.

Overreliance on AI: While AI can help with decision-making, it's important to keep a balance and avoid replacing human judgment totally, especially in situations where subjective considerations are involved.

PRODUCTION PLANNING AND SCHEDULING

Optimized Production Planning

AI has significantly impacted production planning and scheduling in garment manufacturing management. Historically reliant on historical data and human intuition, these processes have been transformed by AI's ability to handle vast data sets and optimize complex variables.

KEY AI APPLICATION

Integration with Demand Forecasting Models: By integrating with demand forecasting models, AI enables businesses to create production plans that closely match anticipated demand. As a result, there is less chance of an oversupply or stock out.

Dynamic Scheduling: AI-driven systems design production schedules that vary in real-time in response to shifts in demand, equipment availability, and labor restrictions. This adaptability maximizes resource use.

Resource allocation: AI algorithms make the best use of production assets by taking into account machine capabilities, labor availability, and material limits . AI aids in the implementation of just-in-time (JIT) manufacturing principles, cutting down on waste and extra inventory while preserving production efficiency.

BENEFITS OF AI IN PRODUCTION PLANNING AND SCHEDULING

Reduced Lead Times: AI-optimized production planning minimizes lead times, allowing companies to respond quickly to changes in market demand and trends.

Enhanced Resource Efficiency: Efficient resource allocation results in reduced machine downtime and labor costs, contributing to cost savings.

Improved Quality Control: Streamlined scheduling reduces the chances of rushed production, leading to better quality control and fewer defects.

CHALLENGES AND CONSIDERATIONS

Data Integration: Successful AI-driven production planning requires integration with various data sources, from demand forecasts to machine performance data. Ensuring data accuracy and compatibility is crucial.

Change Management: Implementing AI in production planning may require changes to existing processes and workforce training. Change management strategies are essential for a smooth transition.

Scalability: Companies need to consider the scalability of AI solutions as their production volumes and complexities evolve AI's applications in production planning and scheduling are pivotal in modern apparel production management. These applications optimize resource utilization, reduce lead times, and enhance production quality. AI-driven production planning systems are increasingly becoming a cornerstone of agile and efficient apparel production processes.

QUALITY CONTROL

AI-Powered Quality Assurance

Quality control is a critical aspect of apparel production management, ensuring that garments meet the desired standards for design, craftsmanship, and durability. AI technologies have emerged as a powerful tool to enhance and automate quality control processes, improving accuracy and efficiency while reducing production errors.

KEY AI APPLICATION IN QUALITY CONTROL

Image Recognition and Defect Detection AI algorithms equipped with computer vision capabilities analyze images of fabrics and garments to identify defects such as irregular stitching, fabric flaws, or color variations. These systems can pinpoint defects with high precision and consistency.

Automated Inspection AI-driven robots and machines equipped with cameras conduct automated inspections along production lines, identifying and flagging any deviations from quality standards. This ensures a consistent and objective assessment of product quality.

Predictive Quality Assurance AI analyzes historical quality data to predict potential defects or quality issues before they occur. This proactive approach allows manufacturers to take preventive measures, reducing defects and rework.

Process Optimization AI identifies patterns in production processes that may lead to quality issues and recommends process improvements. This ensures that the entire production pipeline aligns with quality standards.

BENEFITS OF AI IN QUALITY CONTROL

Enhanced Accuracy: AI systems consistently and accurately identify defects, minimizing false positives and negatives compared to human inspections.

Increased Efficiency: Automated quality control processes reduce inspection time, speeding up production cycles and reducing costs associated with rework.

Consistency: AI systems maintain consistent quality control standards across production runs, regardless of factors like worker fatigue or varying lighting conditions.

PERSONALISATION AND DESIGN

Consumers in the fashion industry now want more than simply clothes; they want distinctive, customized experiences. In order to do this, artificial intelligence (AI) has emerged as a key enabler, allowing garment firms to customize their goods and services to suit customer tastes and requirements. To offer individualized product recommendations, AI-driven recommendation engines examine huge datasets of consumer behavior, purchase history, and preferences. These algorithms can make apparel recommendations that fit a customer's style, size, and browsing preferences, boosting the possibility that they will make a buy.

Virtual fitting rooms- Powered by AI, virtual try-on services let clients virtually try on apparel to see how it will fit and look before purchasing it. The online buying process is improved by this immersive experience, which also lowers returns and boosts customer happiness.

Platforms for customization: AI makes it possible to build platforms for customization, which let users customize apparel by choosing colors, patterns, and designs. AI then converts these choices into customized clothing, producing one-of-a-kind and customized goods.

Design assistance: AI helps clothes designers by researching past trends market need, customer feedback, and trends. As a result, designers are better able to come up with original design concepts and make data-driven judgments throughout the design process.

BENEFITS OF AI IN PERSONALISATION AND DESIGN

Enhanced Customer Experience: Personalization creates a more engaging and tailored shopping experience, increasing customer loyalty and repeat business.

Reduced Returns: Virtual fitting rooms and customization platforms help customers make informed choices, reducing the likelihood of returns due to size or style issues.

Innovative Design: AI augments the design process by providing insights into current trends and consumer preferences, fostering creativity and product relevance.

CALLENGES AND CONSIDERATIONS

Data Privacy: Collecting and analyzing customer data for personalization raises privacy concerns. Companies must adhere to data protection regulations and maintain transparency in data usage.

Balancing Personalization: Striking the right balance between personalization and privacy is crucial. Over-personalization can sometimes make customers uncomfortable.

Design Creativity: While AI can assist in design, it should complement, not replace, human creativity and artistic expression in fashion . AI's applications in personalization and design have revolutionized how apparel companies interact with and cater to their customers. These AI-driven solutions foster a deeper connection between consumers and brands, while also enhancing the creative process for designers.

RETAIL AND CUSTOMER EXPERIENCE

Transforming the Retail Landscape

The retail experience in the apparel industry has undergone a remarkable transformation driven by Artificial Intelligence (AI). AI is not only reshaping how consumers shop but also how retailers interact with and serve their customers. From virtual try-ones to chat bots, AI is revolutionizing every aspect of the retail journey.

KEY AI APPLICATION IN RETAIL AND CUSTOMER EXPERIENCE

Virtual Try: Ones- AI-powered virtual fitting rooms enable customers to digitally try on clothing items. Using augmented reality (AR) and computer vision, these systems overlay virtual clothing onto the customer's image, allowing them to see how garments will look and fit.

Personalized Recommendations: AI-driven recommendation engines analyze customer behavior and preferences to offer tailored product recommendations. These systems consider factors such as past purchases, browsing history, and style preferences.

Chat bots and Virtual Assistants: AI-powered chat bots provide instant customer support, answer product-related queries, and offer assistance throughout the shopping process. They are available 24/7 and can handle multiple customer interactions simultaneously.

Inventory Management: AI helps retailers optimize inventory by providing real-time insights into stock levels, demand trends, and supply chain disruptions. This ensures that products are available when customers want them.

Dynamic Pricing: AI-driven dynamic pricing strategies adjust product prices based on real-time data, market demand, and competitor pricing, allowing retailers to maximize revenue.

BENIFITS OF AI IN RETAIL AND CUSTOMER EXPERIENCE

Enhanced Customer Engagement: AI-driven personalization and virtual try-ons create a more engaging and personalized shopping experience, increasing customer satisfaction and loyalty.

Efficiency: Chat bots and AI-powered assistants streamline customer support and reduce response times, improving operational efficiency.

Optimized Inventory: AI-driven inventory management reduces the risk of overstocking or under stocking, optimizing inventory turnover and minimizing carrying costs.

CHALLENGES AND CONSIDERATION

Data Security: Collecting and storing customer data for personalization and customer support require robust data security measures to protect customer privacy.

Training and Integration: Implementing AI solutions in the retail environment may require staff training and integration with existing systems and processes.

Ethical Use: Retailers must use AI ethically and transparently, ensuring that AI-driven recommendations and interactions benefit customers rather than exploit them.AI has transformed the retail and customer experience in the apparel industry, offering personalized, efficient, and engaging interactions for consumers. These AI-driven solutions empower retailers to offer a superior level of service while optimizing their operations.

FUTURE TRENDS AND DIRECTIONS

The impact of artificial intelligence (AI) on managing the manufacture of clothing is expected to increase as the technology develops. The industry will be shaped by a number of trends and orientations in the future, which promises to be a dynamic environment:

Advanced Personalization: The demand for highly personalized clothing and shopping experiences is expected to intensify. AI will become even more proficient at understanding individual preferences, enabling apparel companies to offer personalized designs, sizing recommendations, and curate product assortments.

Sustainable Practices

Sustainability will remain a critical focus for the apparel industry. AI will play a pivotal role in optimizing supply chains, reducing waste, and developing sustainable materials. Predictive analytics will help companies make informed decisions that align with environmental goals.

AI-Powered Design and Creativity

AI will continue to assist designers in generating innovative and trend-responsive designs. Generative AI models will be used to create unique patterns, styles, and color combinations, fostering creativity while reducing design lead times.

Augmented Reality (AR) in Retail

AR will become increasingly integrated into the retail experience. Customers will use AR apps for virtual try-ones, allowing them to see how clothing fits and looks in real time. This immersive experience will bridge the gap between online and offline shopping.

Block chain for Transparency

Block chain technology will be harnessed to enhance transparency and traceability within the apparel supply chain. Consumers will have access to verifiable information about the origin of materials and production processes, promoting ethical and sustainable practices.

AI-Driven Sustainability Metrics

AI will develop sophisticated metrics for assessing and quantifying the environmental impact of clothing production. These metrics will enable companies to measure and reduce their carbon footprint more effectively.

Predictive Maintenance in Manufacturing

In manufacturing, AI-driven predictive maintenance will become standard. Machines and equipment will be continuously monitored, and AI algorithms will predict maintenance needs to minimize downtime and improve efficiency.

Human-AI Collaboration

While AI will continue to automate many aspects of apparel production management, the importance of human expertise will persist. Human-AI collaboration will be essential, with professionals using AI tools to make data-informed decisions.

E-commerce and Online Marketplaces

Online marketplaces, driven by AI-driven recommendation engines and virtual try-ones, will continue to dominate the retail landscape. Traditional brick-and-mortar stores will incorporate AI technologies to create more engaging in-store experiences.

Ethical AI Practices

AI ethics and responsible AI practices will gain prominence. Companies will prioritize fairness, transparency, and accountability in AI algorithms and decision-making to build trust with customers and regulators.

CONCLUTION

AI has profoundly transformed the fashion industry, impacting garment production management, demand forecasting, quality control, personalization, and sustainability initiatives. It has evolved from experimental to data-driven solutions, addressing challenges like accurate demand forecasting and production planning. AI-driven predictive analytics enables accurate adaptation to customer expectations, while dynamic pricing optimizes revenue. AI enhances personalization, retail experiences, and sustainability through recommendation engines, virtual try-ones, and supply chain optimization. Blockchain ensures transparency. Looking ahead, AI will continue to expand its role, influencing advanced personalization, sustainable practices, AR in retail, and block chain transparency. Predictive maintenance and ethical AI practices will be vital. The industry's future is marked by innovation, efficiency, and sustainability, with AI as a catalyst promising a transformative future.

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DEVELOPMENT AND CHARACTERIZATION OF LINEN FABRIC TREATED WITH HERBAL EXTRACT FOR FLAME RETARDANT APPLICATIONS

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ABSTRACT

Application of flame retardants plays a crucial protective function to reduce overall fire risk by suppressing the spread of fires or by delaying the time of flashover, thus enabling people or resources to have sufficient time to escape or rescue from the fire hazards, respectively. There has been an ever-growing demand for new flame-retardant product options recognizing not only to ensure a favorable ecological profile but also to have a durable and cost-effective product. Flame retardant functionality was imparted in 100% woven linen fabric using spinach leaf extract, an ecofriendly herbal product. The extract was taken using Soxhlet apparatus, then filtered using Whatman no:1 filter paper and made alkaline and applied in fresh bleached, mordanted fabric. Flame retardant properties of the control and treated fabrics were analyzed in terms of limiting oxygen index (LOI), horizontal, vertical and inclined flammability. The chemical composition of the control and spinach extract-treated linen fabric were analyzed by FTIR, SEM AND EDX.

Keywords: Flame retardants, linen fabric, Spinach, Herbal product, Flammability, Limiting oxygen index.

INTRODUCTION

Increasing concern over damage caused by exposure to microbes, chemicals, pesticides, UV light and pollutants in the last few years, has heightened the demand for protective garments. clothing today is expected to be water proof, flame resistant, self-cleaning, insect repellent and antimicrobial to protect human beings from infection, UV light, chemical and biological agents, be warmer in winter and cooler in summer while at the same time being light and less bulky than current solutions[1]. Among these, fire retardant textile is considered to be one of the important parameters for its application in home furnishing, hospital, railway and aircraft. Flame retardant textile is also important for workers, who are directly engaged in oil, gas and petroleum industries. Flame retardant was a sort of assistants to bump flammability or fire resistance of combustible or self-extinguish or smoke abatement up. In recent years, along with fire safe standard increasingly exactitude, the dosage all the while submits ascending trend of the global flame retardant, for slate at henceforth five years within, for global flame-retardant demand years equal growth rate approve reach 4% ~ 5%.Linen is a natural fiber made from the stalk of the flax plant. Flax is a finicky plant to grow and a great amount of care goes into its production[2].Linen is naturally durable and breathable. Linen can range from a durable work fabric to fine home décor and apparel fabrics depending on the weave and quality of the flax it was made from. Burning characteristics are similar to those of cotton. Ironing temperatures are higher than those of cotton (260°C).You could observe this on the temperature dial of your electric which designates a higher setting for linen than that for cotton Spinach (Spinaciaoleracea) is an edible flowering plant in the family Amaranthaceae native to central and western Asia. Its leaves are eaten as a vegetable. There has been an ever-growing demand for new flame-retardant product options recognizing not only to ensure a favorable ecological profile but also to have a durable and cost-effective product[3].This study is an attempt made to improve flame retardant property of cellulosic linen fabric using vegetable extract .i.e., spinach extract as it contains necessary metallic constituents. Extensive study was conducted to assess the effect of spinach extract in different concentration on flame retardant property of linen fabric in terms of LOI and burning rate.

MATERIALS AND METHODS

A 0.340Kg/m^2 plain woven bleach 100: Linen fabric of 76 EPI(ends/inch),64 PPI(picks/inch) with 25s warp count and 30s weft counts were procure from the local market. Spinach juice used for this study was extracted from dried spinach leaves of local market. Extraction was done using Soxhlet apparatus and the extract was then filtered using Whatman No. 1 and prepared for application in selected linen fabric. Bleached linen fabrics were mordanted using 5% Tannic acid and 10% Alum each for 8-24hrs respectively. It was then impregnated with two different compositions of spinach and water 1:1 and 1:2 at 90 °C with material to liquor ratio 1:5 for 30 min. All the solution has been made alkaline at $_P$H 10 using Soda ash. Treated samples were then dried at 110°C for 5 min.

Testing

Before testing, treated linen fabric samples were conditioned for 48 hrs. at 65% Relative humidity and 27°C.

Flammability assessment

Burning behaviour of the control and treated samples were evaluated by standard methods. For limiting Oxygen index (LOI) analysis, ASTM D 2863 test method was used. In horizontal flammability, the propagation rate was measured as per IS 15061:2002 (ANNEX A) standard. In vertical flammability, different parameters were measured as per the ISO 6941 standard. In inclined flammability, the flame time was measured as per the ASTM D 1230 standard.

Fig 1 : Inclined flammability

SEM and EDX analysis

For surface analysis of the control and the treated samples, Scanning electron microscope Bruker model was used. EDX analysis was carried out in field emission gun scanning electron microscope (FEG-SEM).

RESULTS AND DISCUSSION

Bleached mordant linen fabrics have been treated with two different composition of spinach extract and water. The results of the flammability testing of both the control and the treated samples have been given in Table 1.

Flammability testing

Bleached mordanted linen fabrics were treated with two different compositions of spinach juice (1:1 and 1:2) as discussed in materials and methods. The results of the flammability testing including LOI of the control as well as the treated samples are presented in Table 1.

Table 1 : Flammability properties of the control and spinach extract: water treated linen fabric.

Flammability parameters	Control	Different concentrations of spinach extract : water treatment	
1:1 1:2			
LOI	18	23	25
Horizontal flammability Warp burning rate (mm/min)	140	121	128
Vertical flammability marker thread served time(sec)	21.08	31.81	25.08
Occurrence of surface flash	Nil	nil	Nil
Inclined flammability face side burning time (sec) warp	143	325	252

The LOI, a measure of a sample, is defined as the minimum amount of Oxygen in the oxygen/nitrogen mixture requires to support combustion. Fibers having the LOI value of 21 or below ignite easily and burn rapidly in the open atmosphere. Sample with LOI value of above 21 ignite, but burn slowly. When the LOI value of the material becomes equal or more than 26, it may be considered as flame retardant [4]. The LOI values of the control and spinach treated linen fabrics are given in Table 1.

Linen being cellulosic in nature and catches flame readily as that of cotton and showed lower LOI value of 18.Before application of spinach extract, linen samples were bleached and the mordant. After application of Spinach extract in linen samples at two different concentrations, the value increased significantly. In bleached and mordant linen fabrics treated with spinach extract, 1:2 (spinach : water ratio), the LOI value increased to 23 and 1:1 (spinach : water) value increased to 25.In all the spinach extract treated samples as LOI value increased significantly, the samples do not catch flame. In vertical flammability test, the control sample catches flame within 20sec treated samples catches flame only after 30sec without a surface flash or afterglow. Figure 1 represents the inclined burning behavior of the Spinach extract treated(1:1) samples at two-time intervals. By increasing the concentration of Spinach extract, burning with flame time could be reduced to nil.

SEM and EDX analysis

The SEM images of control and Spinach extract treated(1:1 and 1:2)linen fabric is shown in Figure 2. It can be seen from Figure 2(A); control sample is clean and there is no coating and deposition. However, after treatment with spinach extract (1:1 and 1:2) can be easily visible from Figure 2(B) and 2(C).From the EDX analysis it is evident that the control sample shows only the presence of carbon and oxygen and the treated samples using extract of dried spinach leaves shows only the presence of carbon, oxygen and evidence of magnesium, sodium etc. in small amount. .From Figure 3(A), 3(B), and 3(C) we can find its presence. Table 2 shows the results of the EDX analysis of spinach treated linen 1:1.

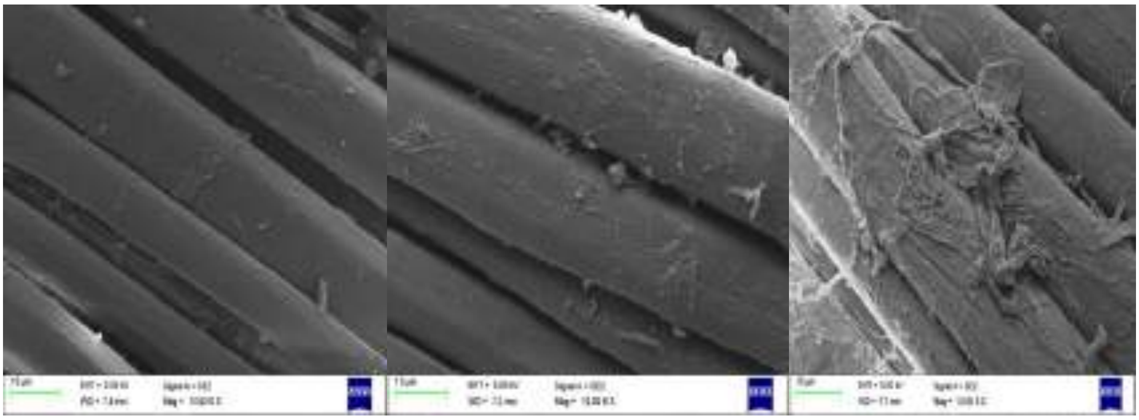

Fig 2(A) Control Sample Fig 2(B) 1:2 Fig 2(c) 1:1

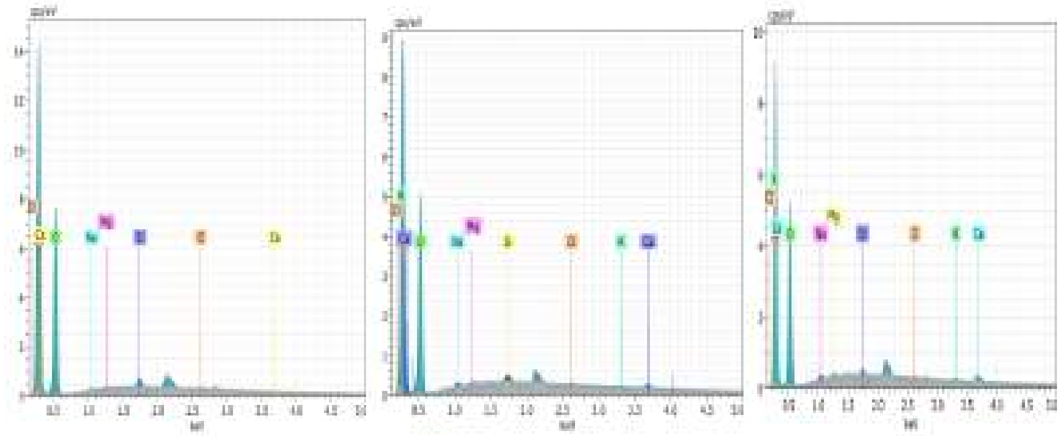

Fig 3(A) Control Sample Fig 3(B) 1:2 Fig 3(C) 1:1

Table 3: EDX analysis of spinach treated linen 1:1

Spectrum: 1:1

Element	Series	Unn. [wt. %]	C.norm. [wt. %]	C Atom. [wt. %]	C Error (3 Sigma) [wt. %]
Carbon	K-series	50.38	50.38	57.76	17.84
Oxygen	K-series	48.46	48.46	41.70	17.79
Silicon	K-series	0.15	0.15	0.07	0.10
Calcium	K-series	0.40	0.40	0.14	0.12
Sodium	K-series	0.30	0.30	0.18	0.15
Magnesium	K-series	0.15	0.15	0.09	0.11
Chlorine	K-series	0.06	0.06	0.02	0.09
Potassium	K-series	0.10	0.10	0.04	0.09
Total		100.00	100.00	100.00	

Mechanism of flame-retardant property

It was seen that linen being cellulosic in nature, it has low LOI value of 18 and does not show any protection from flame[5].Bleach the linen fabric and then mordant it followed by application of spinach extract with different concentration in alkaline condition is being done. Linen becomes flame retardant mainly because of spinach extract and its chemical composition. From various characterizations, it is presumed that the presence of metal salts in Spinach extract may be the reason for the thermal decomposition of linen.

Physical properties and natural color

TABLE 3 : Physical properties of control and spinach extract treated samples.

PARAMETERS	CONTROL	1:1	1:2
Fabric weight(g/cm$^{2)}$	139.4	148	147.6
Tearing strength(gf)	168.32	200.96	188.8

Table 3 shows the fabric weight and tear strength of the control sample and spinach extract treated fabric samples. The application of flame-retardant finish has no adverse effects on fabric weight or tear strength. After application of Spinach extract, the color of the sample changed from white to off white.

CONCLUTION

The study has shown the flame retardancy effect of spinach leaf extract on cellulosic linen fabric. After application of spinach extract, the LOI increased from 18 to 25.Due to higher LOI, the total burning time could increase. This will help to get more safety time either to extinguish the fire or to escape from fire hazards zone. Only spinach extract with more concentration 1:1 was found to be best for the application in linen fabric in alkaline condition. Flame retardancy property in the Spinach extract treated linen fabric might have been attributed to the presence of increased amount of metal salts and water molecules. The application process is simple and cost effective. This developed process could be used in coloration and flame-retardant finishing products such as home textiles. Lower heat transmission factor and high LOI value of the treated fabric helps to use it in diversified application like kitchen cloth, agro textiles, protection wears etc. Therefore, the application of spinach extract in bleached linen fabric for coloration and functionalization will give advantages of value addition using natural product.

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REVIEW ON SMART TEXTILES IN GARMENT INDUSTRY

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ABSTRACT

Smart textiles are defined as textiles that can sense environmental conditions and react to them. Smart textile is made from fusing together fibers and technology. These products include conductive yarns and polymers, shape memory polymers, fiber optics, sensors, chemical treatments and thermo-chromic dyes. The aim of the smart textile is to make technology wearable. Such electronic devices should meet certain criteria to make it wearable. Smart textiles are the future textile industry. As smart textile is a new technology, many people are not aware of its advantages. The aim of this study is to bring the advantages and advancements of smart textiles to light. This review might help the people to know more about the usage of smart textiles which will increase their standard of living. This study focuses on acknowledging the smart textile and to explore their advantages.
Keywords: smart textiles; electronic textiles; wearable systems

INTRODUCTION

The term Smart Textiles refers to a field of studies and products that extend the functionality and usefulness of common fabrics. Smart Textiles are defined as textile products such as fibers and filaments, yarns together with woven, non-woven structures. They integrate a high level of intelligence and can be divided into three subgroups: Passive smart textiles, Active smart textiles, very smart textiles. Sensors provide a nervous system to detect signals, thus in a passive smart material, the existence of this sensors essential. Fabrics incorporating sensing temperature; shape-sensitive fabric sense movement, can be combined with EMG sensing to derive muscle fitness. All electronic devices require power, and this is a significant design challenge for Smart Fabrics. Input devices can include capacitive patches that function as shape-sensitive fabrics that can record flexing, pressure, and stretching or compression. Smart textiles are not just restricted to clothing and apparels but extend to many other applications like automobiles, robotics, aircrafts, medicine and surgery etc. The importance of these materials was so profound at some places examples for military battlefields that they virtually act as lifesaving materials. A study about intelligent textiles was at his first stage reduced for a study on smart materials.

FABRICATION TECHNIQUES:

Over the past decade, many techniques and materials have been used in order to realize smart textiles. In the following section, are together with methodologies, the relative projects also presented.1.Conductive fibers,2.Treated Conductive Fibers,3.Conductive Fabrics4.Conductive inks,5.Conductive Materials as sensors, I)Stretch Sensors, I)pressure sensor, III)Electrochemical Sensors, IV)Textile Energy Harvesting and Portable Power Supply System6.Planar Fashionable Circuit Board (P-FCB),7.Wearable Antenna,8.Stretchable Interconnection.

Manufacturing Process of E-textiles

Manufacturing process of e-textile are several methods which companies manufacture e-textiles from fiber to garment and the insertion of electronics to the process. The conductive ink uses metal fragments the ink to become electrically conductive. Another method would like be using conductive thread or yarn. This development includes the coating of non-conductive fiber like Polyester PET with conductive material such as metal like gold or silver to produce coated yarns or in order to produce an e-textile. Common fabrication techniques for e-textiles include Embroidery,Sewing,Weaving,Nonwoven,Knitting,Spinning,Breading,coating,Printing,laying these are the following a e-textile traditional method.

Chameleonic textiles

These are intelligent textiles which change color (because the dye applied on the surface change color) with change in temperature. Chromic materials are the general term referring to materials which radiate the colourmaps the color or just change it because of its induction caused by the external stimuli, such as light, heat, electricity, solvent, pressure. The color change is especially due to application of thermo chromic dyes whose color changes at particular temperature. Thermo chromic systems was applied to textile in 2 types of recognized, the liquid crystal type and the molecular rearrangement type.

Musical jackets

Smart MP3 Player

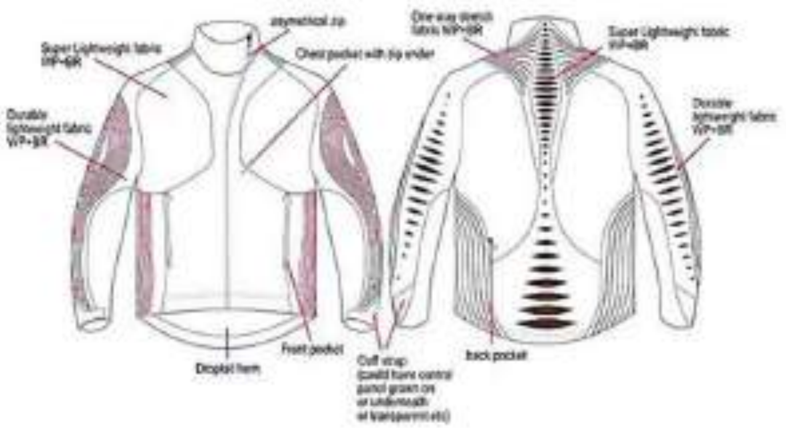
Musical jacket turns an ordinary jacket into a wearable musical instrument. Jackets are allowing the wearer to play notes, chords, rhythms, and accompaniment using any instrument available in the general music scheme. It integrates fabric keypad, a sequencer, synthesizer, amplifying speakers, conductive organza, and batteries to power these subsystems. The sensor system consists of a heart rate sensor, three position and movement sensors and ten temperature sensors, an electrical conductivity sensor and two impair detecting sensors.

Iris van Herpen edit water dress

Smart fabrics and 3D printing have been incorporated in high fashion by the designer Iris van Herpen. Van Herpen was the first designer to incorporate 3D printing technology of rapid prototyping into the fashion industry. The Belgian company Materialise NV collaborates with the printing of designs.

Iris Van Herpen's water dress.

ILLUM jacket



ILLUM jacket layout

The ILLUM jacket are based on technologies including printed electroluminescent ink and printed photovoltaic technology. The functional parts were placed outside the jacket and into several ergonomic panels, while at the front and the photovoltaic source of the shoulders and top of the back. Thermotron of UNITIKA (Osaka, Japan) are a particular fabric able to converts sun light into thermal energy while storing heat without wasting it. Inside the Thermotron there are microparticles of zirconium carbide which allow the fabric to absorb and a filter sunlight.

Wearable electronic Circuit

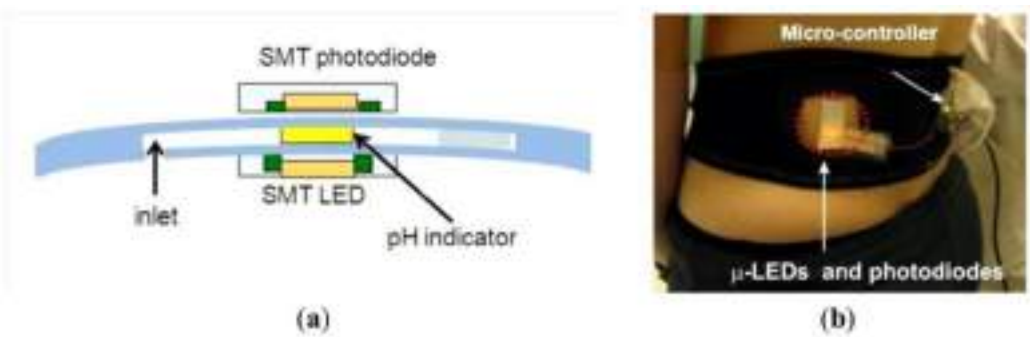
(a) (b)

(a) Musical Jacket comprising a fabric keypad on one side, a MIDI synthesizer on the other side, speakers behind speaker grills in the pockets and fabric buses visible inside the jacket; (b) The fabric keypad with the circuit board placed behind it.

Electronic circuits built entirely out of textiles to distribute data and power have been devised by researchers at the MIT, USA. This creates interactive electronic devices such as musical keyboards and graphic input surfaces. Several circuits have been built with fabric to date, including busses to connect various digital devices, microcontroller systems that sense proximity and touch and all-fabric keyboards and touchpads. Building systems in this way easy because components can be soldered directly onto the conductive yarn.

Stretch Sensors

Stretch sensors are predominantly used for sensing and monitoring body parameters, as the textiles are in contact with the skin over a large body area. This means that monitoring can take place at several locations on the body. For instance, these sensors can be used for determining: heart rate, respiration, movement and pressure blood. A specific structure of textile sensors is that integrating fibers featuring piezo-resistive properties, enabling their use as strain or deformation sensor.



Electrochemical sensor for pH analysis

(a) Scheme of electrochemical sensor for pH analysis

(b) the system application.

The researchers of National Centre for Sensor Research, Dublin City University (Ireland), present examples of wearable chemical sensors that monitor the person and also their environment. In particular the chemical sensor was able to measure and analyze sweat in real-time on the body. They have developed a microchip version of the platform to measure changes in the pH of sweat. The color change of the pH sensitive fabric was detected by placing a surface mount smart LED and photodiode module on either side of the chip, aligned with the pH sensitive fabric. The final device (180 µm thick) is flexible and can adapt to the body.

DISCUSSION

The methods presented in the previous section are quite different and each one has very specific feature such as conductivity, flexibility, biocompatibility, mechanical resistance and washability. However, only a few approaches are able to satisfy all these requirements at the same time. The section below has the aim to clarify some features are about the materials and methods.1.Conductive Wires,2.Treated coating,3.Conductive of Fabric PETEX,4.MIT CAD Embroidery,5.Conductive Inks,6.Stretchable Sensors,7.Pressure Sensors,8.Electrochemical Sensors,9.Power Supply,10.Planar Fashionables Circuit Board (P-FCB),11.Wearable Antenna,12.Stretchable Interconnections. These methods are discussed this section.

CONCLUTION

Textiles are representing an attractive class of substrates for realizing wearable bio-sensors. Smart textiles advantages are more and more. Wearable system and smart textiles applications and electronic textiles usages are most of applied in smart textile. Electronic textiles or smart textiles describe the convergence of electronics and textiles into fabrics which are able to sense, compute, communicate and actuate. As many different electronic systems can be connected to any clothing, a wearable system becomes more versatile, and the user can change its look depending on environmental changes and individual preference. Finally, we consider relevant to the development of smart textiles requires a multi-disciplinary approach in more knowledge of circuit design, smart materials, micro-electronics and chemistry are fundamentally to integrated with a deep understanding of textile fabrication.

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WATERPROOFING PROPERTIES OF FINISHED UPPER LEATHER

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ABSTRACT

Waterproofness property of the leather can be enhanced by modifying different steps involved in pre-tanning to finishing operation. In this study three set of experiment were conducted where tanning and finishing techniques differed to analyze the improvement of the waterproofness property. All other physical properties expect water vapor permeability of leather samples of experiment-3 were excellent as compared to other experiments. Scanning Electron Microscopy (SEM)image of the leather sample was also analyzed.

KEYWORDS: Waterproofness, Surfactants, Retaining, Fat liquoring, Finishing.

INTRODUCTION

Leather is the second export earning sector next to readymade garments in Bangladesh. Leather products confer high aesthetic value as well as functional and social value as a commodity. Therefore, almost all types of leathers, except a few (like chamois) , are made waterproof to varying degrees. In order to prevent the wetting of leather, it is necessary to be aware of the process of leather wetting. Generally, it takes place in four – steps .

Wettability with water is reduced or almost completely eliminated through increasing the interfacial tension between leather fibers and water by depositing water repellents in the leather substance.

There are many other factors that influence the Waterproofness of the leather not only chemical substances used in leather manufacture (salts, ten sides, fanning agents, retaining agents, dyestuffs, fat liquoring agents and finishing agents). Both initial qualify of skin or hide and each operation involved in producing the finished leather have significant influence on the Waterproofness degree of finished leather [10][11]. Leather finishing is the process where a set of operations (chemical and mechanical) are performed in a sequential manner under a system during which finishes are applied to the leather surface with the aim of improving its appearance, feel, Waterproofness and general suitability to intended use. The final uses of different leather are wide and include shoe uppers, garments, gloves, leather goods, furniture and automotive upholstery and so on.

The choice of waterproofing system depends on the degree of water resistance required, the purpose of leather, and price. Extreme hydrophobicity is required for military footwear leather . Waterproof leathers are commercially of high interest because these leathers are sold at a relative high price due to requirement of specialty products.

The aim of this work was to evaluate the waterproofing behavior of the upper leather upon various combinations of pertaining , fanning , retaining, fact liquoring and finishing agents. Extensive work has been performed in this research to develop process for the production of value-added quality waterproof finished leather using domestic cow hides.

THE CHOICE OF CHEMICALS

The hides and skins tanning with chromium salts (I.e., wet blue leather) induced the collagen fiber to be resistant against bacterial attack and increase resistance to temperature. Therefore, vegetable tannins are more difficult penetrate to leather matrix, and leather tanning process runs longer.

The wide use of acrylic acid derivative is related to the presence of many carboxylic acid side groups that can give tanning property both reacting with multiple chrome centers on the leather and chemical bounding to the collagen groups. Acrylic resin interaction mechanism with chrome tanned leather is present. Synthetic retaining materials are used for filling and softening, as auxiliaries during fat liquoring and sometimes as extracts. The filling improves the tightness and fineness of the leather grain with Mellow surface . The retaining agents play important role in the final degree of leather waterproofness. Melamine – dicyandiamide resin , acrylonitrile resin, styrene maleic copolymer , chestnut can significantly to lower water absorption of leather. Fat liquoring agents are one of the important leather chemicals that have great effect on leather performance. It can penetrate into the interwoven structure of the collagen fibers, prevent the leather fibers from putrefaction, make the fibers stick together and improve their physical and mechanical capabilities. The fat liquoring is the main step in the production of hydrophobic leather. Generally ,fat liquoring substances are divided into hydrophobic components and hydrophilic components.

Multi-function fat liquoring agents can offer more new capabilities for leather. Besides fat liquoring function, they can enhance segment mobility of molecular chain of collagen fibers , and contribute higher level of softness, flexibility, waterproofness, perspiration resistance. Not only waterproofing but also repellent properties to the leather confer silicone derivatives and fluor carbonate dressing. Silicones may be applied from hydro-carbon solvents on the dry leather by dipping or spraying or a silicone emulsion may be applied in the drum on the wet leather by a fat liquoring. Silicones have very high interfacial tensions relative to water and these are not very temperature sensitive. However, Silicones are not very effective as solo agents.

Fluorocarbons are applied from solvent solutions and have equally high-water repellency and also oil repellency.

MECHANISM OF WATERPROOFING

A liquid will wet a surface only if it is of lower surface energy or surface tension than that of the surface. If the surface tension is very much lower than the substrate, spontaneous spreading of the liquid can be observed. If the liquid has a higher surface tension than the substrate, the surface will not be wet and the liquid will bead. Looking closely at a droplet of liquid resting on a surface the contact angle (0), formed between the liquid and substrate can be measured. If the contact angle is less than 90 °, the liquid has wet the surface. If the contact angle is greater than 90° the liquid has not wet the surface and the substrate will show hydrophobic nature and waterproofness .

Fluoropolymers and fluorinated chrome complexes are two types of products used to waterproof leather. They act by making the fibers themselves water repellent rather than by filling the interstices. The repellency arises from the presence in the molecule of long fluorocarbon chains, which are inherently chemically inert and hydrophobic .

Both types of products derive their fluorination from perfluoro alcohols or acids . Acrylic impart retaining and fat liquoring properties, such as temper and strength. These products are compatible with waterproofing fat liquors and other waterproofing materials , such as fluorocarbons or silicones.

EXPERIMENTAL

MATERIALS

All pieces of cow hides were collected from the Posta hide market, Bangladesh . Various chemicals of reputed company were purchased from Hazaribagh , Dhaka for the production of wet blue , crust and finished leather.

METHODS

Use of wet blue as a starting material is not advisable as there would be a possibility of presence of wetting agents , detergents and surfactants that would create problems in gaining waterproofness. The approaches of the modified process to achieve good waterproof properties are (i) Avoiding the use of surfactants and hydrophilic fat liquors

ii) Use of syntan to achieve the objectives of retaining without affecting the permeability properties

iii) Use of waterproof fat liquors in installment

iv) Thorough washing of the leathers at the end of the processes to remove any neutral salts that might be present

v) Optimization of finishing process to achieve the desired level of waterproofness. The process of crust leather production from domestic cow hides consists of soaking , liming, deliming, bating , pickling, tanning, retaining, dyeing, fat liquoring, fixing and so on. The finishing process started with surface preparation of crust leather, coating with sprayer and ended with ironing or plating.

RESULTS AND DISCUSSIONS

During processing, the hides were well opened up in the liming to ensure penetration of the waterproofing chemicals. The hydrophilic products such as salts, dyes and certain types of surfactants (e.g., wetting agents, etc.)were tried to avoid as they have a negative effect on waterproofing. The wet – blue leather was neutralized through the cross section otherwise the emulsifiers would de-activate at low pH and produced incomplete hydrophobing. In the form of a micro emulsion, waterproofing fat liquors ensured deep penetration , access to the fibril level and coating the individual fibrils . The regularity of fluorochemical and subsequent performance of waterproofing. The finishing materials and the finishing procedure had been selected according to the condition of the leather, the nature of finish to be produced and the desired quality of the intended waterproof finished leather. The most important things were also considered as the available facilities and the cost involved.

In order to observe the performance of finishing formulation, an attempt has been made in this work and performed physical tests as per SATRA and IUP methods. For all these tests, sampling and conditioning has been carried out according to international method (22) and (23). Samples were conditioned at 20°C and at 65% relative humidity for at least 24 hours prior to all measurements.

CONCLUSIONS

Development of modern economic technology for the production of quality waterproof finished leather is very essential to increase export business and national income. Obviously, implementation of the developed economic process will enhance the total finished leather production and reduce crust leather export which will indeed increase national income, boost up job opportunities and engage more people in the production line besides the export earnings. In this work , different types of crusting and finishing procedure of traditional technology and latest technology were studied on domestic cow hides.

The process of waterproofing leather has been important for high performance footwear many years. Today, however, changing lifestyles and the significance of the leisure sector mean that waterproofing forms a vital part of the high-performance leather market.

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RECREATING A CUTTING WASTE TO MAKE NEW FASHION ACCESSORIES

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ABSTRACT

We use our imaginations in recovering and reusing textile waste in different ways, so it's essentially a celebration of expressing ourselves. Making waste tissue look good can be a challenge. Cutting scraps of fabric and who wants a chance to bring them back to life? This research targets available clothing materials as a kind of finished fabric product. It connects with the characters of the clothing style and uses innovative design thought and craftsmanship to further change the available style of fabric appearance. Creating for a second life by repurposing, reconstructing, recutting and adding decorative elements (embroidery, stitching, threads, crochet techniques, mirror work and etching) to transform the original appearance for a new fashion trend. In the textile and clothing industry, the waste generated by the industry has become an important factor in the increasing cost of waste management and its image. Various useful materials can be recreated from this waste through innovative ideas and processing. In the following study, 30 high-value upcycled fashion and home accessories designs were enhanced from textile offcuts generated during the manufacturing and sewing process of fashion accessory products. The designs resulting from the following study were evaluated for consumer acceptance.

Keywords: upcycling, industrial fabric cutting, fashion and home accessories, design, added value

INTRODUCTION

Nowadays, in the world of modern technologies, high demands and consumption, large amounts of waste are dumped in landfills every year. This causes economic and environmental problems for the society and also represents a serious depletion and waste of resources. In this scenario, recycling of wastes resulting from the production and consumption of products seems to be the emerging alternative. The textile and clothing industry is one of the most important consumer goods industries.

However, the textile industry is also accused of being one of the most polluting industries. Not only the production, but also the consumption of textiles and clothing produces waste. To counteract the problem, the industry has taken many measures to reduce its negative contribution to the environment. One of these measures is the recycling and reuse of textiles and clothing. However, this has not sufficiently reduced the environmental impact of the fashion and textile industry. Several companies are attempting to manufacture their products in more environmentally friendly ways to meet the demands of the environmentally conscious consumer.

Thus, if one can add economic, intellectual, emotional, or material value to a product through the process of reuse, this can be termed as “upcycling” (Modi, 2013) resources that went into making certain materials, but those in them contained resources, embodied value increases through the application of knowledge as it is recirculated.” Unlike reuse or recycling, upcycling uses existing materials to enhance the original ones. The process requires a high degree of creativity and foresight, as well as a foundation for thrift and environmental awareness. The end result is usually a product or item that is unique, handmade, sustainable and cost-effective. Upcycling is the process of creating something new from old products, waste materials and unwanted better-quality products and materials for better environmental value.

METHEDOLOGY

In this section, the methodology chosen for the present study is presented. It was divided into two phases -

1. Experimental phase
2. Evaluation phase

Experimental phase

In this phase, a survey was conducted to collect data from various clothing collections and commodity manufacturing industry of Agra. Information was gathered regarding the demographics of the leather industry and an estimate of the trimmings it produced. The next part of the phase involved creating innovative upcycled products through waste prevention. The produced sustainable upcycling products and accessories were divided into two categories:

Home accessories: products developed

1. Pillowcases
2. Placemats
3. Holders and folders

Fashion accessories: products developed

1. Handbags and purses
2. Yokes and collars
3. Earrings and necklaces

Evaluation phase

In this phase, a self-made questionnaire was formulated to record consumer acceptance of upcycled products made from textile waste. The questions were based on the following points: Evaluation of the fashion products made from industrial waste. Classification by interests with the help of consumers. Determining consumer acceptance of upcycled products made from offcuts. Since the assessment is a basic knowledge of design and aesthetics, 50 students with a background in clothing and textiles were selected as test subjects.

RESULT AND DISSCUSION

Based on a survey conducted in 10 different leather production units, most of the industries were unfamiliar with the term upcycling, but they had an opinion on creating new products from waste: such as children's shoes, purses, keychains, belts, etc. For this reason, the Garment industry to reduce waste by employing skilled labor and using the latest machines, new techniques and CAD/CAM software to produce residual products with minimal waste. The resulting waste came in the form of chips, small parts, strips, etc. in an amount of 20 kg/day. This waste was collected from these industries to develop new upcycled products. In the present study, a total of six product categories, each with five different designs, were developed. A total of 30 different upcycling products were designed. These designs and patterns were created using techniques of braiding, gluing, sewing or cutting additional parts. The developed products are shown in the following figures.

Home

Accessories-Product-Pillowcases

CUSHION COVER-1

CUSHION COVER-2

CUSHION COVER-3

CUSHION COVER-4

CUSHION COVER-5

Fashion Accessories - Product - Necklace & Earrings

EARRING-1

EARRING-2

EARRING-3

NECKLACE-4

NECKLACE-5

CONCLUTION

The "Jewelry Design from Waste" study was creative enough to recycle solid waste. People preferred jewelry from textile remnants such as trimmings, fabric, some decorative things are used to make accessories. They have been identified as the best raw material for reproduction in light jewelry. 68% of people would prefer to wear recycled jewelry made from solid waste. The designs offered scope for good marketability. The study served the purpose of recycling the waste into usable and wearable jewelry.

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TEXTILE FINISHING TECHNIQUES FOR EMERGING

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ABSTRACT:

Miniaturization to the micro and nanometer scale has been one of the most important trends in science and technology over the last several years. This trend also holds immense potential for application in the field of textile finishing. Several techniques have now become available which can be used to produce uniform films of functional materials on textiles whichcan offer functionalities that are hitherto unknown in textile processing. This paper discusses some such cutting-edge technologies which have the potential to revolutionaries the field of textile finishing in the years to come. These include immobilization of enzymes on textile substrates, layer by layer assemblies, development of nanocoating's and use of plasma for nano level finish application. These processes add functionality with minimum effect on the strength, feel, handle or breathability of textiles. Some of these technologies have been tested and validated at lab scale, but most are still in research stages. As advances and developments in these areas of finishing continue to unfold, they will increasingly be used to produce smart, intelligent and interactive clothing of the future.

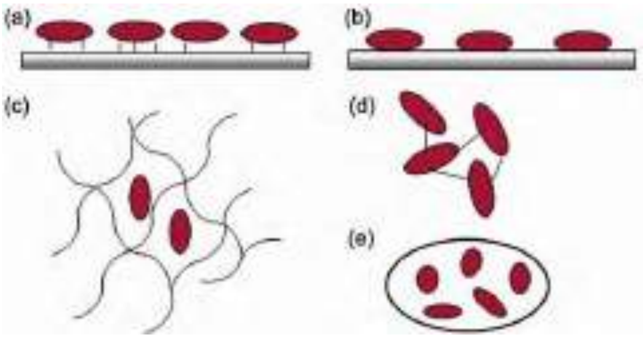
KEYWORDS: Coating, Enzymes, Functional finishing, Layer by layer assembly, Nanotechnology, Surface fictionalization

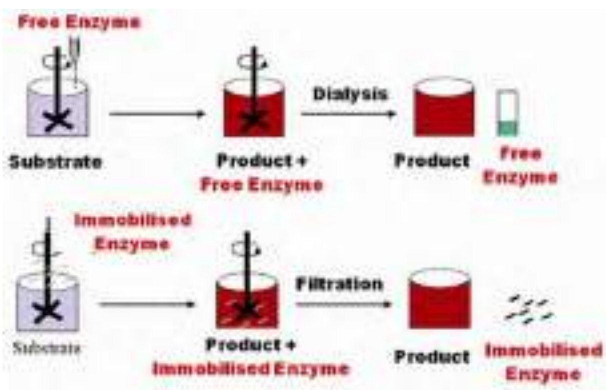
INTRODUCTION

Increasing concern over damage caused by exposure to microbes, chemicals, pesticides, UV light and pollutants in the last few years, has heightened the demand for protective garments. Clothing todayis expected to be waterproof, flame resistant, self-cleaning, insect repellent and antimicrobial to protect human beings from infection, UV light, chemical and biological agents, be warmer in winter and cooler in summer while at the same time being light and less bulky than current solutions .Con venational methods of finish application, suchas pad -dry-cure or coating that are currently beingused to impart antimicrobial, anti UV, self-cleaning and FR finishes, are often accompanied by excessive weight add on, loss of feel and drape, poor durability to washing, loss of mechanical strength and most importantly reduced comfort to wearer. In many cases, protective garments have actually been known to impair user performance. Also, there are several safety issues relating to the use as well as disposal of chemicals used in contemporary finishes. Scientists therefore, continue to look for alternate agents and technologies which are ecofriendly, durable, cost effective and do not adversely affect the comfort characteristics of a garment while providing optimum protection and efficiency. Functional coating methods provide a flexible alternative to conventional finishing methods in that they are independent of fabric type, require low quantities of additives and allow combinations of different functionalities in a simple way. This paper discusses some such innovative technologies whichhave the potential to revolutionaries the field of textilefinishing in the years to come. These technologiesinclude include immobilization of enzymes, layer by layer(LBL) assemblies, nano coatings and use of plasmafor deposition of functional molecules. All these technologies are distinct from conventional finishes inthat they impart special functionalities to textile surfaces by bringing about modifications at micro or nano level, without affecting the bulk properties. They add functionality with minimum effect on the strength, feel, handle or breathability of textiles. Someof these technologies have been tested and validatedat lab scale, but most are still in research stages. The following paragraphs discuss the principles of these innovative technologies, in general, along with some specific examples from their applications in the field of textile processing.

Enzyme Immobilization

Enzymatic processes provide an effective, nonpolluting alternative to conventional chemical finishing treatments because they operate under mild conditions, are substrate specific, nontoxic, biodegradable and do not produce any harmful byproducts. Also, enzymes can be produced on anindustrial scale by simple biotechnological methods[1]. Because of these reasons, enzymes have a long tradition of use in textile wet processing. Enzymatic desizing, bio scouring, bleaching, bio washing and bio-polishing of cotton are well-established commercial technologies (Fig.1). More recently, proteinase subtilisin enzymes have been used for modification of cotton by transesterification[2]. Proteases have also been used extensivelyfor shrink proofing of wool and adding other functionalities to the fiber. Multifunctional wool fabrics with antioxidant, antibacterial and water repellent properties have been produced by grafting alkyl gallates through laccase catalyzed reaction. Degumming of silk with proteases has also been studied[5]. During the last few years, treatment processes with enzymes have been extended tofinishing of synthetic fibers as well. Several studies have been reported on treatment of polyesters with cutinases and esterases to impart hydrophilicity and antistat properties. Treatments of nylon with amidase and polyacrylonitrile with nitrilase have also been reported the focus of this paper, however, is not on such processes mentioned above, where enzyme isused as a catalyst in its free form in a finishing process, but rather on an innovative technology, which can be used to impart long term functionalization to textile surfaces. This technique involves permanent attachment of active enzymes or ‘enzyme immobilization’ on textile substratesto impart special properties to textile surface[9,10].As compared to free enzymes, immobilized enzymes are permanently attached to the textile, therebyadding unique functionalities to its surface. Thus, while the free enzyme is lost after the first use, the immobilized enzyme continues to catalyze the intended reactions again and again (Fig. 2). This helps to reduce the enzyme cost, while at the same time providing a permanently bio active textile surface. If properly designed, enzymeimmobilization can prove to be a very powerful tool for enhancing almost all properties of enzyme including stability, activity, specificity andselectivity as well as reduction of inhibition[11]. Enzyme immobilization on textile surfaces is a more challenging process which is still in initial stages of research[12-15]. The applicability and efficiency ofimmobilized enzyme- b a s e d processes is determinedby the nature of enzyme, physicochemical properties of textile substrate, method of immobilization, enzyme stability in the polymeric environment and most importantly, its surface availability and accessibility and the following paragraphsprovide a brief description of the same.





Conventional applications of enzymes in processing of cotton

Free enzyme *vs* immobilized enzyme

Methods of enzyme immobilization

(a) covalent bonding,

(b) adsorption

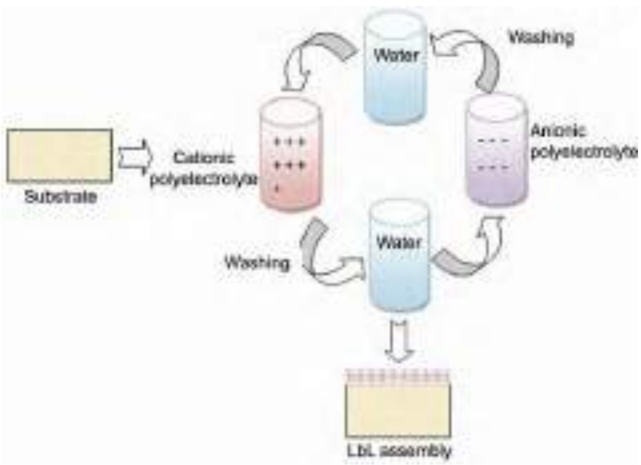
(c) entrapment in gel

(d) intermolecular cross-linking

(e) encapsulation

Layer by Layer Assembly Technique

Layer by layer assembly (LbL) method is a unique technique developed for fabrication of thin composite films on solid surfaces. It involves a sequential adsorption of oppositely charged polycations and polyanions so as to build a series of polyelectrolyte multilayer films on the substrate[30]. The process beginsby charging a substrate appropriately, followed byimmersion in an oppositely charged polyelectrolyte solution and rinsing. The charged surface attracts the oppositely charged polyelectrolyte and binds itwith the help of strong electrostatic bonds. After rinsing, the substrate coated with a monolayer is treated with the solution of oppositely charged electrolyte solution. Repetition of this cycle canbe used to deposit up to 20 ultrathin layers [31-33]. The process is shown in Fig. 4. The technique has been studied extensively for applications in plastics, sensors, LEDs and fuel cells. Few studies which have been conducted on textile surfaces show that LbL method can be used to prepare nanocomposite textile fibers with special functionalities especially suited for protective clothing. A wide range of otherfunctional molecules like charged nano particles, dyesand enzymes can also be incorporated into the layers in a controlled manner.



Nano Coatings

Miniaturization to the nanometer scale has beenone of the most important trends in science and technology over the last several years. As in other fields, nano technology is also being used to create textile surfaces with new capabilities and properties which can be employed gainfully in functionalclothing applications. Coatings which are nano scaled or nano structured can be used to coat individual monofilaments with films which are as thin as 10nm in thickness. Such films allow a much larger surface area to be created with improved functionalityand durability, and without any adverse effect on the fabric feel. These fabrics have special advantages as they are thin, light and flexible. Several techniques have been proposed for the application of nano films and coatings on textile surfaces for imparting special effects like conductivity, hydrophobicity, soil and oil release, self-cleaning, microbial and UV protection, and flame retardancy among others. These include use of nano sols, polymer dispersions, chemical vapor deposition (CVD), physical vapor deposition PVD) and atomic layer deposition (ALD). Plasma and other methods of irradiation have been used either for activation of surfaces prior to coating or to assist in polymerization of coatings. These are discussed elsewhere in this paper. Other novel techniques include self- assembly of nanolayer films, grafting of polymer nanofilms and synthesisof smart hybrid polymer nanolayers[42-44]. Some of the commonly used techniques used for developing nanocoating's on textiles are discussed below.

CONCLUTION

Functional textiles with multiple properties are the future of the global textile and apparel industry- offering new challenges as well as opportunities. A major application of these textiles will be inthe field of functional clothing where the consumeris demanding more and more comfort, easy care, health and hygiene while at the same time expecting protection against mechanical, thermal, chemicaland biological attacks. Along with the newfunctionalities, other desirable properties of finishes include the appearance, feel and durability to laundering. Such complex expectations can onlybe met by developing new, advanced and innovative technologies for finishing of textile products. As can be seen from the techniques covered in this paper, the future of research in textile

A STUDY ON DEVELOPMENT PROCESS OF PORFOLIO PRESENTATION

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ABSTRACT

I Expressed my sharing, some ideas for develop the design and research to present the theme and I explicit information about the best work of portfolio presentation. Here, I display of some design, creativity, experience, Special skills and abilities. So, I produce professional display of work and I give some specification ideas for present the best portfolio assignments.

Keywords: Portfolio, Theme, Creativity

INTRODUCTION

Portfolio define as a portable case for holding materials, such as loose papers, photographs or drawings. The material collected in such a case, especially when representative of a person's work. The creation of a portfolio is one of the most important aspects for a fashion designer. Portfolio means the designer to communicate ideas and concepts about fashion to the people. The portfolio determines the sale quotient of an individual's design. It is a presentation of the range of a designer's skill and their expertise in the field. A designer selects a theme that represents their collection it can be a period in history, a foreign place, a range of colors, a type of fabric.

After the groundwork is completed for the nature of the collection, the designer should decide how many and what types of garments should be included in the collection. Usually, they have a three-month period to design, produce and publicize the collection in time for their fashion show. Finally, press and buyers get their first look at the collection at the show.

Concept of portfolio development

Pre-planning

Research

Predicting trends

Concepts to be considered

Environmental factors

Season

Color

Culture

Fabric design

Occasion

Present technique

Process of portfolio development

Trend forecasting

Trend interpretation

Concept development

Customer profiling

Flat sketch/silhouette development

Fabrics & accessories

Final design/story

Pattern development

Measurement & pattern drafting/grading/cutting

Garment construction

Analyze fitting & quality assurance

Final presentation-styled garment on the ramp

Preparation procedures

Flow chart for portfolio presentation board:

Introductory page

Customer profile

Theme board

Mood board

Color board

Fabric board

Flat presentations

Design development board

Story board

Accessories & ornaments board

Photographic board

Introductory page

It says something unique about the designer/company.

(e.g.) personal logo, designer name, customer name, season, targeted area of the theme.

Customer profile

It creates a customer image and biography that enables you to keep your designs on track and targeted to your customer.

Theme board

The basic building primary idea through which the designer gets impressed. It simply called as the inspiration board.

Mood board

Basically, collages of items such as photographs, sketches, clippings, fabric swatches & color sample that present the mood of your theme to your customer.

Color board

Color is an essential element of any emerging fashion trend. Depending on the forecast, people draw inspiration from certain colors & set the tone for the line creation. Color reflects the mood of the people. Avoid using more than 8 shades in a pallet.

Fabric board

It extensively contains the swatches for the design process. Fabrics are selected with care to suit season/occasion/market/price point. The swatches will demonstrate how the texture, dimension and feeling of the selected fabric is.

Flat presentation

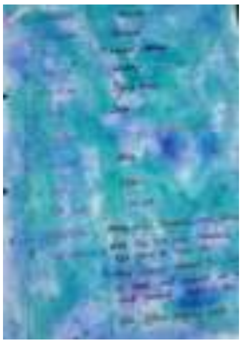
The outline or shape of a garment designed. Flat drawings are exactly that the garment sketch expressed details & features.

Design development board

This board presents the collection of design development of styles of garments related to our theme. This is tool to communicate the designer's ideas.

Story board

It is a summary of your collection's inspiration and theme. This board will usually consist of a full color illustration of a fashion figure wearing the garments being showcased and represent technical renderings of each garment individually.



Accessories & ornaments board

The suitable accessories & ornaments for the designed garment are highlighted in this board.

Photographic board

This board includes the photograph of the finished product of your work. The total finished touch is got by including picture of models wearing them.

CONCLUTION

A fashion design portfolio is a very important tool for any designer.it should contain samplings of the best work done by a designer. The best way to build a great portfolio is to focus on the content.it should showcase the designer's creativity, style, sketching ability, knowledge of color presentation, understanding, design development and problem-solving skills.

In today's competitive fashion industry, your portfolio is your sales tool. There is no one style of portfolio that remains standard forever.

TEXTILE PRODUCTION MANAGEMENT & MERCHANDISING

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ABSTRACT

This paper presents an interactive model-based system for the management of production in textile production systems focusing on the Master Production Scheduling problem. Because of the special characteristics of the industry, that is mainly the multi-phase process with multiple units per phase, different planning horizons and different production requirements for each phase, the scheduling of these systems becomes quite complex. Apart from a comprehensive presentation of the set of the modules the system is composed of, together with their interrelationships, the above characteristics are analyzed, and their impact on the production control system is explained. The system is also related to two well-known production control systems, namely MRP-II and Optimized Production Technology. The system's attributes are presented with the aid of data structure diagrams, while the complete algorithm concerning the Master Production Scheduling module, in a pseudo-code form, and the corresponding part of the database.

KEYWORDS: Master production scheduling; Decision support systems; Production planning; MRP-II; Textile industry

INTRODUCTION

Textile production systems from an interesting area for the study of scheduling problems. The industry has been developed following both vertical integrations, particularly among spinning and weaving firms and horizontal integration, promoted by the idea that a full line of textile products is necessary for effective marketing [1]. Such production systems comprise various production phases which are together with the type of their output. Weaving consists of crossing a yarn, called the weft yarn with several thousands of yarns composing the warp. Starching is a procedure that comprises synthesis and special treatment of some warps. Warp making is the arrangement of the warp yarns in parallel on a roll. Each yarn is taken from a bobbin which is put on a bobbin stand [2]. The oldest industry in India is the textile sector. It started the nation's industrial revolution. It holds a prominent position in the national economy. It has made a sizable contribution to industrial production, employment, and export revenue. The second-largest producer of textiles and apparel in the world is India. In terms of textile exports for apparel, home goods, and technical products, it ranks sixth. India accounts for 4% of global textile and apparel trade. The textile manufacturing process are largely required by the fashion segment in the global textile market. The large amount of textile products, demanded by fashion, accounted for more the 65%of textile product market. Fashion market is followed by technical textiles and household products. Grand view research indicated fashion, technical textiles, and household as the top three sectors by application for the global textile market [3].

The textile and apparel (fashion) industry have social, cultural, and economic significance in many societies. Nevertheless, the word fashion has different meanings ranging from the way of doing things to textiles and apparel. Among others, Hansen's [4] study found that fashion implies discourses representing the developments in arts, social structure, and culture. In Western society, it is highly associated with "style", "dress", or "clothes" [5,6]. As these features make fashion a meaningful phenomenon, in this study, the fashion industry corresponds to fashion-driven textiles and apparel as well as other fashion-related products. It includes a wide range of business networks ranging from raw materials production, design, manufacturing, and retail [7,8]. These advancements improve fashion, and apparel accelerates this development [9].

METHODOLOGY

The term 'Textile' is a Latin word originated from the word 'texter' which means 'to weave'. Textile refers to a flexible material comprising of a network of natural or artificial fibers, known as yarn. Textiles are formed by weaving, knitting, crocheting, knotting and pressing fibers together. History of Textile The history of textile is almost as old as that of human civilization and as time moves on the history of textile has further enriched itself. In the 6th and 7th century BC, the oldest recorded indication of using fiber comes with the invention of flax and wool fabric at the excavation of Swiss lake inhabitants. In India, the culture of silk was introduced in 400AD, while spinning of cotton traces back to 3000BC. In China, the discovery and consequent development of sericulture and spin silk methods got initiated at 2640 BC while in Egypt the art of spinning linen and weaving developed in 3400 BC. The discovery of machines and their widespread application in processing natural fibers was a direct outcome of the industrial revolution of the 18th and 19th centuries. The discoveries of various synthetic fibers like nylon created a wider market for textile products and gradually led to the invention of new and improved sources of natural fiber. The development of transportation and communication facilities facilitated the path of a transaction of localized skills and textile art among various countries. Indian textile enjoys a rich heritage and the origin of textiles in India traces back to the Indus Valley Civilization where people used homespun cotton for weaving their clothes. Rigveda, the earliest of the Veda contains the literary information about textiles and it refers to weaving. Ramayana and Mahabharata, the eminent Indian epics depict the existence of a wide variety of fabrics in ancient India. These epics refer both to a rich and stylized garment worn by the aristocrats and ordinary simple clothes worn by the common people. The contemporary Indian textile not only reflects the splendid past but also cater to the requirements of the modern times.

Textile production is the process by which fibers, filaments, yarn, and thread - both natural and synthetic - are made. It also comprises the production of objects made with these materials. Both processes have their own steps for production. Let's examine them both. Textile management is a professional industry concerned with the make and management of clothing and apparel. The textile industry is often combined with fashion merchandising and design, and universities that prepare students to enter a career in textile management usually have one department for textile, fashion and design. The goal of these programs is to create professionals who will enter the field able and willing to create and interpret knowledge of clothing materials to better serve the industry [10]. Textile merchandising is not a familiar term to us. Though all the textile professionals are known for garments merchandising. Textile merchandising and garments merchandising, both are very important for completing a ready-made garments (RMG) export order. As its importance, today I will present here the overview of textile merchandising, which includes definition and methods of textiles merchandising. Textile merchandising is that which is related with from fiber import to yarn in-housed in the knitting factory. Textile merchandising consists of fiber and yarn merchandising. It starts from fiber import to the spinning factory and ends in yarn in-housed into the knitting factory. Fiber merchandiser and yarn merchandiser are done all the duties here [11].

CONCLUSION

In 2021, Bangladesh earns $35.81 billion US dollars from the garment industry alone. In order to maintain this dominance in the textile sector, more emphasis needs to be placed on production management. If the management has this discrepancy, then the whole production process will be disrupted. Therefore, in this case, besides recruiting more skilled manpower, we have to increase our own skills. Only then will it be possible to hold the top position of Bangladesh in the world.

India has a thriving natural resource economy, manufacturing eco system, extensive geographic infrastructure, etc. India is a significant global center for the textile industry. India is unquestionably prepared to change the narrative and the general pessimism in the global economy by focusing on social quality, long-term objectives, and investments in social and human capital. The Indian government has opened a completely new narrative through its recent initiatives in the textile and apparel sector a narrative of optimism, increased exports, job creation, and social transformation. However, it plays a crucial role in social responsibility, which is why this sector is primarily unorganized. The Indian textile industry has a bright future ahead of it, supported by strong domestic and export demand. Since several foreign companies, including Marks & Spencer, Guess, and Next, entered the Indian market, the retail sector has grown quickly due to rising consumerism and disposable income.

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A Study of Moisture Management finish in Knitted Fabric

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ABSTRACT

The main aim of moisture management fabric is to make the skin feel dry. In order to achieve this, humidity should be evaporated and transferred to the atmosphere as soon as possible. In this paper, we measured the comfort properties of different types of polyester knitted fabrics that are used in the production of sports clothes. The test samples were selected from the most commonly used fabric structures according to the results of a survey. We carried out objective fabric tests to determine the air permeability and moisture management properties. Good moisture comfort, low water vapor resistance and good moisture management properties were preferred. In order to improve the moisture management of knitted fabric, the study was conducted on the basis of the following test methods namely wick ability, absorbency, rate of water vapor transmission which are considered as key parameters of moisture.

Keywords: Moisture Management Finish, hydrophilic, comfort.

INTRODUCTION

Textiles have an important bearing on daily lives that everyone needs to know something about them. From earliest time people used textiles of various type for coverings, warmth, personal adornment and even to display personal wealth, but today, the textiles have been used as adaptive clothing, wearable electronics, medical textiles, industrial garments, smart garments [1]. In the modern day, the image of textile is changing from its conventional functional to its special functions. Traditional textile is now becoming functional textiles as it is giving additional properties [2].

Moisture management property is an important aspect of any fabric which decides the comfort level of that fabric [3]. Every human being sweat during different kinds of activities. An important feature of any fabric is how it transports this water out of the body surface and the wearer feel comfortable [4]. Moisture management can be defined as the controlled movement of water vapor and liquid water(perspiration) from the surface to the skin to the atmosphere through the fabric. Moisture wicking clothing is specially fabrics that quickly draw sweat and moisture away from body evaporating it quickly keeping very cool, dry and comfortable [5]. Wicking fabrics are modern technical fabrics which draw moisture away from the body. They are made of high-tech polyester, which, unlike cotton, absorbs very little water. Cotton will absorb 7% of its weight in water, polyester only 0.4%. Cotton will therefore hang onto sweat, making your garment heavy and unpleasantly clammy [6]. Wicking polyester has a special cross-section and a large surface area, which picks up moisture and carries it away from body, spreading it out, to evaporate easily on the outside of the fabric. So, stay cool and dry. Wicking fabrics are called as breathable fabrics. Synthetic fibers will absorb and wick less water. This drawback of hydrophobicity can be overcome by the use of a hydrophilic polymer [7]. Other factors affecting the thermo-physiological comfort include fabric air permeability, water vapor permeability and thermal resistance. However, while sweating in summer or during sports activities, liquid moisture management is one of the most important phenomena affecting the thermo-physiological comfort of garments [8]. When applied on polyester if forms a durable polymer film that interacts readily with imparting a hydrophilic finish. Hydrophilic fibres such as cotton are good in moisture absorption but poor in moisture transport and release, due to presence of hydrogen-bonding sites for water molecules [9]. On the other hand, hydrophobic fibres such as polyester are poor in moisture absorption but have better chance to transport moisture because of few bonding sites for water.

MATERIALS AND METHOD

Selection Of Fabric

Three samples of different knitted polyester fabrics are taken. Each polyester has different structure and they are named as follows. Polyester(pique) as PP, Polyester (single Jersey) PS, Polyester Lycra as PL. this named its followed throughout the experiment and result.

CHEMICALS & AUXILLIARES

Hydrophilic Silicone Softener

Super FX™ Aquasil 2060 N is a durable non-yellowing hydrophilic silicone softener designed to impart excellent soft hand, improved soil release properties. It exhibits excellent soft, smooth and greasy bulky hand while retaining the fabrics to original water absorbency & pile. They also exhibit excellent wicking and moisture transport. First nomenclature of test samples is taken. Then pre research work to standardize the ranges of process parameters is carried out. Application Of Wetting Agent (Super FX Senalon Jet Conc.Application of Moisture Management Finish Super FX™ Aquasil 2060 is processed. Later Hydro & Tumble Dry of the Materials are tested.

PRE-RESEARCH WORK TO STANDARDIZE THE RANGES OF PROCESS PARAMETERS

The pre research work is undergone and the measurements and amount taken are standardized.

PP 22s Counts

PL 40s counts

120degree Celsius

Acetic acid – 0.5gpl (7.5ml)

Senalon Jet Conc – 1gpl (15ml)

pH – 6.0 Aquasil 2060 N - 5gpl (75 ml)

Application Of Moisture Management finish

The PP fabric of about 2 mts is thoroughly cleaned and there were no residual agents from the scouring or dyeing operations

Polyester (pique) was the material taken. The fabrics were first prewashed and coated with a wetting agent consisting of a Super FX Senalon Jet Conc.at 0.3-1% concentration.

The material liquor ratio is 7: 1-10:1

After this silicon softener *Super* FX™*Aquasil 2060 N* of

Dosage : 1-2%

pH : 6

Temperature : 40 degree Celsius

Time : 20 – 30 min

Exhaust Method

It is carried out in strentering machine through padding method which is the nip and dip process. It consists of 6 heating chambers. Heat is applied to chamber; energy is used in transferring molecules from the solution to the yarn as well as in swelling the yarn to render it more receptive. The technical term for the transfer process is exhaustion. Drain. Hydro extract & dry.

Application in lab

For 1m of PP fabric 15litres of water is needed.

1m of fabric,

Acetic acid - 0.5gpl (7.5ml)

pH – 6.0

Senalon Jet Conc – 1gpl (15ml)

Aquasil 2060 N - 5gpl (75 ml)

Tumble dry for 15 min at 120degree Celsius

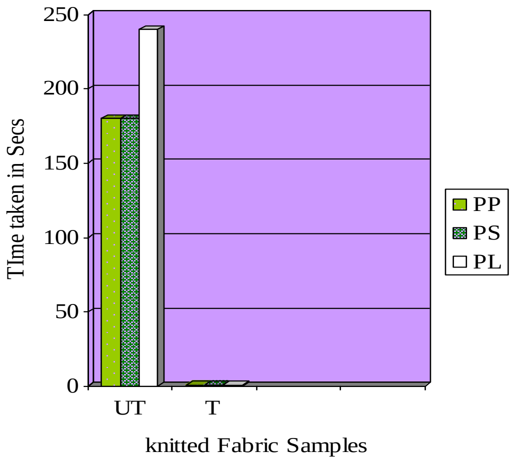
RESULT AND DISCUSSION

Absorbency test

Results for untreated and treated samples

S.no	Sample	Absorbency Time in Untreated Fabric	Absorbency time in treated Fabric
1	PP	After 3 minutes	Less than 1 sec
2	PS	After 3 minutes	Less than 1 sec
3	PL	After 4 minutes	Less than 1 sec

From table 2 and graph it is seen that treated PP sample has better absorbency than other two. The time taken by the three sample is said to be same, but when compared to that of the untreated fabric PL fabric shown a slow in absorption



UT – Absorbency in untreated fabric

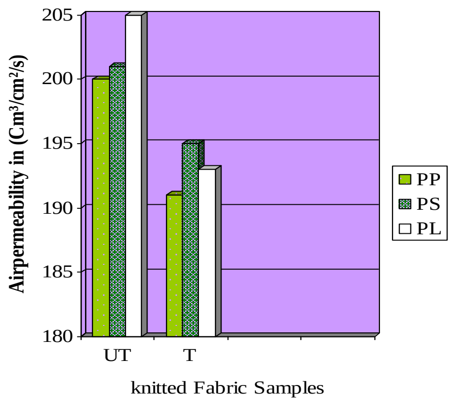
T – Absorbency in treated fabric

Air permeability test

Results for untreated and treated samples

S.no	Sample	Minimum Air Permeability(Cm³/cm²/s)	Maximum Air Permeability(Cm³/cm²/s)	Average (Cm³/cm²/s)
1	PP	192	208	200
2	PS	191	205	201
3	PL	192	209	205

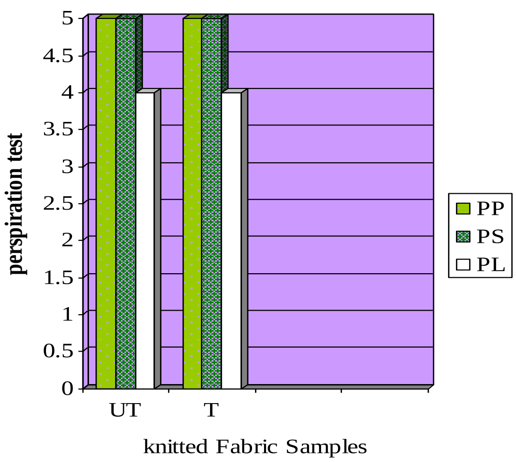
S.no	**Sample**	Minimum Air Permeability(Cm³/cm²/s)	Maximum Air Permeability(Cm³/cm²/s)	**Average** (Cm³/cm²/s)
1	PP	178	201	191
2	PS	181	203	195
3	PL	182	204	193



AUT – Air permeability Untreated fabric test Sample

AT - Air permeability treated fabric test Sample

Perspiration test in acidic &alkaline Medium



UT – Absorbency in untreated fabric

T – Absorbency in treated fabric

SUMMARY AND CONCLUTION

The wicking properties of the knitted fabrics depend on the fabric structure. The PL fabric shows the higher rate of wicking behavior followed by PP, PS structure The loop and the combination order of knit have highly influenced the wicking ability. Time taken to absorb water is also based on the structure of the fabrics.PL fabrics takes lesser time when compared to other type of fabrics. The higher the stitch length of fabric, quicker will be the absorption a It is also important from the practical viewpoint how quickly a fabric absorbs water. The air permeability testing it is concluded that PL shows the better permeable than other fabrics. PP PS also have the similar properties.

There was no loss of color in fastness testing and better results were got PS fabric and stand its color.

CONCLUTION

Comfort due to moisture of the fabrics is influenced by PP, PS, PL .This relation is studied & understood clearly in an experimental way. Moisture management finishes are carried out to improve the performance to absorb the moisture/ humidity from the skin, transport to outside surface of the fabric and then to the environment through the means of convection and mass transfer. Hydrophilic fabric is not always from high regain fiber rather the hydrophilicity is given by hydrophilic finishes for the low regain fibers like nylon, polyester, acrylic. Many people in the world thought that 100% cotton knitted fabrics offer the best thermal comfort since they absorb liquid sweat quickly and easily. However, the absorbed sweat takes longtime wetness, this causes the wearer to feel uncomfortable in any activities as well as long-term use. Fabrics, a comparative of absorbing and dry quickly after sweating, is needed by the wearer in most cases and can be achieved with a chemical treatment.

The conclusions were obtained from results and significantly proved the research and development work a suitable moisture management finishing agent for textile materials and also a suitable wetting agent FX Senalon *Jet Conc,* softeners *Super* FX;l.'';™ Aquasil *2060 N*. Silicon with wetting agents results in good moisture absorption. Comfort due to moisture of the fabrics is influenced by the structures. The area of Absorption depends on the structure of the fabric. Moisture management finishes are carried out to improve the performance to absorb the moisture/

humidity from the skin, transport to outside surface of the fabric and then to the environment through the means of convection and mass transfer. Hydrophilic fabric is not always from high regain fiber rather the hydrophilicity is given by hydrophilic finishes for the low regain fibers like nylon, polyester, acrylic. Many people in the world thought that 100% cotton knitted fabrics offer the best thermal comfort since they absorb liquid sweat quickly and easily. However, the absorbed sweat takes long-time wetness, this causes the wearer to feel uncomfortable in any activities as well as long-term use. Fabrics, a comparative of absorbing and dry quickly after sweating, is needed by the wearer in most cases and can be achieved with a chemical treatment Moisture management finishes are carried out to improve the performance to absorb the moisture/ humidity from the skin, transport to outside surface of the fabric and then to the environment through the means of convection and mass transfer. Hydrophilic fabric is not always from high regain fiber rather the hydrophilicity is given by hydrophilic finishes for the low regain fibers like nylon, polyester, acrylic. Many people in the world thought that 100% cotton knitted fabrics offer the best thermal comfort since they absorb liquid sweat quickly and easily. However, the absorbed sweat takes long- time wetness, this causes the wearer to feel uncomfortable in any activities as well as long-term use. Fabrics, a comparative of absorbing and dry quickly after sweating, is needed by the wearer in most cases and can be achieved with a chemical treatment Moisture management finishes are carried out to improve the performance to absorb the moisture/ humidity from the skin, transport to outside surface of the fabric and then to the environment through the means of convection and mass transfer. Hydrophilic fabric is not always from high regain fiber rather the hydrophilicity is given byhydrophilic finishes for the low regain fibers like nylon, polyester, acrylic. Many people in the world thought that 100% cotton knitted fabrics offer the best thermal comfort since they absorb liquid sweat quickly and easily. However, the absorbed sweat takes long- time wetness, this causes the wearer to feel uncomfortable in any activities as well as long-term use. Fabrics, a comparative of absorbing and dry quickly after sweating, is needed by the wearer in most cases and can be achieved with a chemical treatmentMoisture management finishes are carried out to improve the performance to absorb the moisture/ humidity from the skin, transport to outside surface of the fabric and then to the environment through the means of convection and mass transfer. Hydrophilic fabric is not always from high regain fiber rather the hydrophilicity is given by hydrophilic finishes for the low regain fibers like nylon, polyester, acrylic. Many people in the world thought that 100% cotton knitted fabrics offer the best thermal comfort since they absorb liquid sweat quickly and easily. However, the absorbed sweat takes long- time wetness, this causes the wearer to feel uncomfortable in any activities as well as long-term use.

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BIODEGRADABLE AND SUSTAINABLE TEXTILES

BABY MATTRES 'PILLOW' MADE OF NATURALLY STUFFED FIBER

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ABSTRACT

Pillow are naturally Stuffed on passion flower and mint to filled to finished .it is very healthy and non chemical treated and also gives softness and good texture to feel . It is Naturally eco friendly on environment .It not pollute our environment it killed the bacteria, fungi, yeast to form . It is water absorbency and nontoxic . It prevents the bacteria infection like , fever, virus infection to prevent. Pillows are covered by white natural dyes to made. It's specially made for for babes ,kids for relaxing comfortness . It gives stuffiness to our body. It not caused skin disease , allergAn antimicrobial is an agent that kills microorganisms . The passion flower may help to treat anxiety insomnia .This pillow are makes to help regulate mood of sleeping . The mint and passion flower and valerian are gives the one of relaxing to the brain . It not effects on the skin disease on body . valerian plant will .Its oily extract the valerian Fiber to make pillow. Valerian has been used as an herb in traditional medicine since at least the time of ancient Greece and Rome .Hippocrates described its properties, and Galen later prescribed it as a remedy for insomnia . In medieval Sweden, it was sometimes placed in the wedding clothes of the groom to ward off the "envy" of the elves . In the 16th century, Pilgram Marpeck prescribed valerian tea for a sick woman. Pillow is used on valerian Fiber to stuffed on pillow.

Keywords : pillow, valerian plant, mint ,passion flower

INTRODUCTION

Valerian flower

Passion flower

A pillow is a support of the body at rest for comfort therapy or decoration. Pillow are used by many species including human . Pillow that aid sleeping are a form of bedding that supports the head and neck . Pillow have been historically made of a variety of natural Materials and many cultures continue to use pillow made from natural materials in the world Recycling of pillows, like most textile and bedding items, is expensive and has poor yield. As such, few are recycled and most end up in landfills .Their light weight means that they make up a low proportion of household waste by mass . Most of the few pillows collected for recycling are sent to India and Pakistan and used as low-cost bedding, or in South East Asia , co-mingled with other textiles to manufacture cheap .That's exactly what pillow stuffing allows you to do . It lets you fluff up or otherwise customize the shape of a pillow(s) to suit your personal . In the process, it saves you the money that would otherwise be spent on purchasing new pillows. No matter whether you're looking for polyester, cotton, buckwheat, down, or memory foam, there's a stuffing for pretty much every kind of pillow . So, check out our roundup of best pillow stuffing to get started on improving your comfort .Though the exact origin is unknown, use of pillows evolved in animals well into prehistory, the earliest examples including reptiles and mammals resting their heads on themselves, and one another, to support the head and neck . Animals, including humans, evolved use of inanimate objects in their nests out of wood and stone as .Since domestication, many animals have also learned to make use of human made pillows and cushions, as well as to rest on members of their own and other species, for this purpose . The pillow is giving the mood of relaxation of mind to sleep. Valerian plant will look beautiful in your bedroom thanks to its small pink and white flowers. Aside from the sweet scent, valerian plants have been used for centuries to help with sleep problems including . Inhaling the scent of valerian root has been shown to induce sleep and improve the quality of sleep . Add a few petals to your bath or ensure to take a sniff before you get into bed . These plants need around six hours of sun a day, so keep them on a sunny window sill. The valerian flowers are stuffed on pillow mixing of passion flower, mint extract and Valerian .

This pillow is very soft and smooth . This pillow for babies because they have sensitive skin and the comfortless to use. Pillows are generally covered with a removable pillow case, which facilitates laundering. Apart from the color and from the material of which they are made, pillowcases have three contrasting characteristics.

PILLOW

MATERIALS AND METHEDOLOGY

This pillow is Made only for babies and Adults. This pillow is stuffed on valerian plant and mint , passion flower are stuffed on the pillow there are extract the mind to relaxing the brain . The valerian plant, mint and passion flower are stuffed on the pillow and Antimicrobial to finished . This stuffiness is soft and smoothness to the texture. Pillow is very soft and smooth . This pillow for babies because they have sensitive skin and the comfortless to use . Pillows are generally covered with a removable pillow case , which facilitates laundering . Apart from the color and from the material of which they are made , pillowcases have three contrasting characteristics . This pillow is Naturally stuffed and ecofriendly on environment . These 3 plants are relaxing the mind and mood for sleeping .It gives support to the neck .

CONCLUTION

A pillow is a support of the body at rest for comfort, therapy, or decoration. Pillows are used by many species, including . Some types of pillows include throw pillows, body pillows, decorative pillows and many more . Pillows that aid sleeping are a form of bedding that supports the head and neck. Other types of pillows are designed to support the body when lying down or sitting . There are also pillows that consider human body shape for increased comfort during sleep . Decorative pillows used on people, couches or chairs are sometimes referred to as cushions .a plant with small white or pink flower and a root that is Used in medicines especially as sedative . This pillow is very useful and comfortable to laying on pillow. Neck pain doesn't come . It made only organically it not spoil the environment.

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TEXTILE FINISHING TECHINIQUES

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ABSTRACT

Textile finishing techniques play a pivotal role in the fashion industry, determining the aesthetics, durability, and functionality of garments. In recent years, the global fashion community has witnessed a significant shift towards sustainability, driven by environmental concerns and consumer demand for eco-friendly products. This paper explores the intersection of textile finishing and sustainability, shedding light on innovative approaches that minimize the environmental impact while enhancing the appeal of textiles .The paper begins by outlining the environmental challenges posed by traditional textile finishing methods, including water and chemical usage, energy consumption, and waste generation. It then delves into various sustainable textile finishing techniques that have emerged in response to these challenges. These techniques encompass biodegradable finishes, dyeing methods that reduce water usage, and low-impact printing technologies.

INTRODUCTION

Textile finishing techniques are processes applied to textiles after production to improve their appearance, performance, and functionality. These techniques include dyeing, printing, bleaching, and the application of various chemicals and treatments to enhance properties like wrinkle resistance, flame retardancy, and water repellency. They are essential for creating textiles suitable for a wide range of applications.

Functional Finish

This type of finish changes the internal performance of the fabric. These are given to improve the aesthetic purpose of a fabric. Thus functional finishes can be further divided into two groups :

Aesthetic Finish

It is given to enhance the fabric appearance and its draping ability. Some of the important aesthetic finishes are:

a. Napping and scudding

b. Mercerization

c. Shearing
d. Softening
e. Stiffening

Performance Finish

It is given to enrich the fabric properties like strength and durability. Some of the important functional finishes are:

a. Antimicrobial
b. Moth proof
c. Crease resistant
d. Durable press
e. Soil resistant
f. Water repellent or water proof
g. Shrink proofing
h. Flame resistant

Quality Finish

These types of finishes improve the quality of the fabric based on the time line or usage. They can be temporary, semi-permanent or permanent.

Temporary Finish

As the name suggest the temporary finish is not a stable finish and it disappears immediately after the first wash or first few washes. It includes finishes like :

1. Starching
2. Sizing
3. Softening
4. Embossing
5. Calendaring

Semi-Permanent Finish

This finishing is durable than temporary finish and can withstand more than 10 to 15 washes. It includes finishes like:

- Schreiner calendaring
- Buckram finish

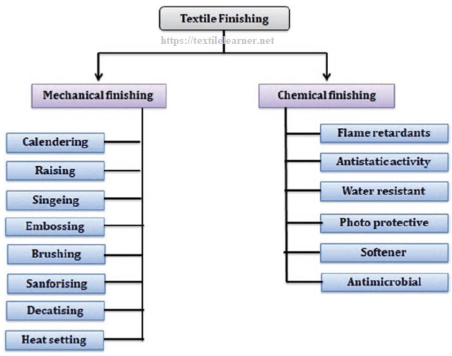
Permanent Finish

Permanent finishing does not disappear and remains unaffected through all the conditions of wear and washing treatments given to the fabric. It includes finishes like:

1. Flame retardant
2. Resin finish
3. Sanforising
4. Water proof or water repellent

Types of Textile Finishing

Finishing comprises final process in the textile processing sequence to improve the appearance, hand-feel or other aesthetics of the textiles or to add any extra functionality such as water repellency or flame retardancy, etc. Broadly it can be classified into following classes, which are used individually or in combination with each other. (Other terms are also used such as wet finishing, dry finishing, durable finishes and non-durable finishes)



Textile finishing techniques are processes applied to textiles to enhance their appearance, performance, or functionality. Here are some types briefly: Dyeing: Involves adding color to textiles, often with various dye types like direct, reactive, or vat dyes. Printing: Applies patterns or designs to fabrics using techniques like screen printing, digital printing, or block printing. Bleaching: Removes natural or added color from textiles to achieve a white or lighter shade. Calendaring: Uses rollers and heat to smooth and flatten fabrics, giving them a glossy finish. Mercerization: Treats cotton fibers with caustic soda to increase their strength, luster, and dye affinity. Finishing agents: Applies chemicals to textiles for specific effects like softening (softeners), flame resistance (fire retardants), or water repellency (waterproofing agents).Coating: Adds a layer to textiles for functions like waterproofing (polyurethane coating) or adding texture (flocking).Sulfurization: Reduces fabric shrinkage through a controlled shrinkage protestant-pilling: Treatments that minimize the formation of fuzz or pills on the fabric's surface. Embossing: Creates textured patterns or designs by pressing the fabric between engraved rollers.

The process of textile finishing techniques can vary depending on the specific technique being used. Here's a general overview of the steps involved in textile finishing: Preparation: The textile material is prepared by cleaning and washing to remove impurities and contaminants. For dyeing or printing, the fabric may undergo processes like desizing, scouring, and bleaching to ensure it is ready to accept color or patterns. Dyeing or Printing: Dyeing: The fabric is immersed in a dye bath, and color is absorbed by the fibers. Various dye types and methods can be used. Printing: Designs or patterns are applied to the fabric's surface using techniques such as screen printing, digital printing, or block printing. Different colors are layered if needed. Fixation: After dyeing or printing, the fabric is typically heat-set or chemically treated to fix the color or design. This ensures colorfastness. Washing and Rinsing: The fabric is thoroughly washed and rinsed to remove excess dye or chemicals. This step also helps improve the fabric's softness. Finishing Agents: If specific properties are desired, finishing agents may be applied. For example, softeners can be added for a softer feel, or fire retardants for flame resistance. Drying: The fabric is dried to remove moisture. This can be done through air drying, steam drying, or other methods. Calendaring or Pressing: Depending on the desired finish, the fabric may be passed through calendaring rollers or pressed with heat to flatten and smoothen the surface. Inspection and Quality Control: Each finished textile is inspected for defects and quality issues. Any necessary corrections are made.

Rolling and Packaging: The finished textiles are rolled onto bolts or spools and packaged for distribution. Additional Processes (Optional):Depending on the specific finishing goals, additional processes like coating, laminating, or embossing may be applied.

ADVANTAGES

Textile finishing techniques offer several advantages, including: Enhanced Appearance: Finishing techniques improve the visual appeal of textiles, making them look more attractive and appealing to consumers. Softness and Comfort: Finishing processes can make textiles softer and more comfortable to wear, enhancing the overall comfort of clothing and fabrics. Durability: Finishing treatments can increase the durability and longevity of textiles, making them more resistant to wear and tear. Color Fastness: Textile finishing can improve the color fastness of fabrics, preventing fading or bleeding of dyes, even after multiple washes. Wrinkle Resistance: Some finishing methods can make textiles more wrinkle-resistant, reducing the need for ironing and maintenance.

DISADVANTAGES

Environmental Impact: Many finishing processes involve the use of chemicals and water, which can contribute to environmental pollution if not managed properly. Cost: Implementing finishing techniques can add to the production cost of textiles, potentially increasing the final product price. Reduced Breathability: Some finishing treatments, like waterproofing, can reduce the breathability of textiles, making them less comfortable in certain applications. Health Concerns: Exposure to certain chemicals used in finishing processes can pose health risks to workers in the textile industry. Limited Durability: In some cases, finishing treatments may not provide long-lasting effects, requiring reapplication or leading to decreased product lifespan.

CONCLUSTION

In conclusion, textile finishing techniques offer numerous benefits such as improved appearance, comfort, and durability, but they also come with drawbacks including environmental concerns, increased costs, and potential alterations to the fabric's characteristics. Balancing these factors is crucial for responsible and sustainable textile production.

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RECENT DEVELOPMENTS IN GARMENT TECHONOLOGY

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ABSTRACT

The purpose of the paper is to explore those different developments made in the garment industry.
Rapid technological breakthroughs are currently being tapped into by organizations, and fashion sector is no stranger to this trend. With the use of the most recent advancements to produce ground-breaking items, clothing manufacturing industry has experienced significant growth.
While clothing is the main focus, the marketing sector is also being quickly invaded by new technology and solutions. For instance, using the most recent ERP solutions makes it easier to track labor and materials and to create receipts and work orders. Similar to this, numerous other software tools support integrated costing and procurement procedures, simplifying the production of ledgers, reports, and queries. The most recent manufacturing trends tend to be product-centric, and over time, the majority of them fade away learning too.
Keywords: Design automation, 3d scanning, Robots, Recycled clothes

The growth of garment manufacturing

Before the industrial revolution, textiles and clothing were produced manually by hand. They were made from raw, organic materials including hemp, flax, cotton, silk, and wool. After being gathered, cleaned, and spun into yarn, these fibers. Color was added using natural dyes derived from plants, animals, and minerals. The yarn would next be woven or knitted into fabric, and finishing procedures like pressing, stretching, and washing would be used to improve the textile's durability and aesthetic appeal. This method of fabric production required a lot of labor, took a long time, and had a low output. During the industrial revolution, when the garment industry underwent an enormous transformation. Fabrics could now be produced at astounding rates because to the development of steam power and sophisticated machinery, which mechanized manufacturing processes and allowed for the construction of textile mills. As a result of mechanized production, which lowers costs, boosts productivity, and enables mass production, the industry moved away from the handloom (the method of human-only cloth weaving). As a result, factory employees operating powerful machines gradually displaced craftspeople in the historically labor-intensive clothing manufacturing process. The industrial revolution ushered in a new era of garment production as a result, establishing the basis for the contemporary textile and fashion industries.

Design automation for products

Automated workflows can be implemented across several approaches by the textile industry to release products more quickly than their rivals. Automation helps clothing manufacturers speed up manufacturing processes. The curated databases that result from these automated workflows also include historical product-related data that owners may utilize to design efficient workflows that automatically allocate jobs, validate procedures, and alert people. Standard technologies like Product Lifecycle Management (PLM) software, Robotic Process Automation (RPA), Product Information Management (PIM) systems, and several other virtual solutions can also be used to automate product design.

The demand for automation in the clothing sector

In modern global trade, technology adoption has become a crucial competitive choice. The ability to lower costs or expand production without raising costs is the primary driver of the trend towards more mechanization and automation. The industry will boost production without increasing overall cost if it can lower the cost per unit. It was almost equally critical to be able to raise the quality without raising the price per item. For businesses to become globally competitive, flexibility, quality, inventory reduction, an effective production cycle, and reduced lead times were crucial. It is clear that for businesses today looking to enhance their market share, cost reduction and production capacity improvement are of utmost importance. Due to businesses' ability to employ technology to maintain quick answers to market needs, the widespread introduction and adoption of new technologies has become a significant role in the competitive advantage of the worldwide market.

Scanning and 3d designing

Using CAD (Computer Aided Design) and other tools, garment producers can include 3D designs in the embroidery that is applied to the clothing. Other printing tasks including pattern embedding, grading, nesting, marking, and calculating fabric consumption are made easier with the aid of these tools. Fit is of vital importance in the clothing industry. And this was acknowledged when a group of astronauts had to postpone a NASA-planned spacewalk because a woman could not find a spacesuit that was the perfect fit. Therefore, bodily movements can change, especially during special tasks while wearing spacesuits, military gear, sporting, and firefighter gear. Fit is crucial in these circumstances. Because of this, it is the designer's entire responsibility when creating performance clothing to incorporate movement data into designs.

Uses of body scanning technology for clothing:

1. Custom-made clothing
2. Creating and making clothing
3. Body type evaluation
4. Development of 3-D products, including clothes, car seating, and other equipment applications, and apparel sizing standards
5. The creation of virtual dolls and models for internet shopping consumers and manufacturers of apparel see measures as vital.
6. Future uses for 3d body scanning in the garment technology
7. Standardizing sizes will enable smart cards to store a person's body dimensions for creating specially fitted clothing for them.
8. Through the use of a customized avatar, online shoppers are forced to imagine themselves from every perspective.
9. The system of increasing clothing size suggestions is called "made-to-measure tailoring."
10. Avatars can virtually dress themselves with digital clothing in virtual try-on systems, with the option to choose the fabric pattern and color as well as even the accessories like the trimming and buttons, and can even create dynamic poses like walking.
11. 3D shape information is used to create avatars for online shopping, test virtual fits, manufacture 3D products, and analyses body dimensions for target audiences.

Robots

Using CAD technologies, you may also make 3D models of the clothing or apparel to check their fits and patterns. The majority of 3D modelling programmed now include scanners, allowing you to precisely measure dimensions and include them in your creations.

Machine learning technologies have advanced significantly over time, and their use in clothing design is clear. Due to the knowledge and expertise that handcrafted designs bring, they cannot be entirely eliminated. Robotic manufacturing techniques, however, can expedite work. These manufacturing methods not only improve designs but also streamline the production process and hasten the release of finished goods onto the market.

Automated stitching with robots

Robotic sewing has gained popularity in recent years because it produces goods more quickly and precisely than manual stitching. Robots can sew quickly—up to 1,000 times faster than a human, in some situations.

Producing high-quality goods is made simpler by the precision and accuracy of robotic sewing machines. Additionally, humans are incapable of creating intricate patterns or working around edges like robots can.

Automated sewing robots that can be programmed for a variety of jobs are available from numerous robotics businesses, making it simple for consumers to produce unique patterns. Additionally, robotic sewing machines have the ability to stitch materials together using heat or water to make a variety of garments, such as shirts, jeans, coats, dresses, and more. Robotic sewing has gained popularity in recent years because it produces goods more quickly and precisely than manual stitching. Robots can sew quickly—up to 1,000 times faster than a human, in some situations. Producing high-quality goods is made simpler by the precision and accuracy of robotic sewing machines. Additionally, humans are incapable of creating intricate patterns or working around edges like robots can available from numerous robotics businesses, making it simple for consumers to produce unique patterns. Additionally, robotic sewing machines have the ability to stitch materials together using heat or water to make a variety of garments, such as shirts, jeans, coats, dresses, and more.

Several automatic devices used in the clothing industry:

1. pocket creasing machine automatically
2. Machine for automatically creasing sleeve plackets
3. machine that automatically cuts and creases labels
4. poly bagging machine automatically
5. Machine for cutting and twisting collar points
6. Cuff and collar shaping press
7. Automatic workstation for topstitching, run stitching, or collars
8. Machine with a single needle and an automated thread trimmer.
9. One-needle lock stitch machine with automatic thread trimmer and programmed control.
10. Recyclable clothes

The apparel business has long placed a high priority on sustainability, especially in the retail sector. Between 2015 and 2019, more than half of consumer-packaged goods (CPG) grew with the help of sustainable products. However, according to the NYU Stern Centre for a Sustainable.

The clothing industry is gradually embracing environmentally friendly production and marketing methods in order to appeal to environmentally concerned consumers. The movement covers practically all topics, including labor, supply-chain management, production, and distribution, and is not just focused on the materials.

Recycling involves repurposing used clothing, or in the case of textiles, it may also entail turning trash into useable materials. The recycling of clothing typically entails giving it a new purpose or user by starting a new stage of its life at the store. Because of this, the recycling loop closes near the end of the supply chain and commonly reenters the market through nonprofit organizations and collection points. The breakdown or grinding of premium materials into their most basic raw forms or substrates can also be a part of the recycling process for textiles. Recycling technology is regarded as crucial in the fight against raw material shortage and provides businesses with new means of controlling their raw material supply.

Market for used clothes

Evaluation of the recycled clothing business is challenging. A generation that has received education about the negative effects of excess and is aware of the planet's finite resources is driving it. Recycling is not a novel idea. The "Rag and Bone" men of the 19th century scavenged for home trash to sell to merchants. Since then, "fabric jobbers" have offered mill ends for sale, and nonprofit groups have encouraged the development of the vintage. Over 70% of people worldwide wear secondhand clothing, and women's apparel is seven times more plentiful than men's, according to the Textile Exchange Fast Facts. In the municipal garbage stream, over 5%.What is certain is that when a garment can be made and delivered to store in under two weeks and last for as long as ten years, the pile of product at the end of the apparel supply chain will continue to escalate. As a recycled item reenters the market particularly at retail, it reestablishes a cheaper value for clothes in the minds of the consumer. This puts enormous downward price pressure on the front end of the supply chain and will drive new sustainable models for an apparel business.

Reuse the clothes sustainably

The world of accessories and the current trend of DIY (do it yourself) are fantastic sources of inspiration, having given rise to a wealth of video tutorials and ideas on the internet that allow anyone to make their own garments or accessories and dress quite creatively. Additionally, you can now buy ENVIRONMENT FRIENDLY clothes IN online. With the leftover pieces of clothing that you no longer need, you can create bracelets, pendants, wallets, and anything else you can think of. You won't be sacrificing style with this craft because the accessories will become one-of-a-kind pieces. You'll enjoy exercising your ingenuity while letting your imagination go wild. Become one-of-a-kind pieces. You'll enjoy exercising your ingenuity while letting your imagination go wild.

Donate clothing:

Another alternative is to select garments that are still in good shape but no longer suit you because of your size. These are the perfect clothes to give to those who need them the most; recycling in this way is incredibly good for everyone. You won't have to exert much effort because there are bins in every city where you can dispose of them, as well as charities and organization that can offer guidance.

CONCLUTION

The mentioned technologies can be adopted and used to manage the business, enhance performance and accuracy in particular procedures, and more regardless of the size of the company. Today, clothing makers must figure out which technologies to use and how and where to use them in order to optimize manufacturing processes. Supply chains and marketing are just two more facets that are connected to production. In order for businesses to grow, clothing makers must employ the appropriate technology and solutions.

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NEW METHODS IN TEXTILE TESTING AND ANALYZE

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ABSTRACT

Although they are rarely considered, textiles are a fundamental part of our daily lives and are used in everything from our clothing to automobile upholstery to rugs and beyond. While good textiles may go unnoticed, inferior textiles are immediately noticeable. Our experience with textile products can be noticeably harmed by a shirt that only holds up to one or two washes before falling apart or a hand towel that bleeds color while in use. By establishing a set of standards that textiles may be held to, fabric testing aims to address these drawbacks. In this post, we'll define textile testing, discuss the organizations in charge of overseeing the textile industry, and go through some of the standard testing procedures.

Keywords: Textile testing, Methods, Fabric, Testing standards, Physical properties, Chemicals, Organization.

INTRODUCTION

When a textile product is made available on the market, it may undergo a variety of quality tests, which are collectively referred to as textile testing. As buyers, we want to feel certain in the caliber of the textiles we use for our clothes and other items. When we wear them, we want them to be comfortable, to keep their color brightness, to not fray or fall apart, and to be devoid of any chemicals that might not be safe for human contact. We also want to be certain that the textile will function as planned and fulfill its intended purpose in cases when textiles are used, such as when making industrial use materials or flame-resistant protective clothing. Fabric testing guarantees that our goods will maintain the desired physical and chemical characteristics and will not harm us.

METHODS

The techniques used to produce textiles frequently include a variety of locations and nations. Standardization and excellent quality practices are intended to be introduced to the textile sector by groups like ISO (International Organization for Standardization), ASTM International (formerly American Society for Testing and Materials), as well as various regional regulatory agencies. No matter where a product is created, these organizations aim to guarantee an acceptable end result. Governmental organizations may in some situations enforce regulatory standards for textiles. The FTC in the US controls aspects of fabric production, including statements about the environment and clothing labels.

Textile Testing Standards

The two ISO and ASTM International are organizations which develop voluntary, committee-based standards. These technical committees are often made up of people who themselves work in the relevant industry. The international textile committees of ISO and ASTM collaborate to develop textile standards and provide recommendations for streamlining production techniques. The fabric testing guidelines have been put together and may be published online or in a real book that can be bought. Although adhering to the recommendations of these organizations is not required, it might assist textile manufacturers in ensuring uniform quality and developing a set of standard operating procedures.

Importance of Textile testing

Textile testing is important for a number of reasons, including process control, raw material control, product control, and the gathering of analytical data. Actually, testing is a two-way process in which the incoming raw materials that will be required to make the company's products are examined to make sure they adhere to the requirements. In other words, any manufacturing issues will be kept to a minimum while also ensuring that the textile item produced won't cause issues for the consumers; in other words, that the item being produced is a high-quality product. Understanding the complexity of the equipment and their operating principles, as well as how to analyze the results in a systematic and scientific fashion, is a critical component of modern testing.

For a manufacturer to ensure product quality for the market in which the textile producer competes, testing is crucial, especially for consumer satisfaction with the textile product. Testing is crucial for maintaining cost and production quality in the manufacturing process. Testing is a crucial tool for controlling the manufacturing process in the textile sector for a variety of financial and other reasons. Testing is crucial for ensuring customer satisfaction and controlling manufacturing costs. Additional factors include sales, reputation, staff satisfaction, and customer relations.

Methods of Fabric Testing

According to the application, there are numerous different ways for conducting textile tests since there are numerous different types of fabric tests to satisfy various regulatory requirements. However, we may categorize textile testing procedures into a few general groups:

Physical Testing

The quality analysts will look at a fabric's physical properties when performing physical testing on textiles. The goal of this testing is to get as much physical information about a textile sample as possible so that customers may be confident in its composition and that it will be appropriate for the use for which it is designed. Fibers are recognized and evaluated during physical testing for a variety of factors, including stiffness, fabric count for woven materials, coatings, weight (also known as GSM), unit length of both individual and bundled fibers, and more.

Mechanical testing

The term "mechanical testing of textiles" refers to a variety of tests used to ascertain a fabric's tensile strength and durability. This is significant because, as buyers, we want to know that the textiles we purchase will hold up to normal wear and tear over the course of their intended lifetime. Although there are many other mechanical tests for textiles, the following are some of the most used ones.

Tensile Testing

It determines the maximum force that a cloth, when placed under continual, regulated tension, can withstand. In this test, a cloth is continuously pulled at from various angles until it ruptures using specialized tensile testing equipment. Tensile testing can assist establish a textile's breaking point, how much it can be stretched before losing its shape, how strong it is against damage, and more.

Air Permeability and Hydrostatic Instruments

James Heal recently expanded its Performance Testing product range with the addition of the AirPro air permeability tester. The company reports it is an innovative alternative to similar testers available in the market. Some key features of the AirPro include:

Test Wise software - James Heal's in-house, proprietary system for simplified operation with preloaded standards and a "quick test" function;

A large, illuminated test bed to accommodate a variety of materials and large samples;

Quick change test heads ranging from 5 to 100 square centimeters; and
A wheeled base for easy movement around the lab or factory floor.

Abrasion Testing

It uses frequent rubbing to assess a fabric's resistance to surface wear and tear. The Wyzenbeek method and the Martindale method are the two main abrasion testing techniques. A material is pulled taut on a Wyzenbeek machine and repeatedly rubbed back and forth with an authorized abrasive material for Wyzenbeek testing. The number of "double rubs" is counted up to the point where two yarn breaks or obvious wear occur. In a process called Martindale testing, a piece of fabric is mounted and rubbed in the shape of an eight with a piece of worsted wool acting as the abrasive material. Despite the fact that the two tests are connected, a high or low score on one test does not automatically translate to the same score on the other.

Pilling Testing

It evaluates a fabric's ability to resist pilling. Pilling, which is frequently caused by wear and friction over time, is the tendency for a fabric to produce little, fuzzy balls of loose fibers on its surface. Quality experts primarily use the ICI Box Pilling Test to assess a fabric's tendency to pill. For this test, textile samples are fastened to specialized polyurethane tubes. These samples are then put in a pilling box, tumbled around for a specific number of rotations, and any pill formation is then determined. In some circumstances, pilling may also be assessed using the Martindale approach.

Chemical testing

To make sure a fabric is free of dangerous compounds that could not be acceptable for human contact, chemical testing of textiles has this as one of its main objectives. To ensure that a cloth is safe, chemical tests for lead and other heavy metals, dangerous dyes, phthalates, and other substances may be used. Chemical testing of textile samples can be performed to check a fabric's pH and color fastness in response to things like light, heat, perspiration, or chlorination in addition to keeping us safe. This is particularly important for fabrics used in sporting clothing to provide the best possible fit and performance on the body during physical exercise. Testing for flammability of textiles is also a part of chemical testing.

Color Measurement

The Color match color formulation software from X-Rite aids businesses in selecting the ideal color formula for a given application. Key components for a textile digital workflow are provided by Grand Rapids, Michigan-based X-Rite Inc., including spectrophotometers, color formulation software, software to assist with virtual materials, and light booths for visual review. Depending on the application, the company offers a wide range of spectrophotometers, but the Ci7800 is a top pick for textile producers. Using up to five reflectance apertures and four transmission apertures, the spectrophotometer can measure opaque, translucent, and clear samples. It is possible to measure a variety of materials, including textured samples, using a variety of attachments.

CONCLUTION

A wide range of features of textile manufacture are covered by the discipline of textile testing. Following best practices and being aware of the characteristics of textiles can assist produce goods of high quality that are both aesthetically beautiful and useful. Technologies for odor reduction and capture have been utilized for a long time to reduce the financial and environmental costs of premature fabric disposal while also increasing customer satisfaction. While there are no clear solutions for how to explain to the average consumer the advantages of minimizing microbial development on garments, evaluating these capacities has proven difficult. For the first time, the recently approved AATCC TM211-2021 test can actually assess the value of odor control technologies, demonstrating that they are useful applications that the textiles sector should continue to employ as customers look for more environmentally friendly solutions.

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Principles of Textile Testing: An Introduction to Physical Methods of Testing Textile Fibers, Yarns and Fabrics.

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TEXTILE FINISHING PROCESS

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ABSTRACT

Textile Finishing is a process used in manufacturing of fiber, fabric, or clothing. It is common practice to subject the material to various sorts of chemical and physical processes in order to give the fiber or fabric the necessary functional qualities. For instance, a wash and wear finish are required to make a cotton fabric crease- or wrinkle-free. Similar to this, essential finishes applied to textile fabric include mercerizing, singeing, flame retardant, water repellent, water resistant, antistatic finish, peach finish, etc.

INTRODUCTION

Once a fabric is created, a fabric finish is applied to enhance its look, feel, and other qualities. Finishing procedures are used to enhance the fabric's inherent qualities or aesthetic appeal and to boost its usefulness. Finishing entails modifying a manufactured part's surface to give it the desired appearance, to make it simpler to bond with, or to increase durability. Whether the manufactured product is made of plastic or metal, the finishing techniques employed on it all depend on that material.

Finishing Importance:

Fabric finishes are used to improve the fabric in some way.
Improve the appearance - color, pattern.
Change the texture of the fabric - embossing, brushing or smoothing.
Improve the feel - softer, crisper, firmer.
Improve the drape weighted.
Improve wearing qualities - crease resistance, satin resistance, flammability, water proof etc.
Modify care requirements - easy wash, quicker drying time, color fast, less shrinkage.

Types of Finishes

Textile finishing can be done through the use of many different methods. These methods typically fall under the following common types or categories of fabric finishes:

Functional finishes: It is purely functional finishing (those that improve the usefulness or purpose of a textile or help a textile perform better) and aesthetic finishes are the two main types of functional finishes. Given that one of the main goals of textiles is appearance, aesthetic finishes are a significant category.

Performance finishes are used to increase the durability or longevity of a textile. There are four basic levels of performance finishes. The level of finish used depends on the fabric and its intended use. Sorted by the increasing degree of durability, these levels are: Temporary (will wash or wear off quickly), semi-durable (lasts multiple washes but will eventually wear off), durable (lasts the lifetime of a fabric, yet the finish can lose its effectiveness), and permanent (permanent. because it often changes the structure of the fibers through the addition of chemicals).

Chemical finishes are also called wet finishes because these types of finishes are generally applied in liquid form. These types of finishes are used for many fabrics to provide features such as moth protection, moisture management, temperature adaptability, felting or shedding prevention, flame retardation, fragrance, anti-slip, anti-static, or anti-microbial.

Mechanical finishes are also called dry finishes. These types of finishes are used to produce temporary or semi-durable finishes. It generally involves processing the textile through a machine with the application of physical principles like pressure, temperature, and friction to the textile.

Basic methods and processes

The term "finishing" refers to all mechanical and chemical operations used in commerce to increase product acceptance, with the exception of those specifically related to coloring. The goal of the various finishing procedures is to increase consumer acceptance of cloth produced on a loom or knitting frame. Preparatory treatments used before further treatment, such as bleaching before dying, treatments to enhance appearance, such as glazing, treatments to increase touch, and treatments that add qualities to improve performance, such as preshrinking, are all examples of finishing processes.

Preparatory treatments

Before adding other finishing techniques to the freshly produced cloth, it is frequently required to carry out some kind of preparatory treatment. All residual contaminants must be eliminated, along with any additives used to speed up the manufacturing process. To make something whiter or to get it ready for color application, bleaching could be necessary. Below are some of the preliminary procedures that are most frequently utilized.

Burling and mending

Newly developed products, which commonly have flaws, are thoroughly examined, and flaws are typically fixed by hand procedures. Perching is the initial evaluation of woolen and worsted fabrics. Burling is the process of removing any leftover foreign matter, such as burrs and, additionally, any loose threads, knots, and unwanted slubs from woolen, worsted, spun rayon, and cotton fabrics.

Scouring

When applied to gray goods, scouring removes substances that have adhered to the fibers during production of the yarn or fabric, such as dirt, oils, and any sizing or lint applied to warp yarns to facilitate weaving.

Bleaching

In an attempt to whiten cloth by erasing its natural color, such as the tan of linen, bleaching is often done using chemicals that are chosen based on the chemical makeup of the fiber. Chemical bleaching is often carried out through hydrogenation or oxidation, which removes color by applying oxygen to the material. Wool and other animal fibers are treated with mildly alkaline hydrogen peroxide or acidic reducing agents such gaseous sulfur dioxide. Cotton and other cellulosic fibers are often treated with hot alkaline hydrogen peroxide.

Mercerization

A method known as "mercerization" is used to improve cotton's strength, luster (which also improves appearance), and dye-binding properties. Cotton and cotton blends may also undergo this process. The procedure involves immersing under tension in a caustic soda (sodium hydroxide) solution, which is then neutralized in acid. It can be used at the yarn or fabric stage. The enlargement of the fiber is permanent as a result of the treatment.

Drying

Fabrics obtain water from the various stages of textile manufacturing, and the extra moisture eventually needs to be eliminated. The initial step of drying involves mechanical means to get rid of as much moisture as possible because evaporative heating is expensive. These techniques include using centrifuges and a continuous process that uses vacuum suction rolls. The last bit of moisture is subsequently evaporated in heated dryers.

Finishes enhancing appearance

Treatments enhancing appearance include such processes as napping and shearing, brushing, singing, beetling, decanting, tentering, calendaring or pressing, moireing, embossing, creping, glazing, polishing, and optical brightening.

Napping and shearing

Woolens, cottons, spun silks, and spun rayon, including both woven and knitted forms, can all be napped to create a velvety, soft surface. To create a nap, the short, loose fibers are lifted to the surface of the fabric by rotating cylinders wrapped with fine wires. This procedure is typically used with weft yarns. Woolens and worsteds, as well as blankets, are regularly subjected to the process, which boosts warmth. On pile textiles, shearing is done for the same reason and lowers the higher nap to a standard height.

Brushing

This process, applied to a wide variety of fabrics, is usually accomplished by bristle-covered rollers. The process is used to remove loose threads and short fiber ends from smooth-surfaced fabrics and is also used to raise a nap on knits and woven fabrics.

Singeing

Also called gassing, singeing is a process applied to both yarns and fabrics to produce an even surface by burning off projecting fibers, yarn ends, and fuzz.

Beetling

Beetling is a process applied to linen fabrics and to cotton fabrics made to resemble linen to produce a hard, flat surface with high lusture and also to make texture less porous.

Tentering, crabbing, and heat-setting

These are the last steps used to stretch and set the fabric to its final proportions, as well as to align the warp and weft of woven fabrics at right angles to one another. By using a tender frame, which is made up of chains connected with pins or clips to hold the fabric's selvages and moving along tracks, it is possible to expand breadth under tension. Creases and wrinkles are eliminated, the weave is straightened, and the cloth is dried to its final size as it moves through the heated chamber.

Calendaring

Calendaring is a finishing step in which a cloth is heated and pressured while being moved between heated rollers to give it a flat, shiny, smooth surface. When pressure and heat are increased, luster also increases. Calendaring is used on fabrics that need to have a smooth, flat surface, such as the majority of cottons, many linen, silks, and other synthetic fabrics. Because a smooth surface is not preferred in materials like velveteen, the cloth is heated while in tension rather than being pressed. The method is known as pressing when it is used on wool, and it uses hot, heavy metal plates to steam and press the fabric. Calendaring is typically not a long-term procedure.

Creping

A crepe effect may be achieved by finishing. In one method, which is not permanent, the cloth is passed, in the presence of steam, between hot rollers filled with indentations, producing waved and puckered areas.

Finishes enhancing tactile qualities

Finishes enhancing the feel and drape of fabrics involve the addition of sizing, weighting, fulling, and softening agents, which may be either temporary or permanent.

Sizing

Sizing, or dressing, agents are compounds that form a film around the yarn or individual fibers, increasing weight, crispness, and luster. Sizing substances, including starches, gelatin, glue, casein, and clay, are frequently applied to cottons and are not permanent.

Weighting

Weighting, in the processing of silk, involves the application of metallic salts to add body and weight. The process is not permanent but can be repeated.

Softening

Making fabrics softer and sometimes also increasing absorbency involves the addition of such agents as dextrin, glycerin, sulfonated oils, sulfated tallow, and sulfated alcohols.

Finishes improving performance

The performance of fabrics in use has been greatly improved by the development of processes to control shrinkage, new resin finishes, and new heat-sensitive synthetic fibers.

Durable press

The characteristics including shape retention, perpetual pleating and creasing, permanently smooth seams, and the capacity to shed wrinkles, durable press materials can maintain a clean appearance without ironing. These materials can be machine cleaned and dried without risk. A curing procedure adds these beneficial properties. Fabrics can be precured (a process in which a chemical resin is added, the fabric is dried and cured (baked), and heat is applied by pressing after garment construction) or postcard (a process in which a resin is added, the fabric is dried, made into a garment, pressed, and then cured) depending on composition and the desired results.

Waterproofing and water repellency

When raincoats and umbrellas are waterproofed, the fabric's pores are sealed up by the use of ingredients including bituminous materials, drying oils, paraffin, and insoluble metallic compounds. Although they impart some water resistance, water-repellent treatments are more comfortable to wear since the cloth pores are left open. Wax and resin blends, aluminum salts, silicones, and fluorochemicals are a few examples of such finishes.

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TEXTILE FINISHING TECHNIQUES

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ABSTRACT

The textile industry uses a lot of energy, water, and chemicals at a high cost to the producer. A technique used in the creation of fiber, fabric, or garment is known as textile finishing. It is typical to subject the cloth to unique forms of physical and chemical treatments in order to give the fiber or material the appropriate functional properties. It involves giving the textiles a better look, feel, or other aesthetic qualities, as well as adding any additional properties like water resistance or flame resistance.

Keywords: Chemical finishing, Mechanical finishing, Decatizing, Sanforizing, Crease Resistant Finishes etc.

INTRODUCTION

In general, the textile industry uses a lot of energy, water, and chemicals at a high cost to the producer. Therefore, it is expected of the textile sector to create eco-friendly technologies and procedures that lessen pollution and take advantage of current opportunities for the wise use of natural resources. A technique used in the creation of fiber, fabric, or garment is known as textile finishing. It is typical to subject the cloth to unique forms of physical and chemical treatments in order to give the fiber or material the appropriate functional properties. For instance, to produce a cotton textile crease-free or wrinkle-free, washing and applying finish are required. Similarly, mercerizing, singeing, flame resistance, water resistance, water proof, antistatic finish, peach end and so forth are some of the vital finishes applied to textile material.

Textile finishing process:

The functionality, durability, and overall beauty of materials are all enhanced through textile finishing. The phrase refers to any mechanical, chemical, and biological operations carried out to enhance the characteristics of the products, giving them a certain look (for instance, color), or function. Finishing procedures are applied to lose fibers, yarns, textiles, or clothing at any stage of the production process. But the predominant substrate is fabric.

Styles of fabric finishing:

The final step in the textile processing process is called finishing, and it involves giving the textiles a better look, feel, or other aesthetic qualities, as well as adding any additional properties like water resistance or flame resistance. It can be broadly categorized into the following classes, which can be used separately or in combination with one another. Other words, such as wet finishing, dry finishing, long-lasting finishes, and non-long-lasting finishes, are also used.

Pre-treatment:

Before they can be dyed, printed, or completed, the majority of fabrics go through pre-treatment, for example, to remove natural contamination from the grey fabrics, such as wax, pectins, earth alkaline metals, or biocides, as well as to get rid of size materials that were added during weaving. Monomers, oligomers, and spinning lubricants are all components of synthetic fibers. These by-products have the potential to seriously contaminate wastewater and exhaust air, in addition to the chemicals employed in pre-treatment. The following effects on fiber qualities result from pre-treatment, which is necessary for all subsequent finishing stages and cleans the fibers. There is an increase in dye absorption. Textile tensions are reduced, and dimensional stability is enhanced. The material has better wettability.

A change in crystallinity of the cellulose can be achieved through mercerization, thus improving its luster. The whiteness of the substrates is enhanced through bleaching, which is important for full white fabrics as well as for fabrics dyed in light shades or with a high brilliance. The three main techniques applied are mechanical, wet and thermal pre-treatment. The processing steps and their sequence depend on the substrate (for example cotton, wool, man-made fibers, woven or knitted fabrics, etc.) and also on the downstream processing steps of the textiles and the equipment used.

There are two broad categories of finishing:

Chemical finishing

Mechanical finishing

Mechanical finishing is a procedure that involves technology of different-searching floor textures on metallic material through buffing, brushing, tumbling, or bead blasting the surface. Concerning the utility of bodily ideas including friction, temperature, stress, tension and many others. Normally used mechanical finishes consist of calendaring, compressive shrinkage/ Sanforizing, raising, emerizing/ sueding/ peaching, shearing/ cropping.

Calendaring

A system of passing garments among rollers (or ‘calendars'), normally under carefully controlled heat and strain, to supply a spread of floor textures or effects in cloth together with compact, clean, supple, flat and glazed. The process involves passing fabric through a calendar in which a surprisingly polished, commonly heated, metallic bowl rotates at a higher surface pace than the softer (e.g., Cotton or paper packed) bowl against which it really works, thus generating a glaze on the face of the fabric that is in contact with the metallic bowl. The regular woven material surface isn't flat, especially in normal fine undeniable weave fabric, due to the round form of the yarns, and interlacings of warp and weft at proper angles to each difference. In such fabrics it's miles greater frequently seen that even when the fabric is quite normal, it isn't flat. For the duration of calendaring, the yarns within the material are squashed into a flattened elliptical shape; the intersections are made close-up between the yarns. This causes the cloth floor to become flat and compact. The improved planeness of the floor in flip improves the glaze of the material. The calendar machines may additionally have numerous rollers, a number of which may be heated and sundry in speed, so that in addition to strain a polishing motion can be exerted to grow luster.

Compacting

A long-lasting finish applied to knitted fabrics and man-made fibers by shrinking them under pressure and heat to create a thick and creepy texture.

Embossing

This specific kind of calendaring enables the etching of a straightforward pattern onto the fabric. passing fabric through a calendar that pits a hot metal bowl with the pattern engraved on it against a comparatively soft bowl made of compressed paper or cotton on a metal center to create a pattern in relief.

Sueding

A roller covered in abrasive substance is used to carry out the sueding finishing procedure. The fiber end being moved away from the fabric's surface gives the cloth a considerably softer feel and better insulation capabilities.

Raising

Napping

The process of elevating the fiber on a product's face using rollers or tassels that have steel wires or card covering that is about an inch high. Either method raises the protruding fibers, compacts the fabric, makes it softer to the touch or smoother to the touch, increases durability, and covers the tiny spaces between the interlacing of the warp and the filling. The finished fabric also provides the wearer with more warmth as a result. Blankets, flannel, unfinished worsted, various coatings, and some clothing items are examples of napped materials. Gigging, Genapping, Tasseled, and Raised are additional terms for napping.

Shearing

Shearing is a crucial element in the preparation process for processing cotton fabric. "Shearing" is a process used to improve surface quality by removing fibers and loose threads from the fabric's surface.

Stabilization

A term usually referring to fabrics in which the dimensions have been set by a suitable preshrinking operation.

Decanting

The other term for it is decatizing. A process used to finish fabrics that improves the hand, gloss, and setting of the cloth. A perforated roller with fabric coiled onto it is heated with steam or hot water.

Steaming and Heat setting

High temperatures are used to stabilize fabrics made of polyester, nylon, or triacetate; however, cotton or rayon are not affected. It can be carried out on fabric or clothing, and if done before dying, it could cause side-to-side shade fluctuation; if done after dyeing, it might modify the shade.

Sulfurizing

Pre-Shrinking

The cloth is put through a machine called a syntonizer, which has drums filled with hot steam, to sulfurize it. This procedure is used to limit the fabric's shrinking. The application of mechanical forces and water vapor results in the fabric having the best possible dimensional stability.

Chemical

Finishing

A fabric can acquire qualities from finishes that use chemicals of various origins that are otherwise impossible to achieve using mechanical techniques. Commonly used chemical-based finishes include softening, stiffening / hand-building, easy-care / wrinkle-recovery / durable-press, water / oil repellent, soil repellent, soil release, flame retardant, anti-slip, anti-static, anti-pilling, anti-microbial, elastomeric, UV protection, insect resistant / moth protection, bio-polishing, fragrance, moisture management, temperature adaptability, and finishes to improve color fastness of the dyed or printed fabrics.

Some requirements of chemical finishes include:

Suitability of the finish for all fibers in all forms

Desired durability of the finishing effect

No loss of desirable fabric properties, e. g. appearance, hand-feel, strength, comfort, abrasion resistance

No yellowing of the white finished fabric

No change in color of the dyed or printed fabric

Safe to use and simple to apply on the fabric

Good storage stability and shelf life

Good compatibility with other ingredients of the finishing formulation

Easy correction in case of faulty finish application

Sustainability and no harmful impact on the environment

Factors that are commonly considered for proper formulation of the chemical finishes include:

The type of textile being treated (fiber type, yarn type, fabric construction)

The performance requirement of the finishes (the extent of desired effect and its durability)

The cost to benefit ratio

Limitations imposed by the available machinery or environmental issues

Compatibility of various components of the formulation

Softening

When a fabric's softness needs to be altered, softening is used, always carefully taking into account the composition as well as the features of the substrate.

Electrostatic finishes

The knitwear industry in specific ways benefit from elastomeric finishes, commonly referred to as stretch or elastic finishes. Only silicone-based products currently allow for the creation of these coatings. Because extensibility must be improved as well as recovery from deformation, the major result is durable elasticity. The fabric should regain its natural shape once all strains and disruptive factors have been removed.

Crease resistance or crease proofing

For cellulose textiles (cotton, linen, and rayon) that wrinkle easily, crease-resistant finishes are used. Fabrics from Permanent Press include crease-resistant coatings that assist keep creases and pleats while being worn and washed.

Soil release finish

They help in soil removal by drawing water to the surface of the fibers during cleaning.

Flame retardant finish

They are used to treat flammable substances such as carpets, curtains, and children's sleepwear to keep them from catching fire.

Anti pilling

Fabrics produced from spun yarns—yarns made from staple fibers—show the phenomena known as pilling. When cloth is worn or washed, clumps of tangled strands called "pills" develop on the surface. Fabrics containing pills have an unpleasant handle and an ugly appearance. The frictional forces of abrasion draw loose fibers from threads and shape them into spherical balls. Longer strands known as anchor fibers hold these balls of tangled fibers to the fabric's surface.

The formation of pills on textiles and knitted goods created from yarns including synthetic fibers, which are prone to pilling due to their significant strength, flexibility, and impact resistance, is reduced by anti-pilling finishes. The foundation of an anti-pilling finish is the use of chemical treatments that are intended to lower the mechanical resistance of synthetic fiber as well as the capacity of fibers to slacken.

Non slip finish

A finish applied to a yarn to make it resistant to slipping and sliding when in contact with another yarn. The main effect of non-slip finishes is to increase the adhesion between fibers and yarns regardless of fabric construction, the generic term for these finishes would be fiber and yarn bonding finishes. Other terms that can be used include anti-slip, non-shift and slip-proofing finishes.

Satin and soil resistant finishes

Prevent soil and stains from being attracted to fabrics. Such finishes may be resistant to oil-bourse or water-borne soil and stains or both. Stain and soil resistant finishes can be applied to fabrics used in clothing and furniture. Scotchgard is a stain and soil resistant finish commonly applied to carpet and furniture.

Oil and water proofing

Waterproof Finishes -Allows no water to penetrate, but tend to be uncomfortable because they trap moisture next to the body. Recently, fabrics have been developed that are waterproof, yet are also breathable.

Water repellent finish

Water-repellent finishes resist wetting. If the fabric becomes very wet, water will eventually pass through. Applied to fabrics found in raincoats, all-weather coats, hats, capes, umbrellas and shower curtains.

Absorbant finish

Increase fibers' moisture holding power. Such finishes have been applied to towels, cloth diapers, underwear, sports shirts and other items where moisture absorption is important.

Anti-static finish

Reduce static electricity which may accumulate on fibers. The most common type of anti-static finishes is fabric softeners.

Anti mildew

In certain ambient (humidity and heat) conditions, cellulose can be permanently damaged. This damage can be due to depolymerization of the cellulose or to the fact that certain microorganisms (mildews) feed off it. The situation is worsened, during long storage periods, by the presence of starch finishing agents. This damage can be prevented by the use of antiseptics, bacteria controlling products containing quaternary ammonium salts, and phenol derivatives. Dyestuffs containing heavy metals can also act as antiseptics.

Antibacterial finish

The inherent properties of textile fibers provide room for the growth of micro-organisms. The structure and chemical process may induce the growth, but it is the humid and warm environment that aggravates the problem further. Antimicrobial finish is applied to textile materials with a view to protect the wearer and textile substrate itself. Antimicrobial finish provides the various benefits of controlling the infestation by microbes, protects textiles from staining, discoloration, and quality deterioration and prevents odor formation. UV Protection Fabric treated with UV absorbers ensures that the clothes deflect the harmful ultraviolet rays of the sun, reducing a person's UVR exposure and protecting the skin from potential damage. The extent of skin protection required by different types of human skin depends on UV radiation intensity and distribution with reference to geographical location, time of day, and season. This protection is expressed as SPF (Sun Protection Factor), higher the SPF value the better is the protection against UV radiation.

Colorfastness improving finish

Color fastness is the resistance of a material to change in any of its color characteristics, to the transfer of its colorants to adjacent materials or both. Fading means that the color changes and lightens. Bleeding is the transfer of color to a secondary, accompanying fiber material. This is often expressed as soiling or staining meaning that the accompanying material gets soiled or stained. The physical and chemical principles involved in the performance of the fastness improving finishes concern either the interaction with the dyestuff or with the fiber or both.

The finishes are applied to:
Improve the colorfastness to washing
Improve the colorfastness to crocking
Improve the colorfastness to light
Improve the colorfastness to weathering
Improve the colorfastness to chemical washes such as mild bleaching, dry cleaning and commercial washing.

Enzyme finishing

Bio polishing, also called bio-finishing, is a finishing process applied to cellulosic textiles that produces permanent effects by the use of enzymes. Bio-finishing removes protruding fibers and slubs from fabrics, significantly reduces pilling, softens fabric hand and provides a smooth fabric appearance, especially for knitwear and as a pretreatment for printing.

Sewing thread finishing

Apart from many of the above said finishes which can be applied to sewing threads also, A variety of finishes are used to improve the sew ability of sewing thread, for example. Lubricants reduce friction and improve the lubricity of the thread. Lubricity refers to the frictional characteristics of thread as it passes through the sewing machine and into the seam. Good lubricity characteristics will minimize thread breakage and enhance sew ability. Glazing increases strength and abrasion resistance. Glaze Finish refers to a finish put on 100% cotton threads or cotton-polyester core spun thread made from starches, waxes or other additives. This coating is then brushed to give the thread a smooth surface. A glaze finish protects the thread during sewing giving better ply security and abrasion resistance.

CONCLUTION

Although both of the above categories of textile finishing process are accomplished with the help of some machine, in chemical finishing the final effect obtained on the textiles is primarily due to the chemicals used in finishing. In mechanical finishing, the final effect obtained on the textiles is primarily due to some mechanical action on the fabric by the machine. Chemical finishing results in a change of chemical composition of the fabric. Most of the chemical finishes do not result in change in the fabric appearance but may result in change in some other physical and mechanical properties of the fabric. Mechanical finishing does not result in any change in the elemental composition of the fabric. However, most mechanical finishes alter the fabric appearance.

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TEXTILE PRODUCTION MANAGEMENT AND MERCHANDISING

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ABSTRACT

This is based on analyzing the role of textile merchandiser. The Merchandiser on the side of Production and the side of the agent. The Merchandiser in the textile Production management is responsible from the production of yarn to the final stage including the shipment. Production management includes everything from the collection of raw materials for the manufacture of garments to the planning of activities. The successful shipment of export orders in the textile industry mainly depends on the merchandiser. The organization's business strategy, which includes the creation of new designs and fashions within the company, is called product development.

Keywords: Textile production, Process, Merchandising, Business, Product, Yarn, Fiber, Fabric, Cost, Qualities, Functions etc.

INTRODUCTION

Textile production is the process by which fibers, filaments, yarn, and thread - both natural and synthetic - are made. It also comprises the production of objects made with these materials. Merchandiser is the interface between Buyer and Exporter. Merchandiser is responsible for order analysis of shipment. So Merchandising is a very valuable department in the Textile Industry.

Textile Production Management

Production management is the process of planning the conversion of raw materials into finished products, procurement of necessary materials, supervision and control. In the textile industry, production management refers to the process of making a garment from beginning to end. Production management includes everything from the collection of raw materials for the manufacture of garments to the planning of activities required for the transformation of garments, procurement of necessary materials, supervision, control, proper layout of employees and even handing over of garments to buyers.

Merchandiser

Merchandising is the process of planning the right merchandise at the right time in the right quantity and at the right price to meet the needs of the company's target customer. A merchandiser plays double roles in the apparel industry. Acts as a seller to the buyer, on other hands plays a buyer role to the manufacturer. So, the person who is involved in buying and selling goods is called a merchandiser. All the procedures of an apparel industry, a merchandiser is directly or indirectly involved. For this reason, the merchandising department is a very important department in the textile Industry. For smooth order execution, a merchandiser must have some essential qualities. Merchandising is the department which mediates marketing and production departments. Sometimes, the merchandising department will have to do costing and pricing also. In any case, the merchandiser is the person whose responsibility is to execute the orders perfectly as per the costing and pricing. So, it is a very valuable department.

FUNCTIONS OF MERCHANDISERS

Product development

The organization's business strategy, which includes the creation of new designs and fashions within the company, is called product development. This practice increases revenue for the company and impresses buyers by demonstrating initiative in design development. Production merchandisers have a crucial function to perform in this operation. Production merchandisers are required to periodically inform customers about the product development work done by the company. Encourage the customer to hire the company to handle the design development rather than doing it themselves. Production merchandiser presents fresh color, prints, embroidery designs, and desk loom improvements whenever a customer visits the company. to showcase fresh designs created by the product development division. Make an effort to persuade the buyer to choose the designs from the presentation.

Sampling

Sampling is one of the main processes in Garment manufacturing and it plays vital role in attracting buyers and confirming the order, as the buyers generally places the order once satisfied with the quality and responsiveness of the sampling. Sampling is the most crucial and most important stage of fashion merchandising. Sampling department makes samples on the basis of the specification and requirement by the buyer. Sampling in merchandising may be defined as. The concept, perception and ideas of a fashion designer developed into product samples, in systematic stages of product development, with technical and quality clarity in a development. The role of merchandiser plays a crucial role as the follow up of the samples is an important aspect. Buyer passes some comments to the merchandiser after submitting the sample. These comments are needed to understand and communicate with the sampling department. Get changes from the sampling and resubmit to the buyer. Follow up with the buyer to get approvals of the sample.

Costing

Costing is the very dynamic process, and it is the most important function performed by merchandiser. Merchandisers should have knowledge of costing and its calculations. While calculating the cost of the garment merchandiser keeps following things in mind.

Fabric consumption
Trims
CMT
Value added services: printing, embroidery, washing, applique
Testing
Transportation and logistics cost
Profit of the manufacturing organization
Currency exchange rate
The role of merchandiser does not end only after calculating the cost, but after quoting the
The cost merchandiser needs to negotiate with the buyer on the cost of the garment.

Planning (Time and action calendar)

Production merchandising is an interdependent activity. Successful merchandising is the outcome of effective preparation and follows up the time and action calendar by all departments. Time and Action Calendar or TNA, a most important jargon used in fashion merchandising, is an effective way of coordination and following up of important milestones in pre-production processes to ensure timely delivery within stipulated delivery date. Despite claims of being practically in use by most buying and manufacturing organizations, the follow-up of orders/styles during the pre-production processes are not fool proof and there are several myths which need to be redressed. Production merchandiser prepares the TNA by keeping things in mind like production capacity, lead time of buyer, holidays etc.,

Communication

Communication is the most important aspect of any export order process. In production merchandising there are various tools used to communicate with buyers in order to proceed further in export order like quality manual, purchase order, packing list, color way communication, style no. tech pack. Buyer communicates each and every aspect of on-going and future style with merchandiser only. Merchandisers must be able to communicate with buyers and with internal departments effectively to process the export order effectively. There are several modes of communication like telephone, email, actual meetings, fax etc. merchandisers must be aware of etiquettes to use these modes of communication.

Coordination

Coordination is the major aspect of fashion merchandising; one need to coordinate with all the departments within the organization and outside the organization in order to run the export order successfully. Coordinating with another department is the one of the major responsibilities of a production merchandiser. A production merchandiser has to coordinate with the other departments so as to complete its job and to follow the production activities. Factory merchandisers use different formats and documents to coordinate within the factory production. Some of them are need to be created by factory merchandisers, some of them are provided by buyers. This type of coordination is referred to as internal coordination. Production merchandiser needs to coordinate with buyer as buyer also takes the follow up from merchandiser. Merchandiser provides the formats to the buyer like production status report,
packing list, TNA etc.,

Sourcing

For garment export house fabric and trims are the raw material which needs to be outsourced. Sourcing is basically determining the most cost-efficient vendor of materials, production, or finished goods at the specified quality and service level. It is closely associated and an important part of apparel merchandiser‘s responsibility. Materials basically include piece goods that will be cut and converted into garments. Not only does the fabric have to be appropriate and suited to the garment design and end use but it must also be made available at the precise time when it is needed. Thus, lead times play an important role in the sourcing and placing orders for the materials required for the production. Lead times required from a supplier can vary from as little as two weeks to as much as nine months. Trims are all the materials other than the piece goods that are required to make up a garment. Findings require the same careful planning as the piece goods.

As soon as the fabric is in the stores, then only the sourcing of the threads starts because the color of the thread must match the buyer‘s requirements. The ordering of the threads must be complete by the time fabric is cut ready to be needed to the sewing lines.

Sourcing department

Along with apparel merchandiser plays the vital role to execute and shipment of export orders successfully. Merchandisers must make sure that all approvals related to fabric and trims should be coordinated with the sourcing department in a given time frame.

ESSENTIAL QUALITIES OF A MERCHANDISER

Textile knowledge

Language skill

Negotiation

Computer skill

Consumption

Costing

Planning and Teamwork

Smartness

Present Market Prices

The main function of the merchandiser in the production industry is to coordinate each department in the textile industry for quality of the production.

Quick Response Merchandiser in Textile Industry

Textile marketing is one of those jobs where it's necessary to be constantly active. Time management is essential and crucial in this situation because it involves the shipment of clothing to foreign nations. One measure of efficiency is how quickly merchandisers can respond.

Marketing for pre- and post-order products

Contracts for Pre-Orders (Marketing Section)

Marketing: Publicity, advertising, and promotional efforts

Receiving Request for Information: Tech Pack, Measurement Chart,

Price Estimate: Consumption, pricing, and cost

Price-fixing through negotiation

Post order Jobs (Execution part):

Sampling & Approvals: After confirmation of an order merchants need to sampling and take approval on samples, fabric development and trim and accessories.

Sampling and approvals

Raw material Sourcing,

Production Follow up and

Post Production Tasks

Are the Major tasks and process flow after sampling have been shown to the buyer.

Merchandising Challenging in Textile Production

There are numerous difficulties in the job of merchandiser. These difficulties could originate from various angles. The following are important considerations for career experiments.

Social Perspective

Industrial Perspective

Organizational Perspective

Leadership Perspective

Earning / Economical Perspective

The challenges face by textile merchandiser

The globalization of the economy and the supply chain, the idea of producing and consuming is no longer existing in one place, as the consumption has increased geographically. The pressure of global competition treats the textile industry to make considerable change over years.

CONCLUTION

Due to a shortage of orders and fierce competition from surrounding nations, the number of Indian manufacturing exporters has decreased. More focus must be given to production management if this supremacy in the textile industry is to be maintained. The entire manufacturing process will be affected if management has this discrepancy. Therefore, in this situation, in addition to hiring more skilled labor, Merchandisers need to develop talents and be updated.

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TECHNIQUES IN COMPUTER COLOUR MATCHING

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ABSTRACT

The fundamentals of quantitative measurement, analysis of surface color parameters, surface appearance of undyed and dyed textile materials, and color matching with standard textile samples are discussed in this chapter. The Computer Color Matching (CCM) is based on recipe computation and utilizes the spectrophotometric characteristics of dyestuff and fibers. The computer attempts to match the standard with each and every feasible dye combination, then presents the resulting formulas according to cost and best match. CCMS makes it easy to match the shade quickly. It also makes the work of a textile engineer who is responsible for it. It also calculates the color difference of the sample and dyed sample which is dyed according to the recipe of the CCMS. The strength affects the concentration of dyes which will be used for dyeing. So, CIE-1976 equations for measurement of Tristimulus values, surface color strength, color differences, Metamerism index, color difference index as well as specific formulae for measuring Whiteness Index, Yellowness Index, Brightness Index and the theory of color match prediction are discussed here.

Keywords: Data, CCMS, Display, Color, Dyes and pigments, Garments, Measurement, Time, Shade, Hue, Money, Spectrophotometer, Prediction.

INTRODUCTION

The computerized color formulation known as Computer Color Matching (CCM) is based on recipe computation and utilizes the spectrophotometric characteristics of dyestuff and fibers. Typically, a fabric sample swatch or Pantone code for a particular color is sent to the clothing maker by the garment customer. The fabric sample is then given by the manufacturer to the lab dip section for color matching. They manually assess the sample's color after receiving it. It is a difficult, time-consuming, and important task that calls for the knowledge and experience of the team members creating the lab dip. However, they can use the computer color matching system (CCMS) to save time and money.

The computerized color matching system serves two distinct functions. Selection comes first. It refers to selecting one or more useful combinations of complementary dyestuffs that are anticipated to satisfactorily match the specified hue at an affordable price. The second is that the amount of each colorant to be added to the color formulations in order to achieve a suitable match is determined. It signifies that there are typically more dyes available than the set of colors needed to get the desired color. The computer attempts to match the standard with each and every feasible dye combination, then presents the resulting formulas according to cost and best match. After that, the colorist can select a matching formula from the list based on the similarity of the match, price, and other relevant factors.

Color theory

When an object is observed in the presence of a specific light source, the reflected wavelength of the object has a physio-psychometric influence on the observer's brain. The term "color theory" referred to a standardized scientific method with a precise mathematical/empirical formula, an arrangement of light incidence and a standard illuminant for the absorption and reflection of color on and from the object, detection followed by measurement of color value specific reflectance or any other quantified values to record and communicate color information for reproducibility and matching.

Three fundamental components of understanding or measuring or matching any color:
Light sources /standard illuminant.
Objects / samples illuminated by standard light.
Observers /detector to record colors reflected from it.
Most Important and commercially useable Two of the major Color quantification systems are:
Munsell Color Theory -hue, value and chroma.
The CIE Theory of Color -Tristimulus values (X, Y and Z) and CIE L*, a*and b* values.

Color measuring instruments

The most used analytical method for measuring color in a solution or solid in a laboratory is photometry. It is intended to gauge the brightness of a light beam that has passed through or been reflected off of a colored substance or solid. The following list of procedures for analyzing colored materials, substrates, and solutions uses several instrument types with photometric principles. Where absorbed or transmitted light is measured.

Colorimeter

UV–VIS Absorbance Spectrophotometer
Atomic absorption spectrophotometer, and
Turbidometer

Output:

Drive filters

Display color coordinates.

Stored program:

Input/output.

Command recognizer.

Data acquisition and storage.

Computations display.

Self-diagnosis and calibration.

The basic three things are important in CCMS:

Color measurement Instrument (Spectrophotometers).

Reflectance (R%) from a mixture of Dyes or Pigments applied in a specific way.

Optical model of color vision to closeness of the color matching (CIE L*A*B).

Functions of Computer Color Matching System:

The following works can be done by using CCMS –

Color match prediction.

Color difference calculation.

Determine metamerism.

Pass/Fail option.

Color fastness rating.

Cost Comparison.

Strength evaluation of dyes.

Whiteness indices.

Reflectance curve and K/S curve.

Production of Shade library.

Color strength

Above functions of computer color matching system are described below:

Color Match Prediction

The main function of CCMS is to predict the color of a sample. In the lab dip section, it is necessary to match the shade of the sample. CCMS makes it easy to match the shade quickly. It also makes the work of a textile engineer who is responsible for it.

Color Difference Calculation

We know that; when a sample is put in the sample holder of a spectrophotometer it analyzes the color of the sample. It also calculates the color difference of the sample and dyed sample which is dyed according to the recipe of the CCMS.

Determine Metamerism:

CCMS also shows the metamerism of the sample color.

Pass / Fail Option:

The sample which is dyed according to the recipe of the CCMS matches with the buyer's sample that could be calculated by this system. If the dyed sample fulfills the requirements, then CCMS gives a pass decision and if it can't then it gives a fail decision. So, pass-fail can be decided by CCMS.

Color Fastness Rating:

Color fastness can be calculated by CCMS. There is a different color fastness rating (1-5/1-8). CCMS analyzes the color fastness and gives results.

Cost Comparison

Cost of the produced sample can be compared with others. It also helps to choose the right dyes for dyeing.

Strength Evaluation of Dyes:

It is important to evaluate the strength of the dyes which will be used for production. All of the dyes do not have the same strength. Dyes strength affects the concentration of dyes which will be used for dyeing.

Whiteness Indices:

Whiteness Indices also maintained in CCMS.

Reflectance Curve and K/S Curve:

Reflectance curve also formed for specific shade by which we can determine the reflection capability of that shade.

Production of Shade Library:

Computer color matching systems also store the recipe of the dyeing for specific shade. This shade library helps to find out the different documents against that shade. It is done both for the shade of sample and bulk dyed sample.

Color Strength:

Computer color matching systems also determine the color strength of the sample.

Implementation of Computerized Color Matching System:

The process of implementing automated color matching entails a number of processes. Making laboratory dyeing, which depicts various concentrations of the primary dyes and characterizes each dye's affinity to the fabric, is the first and most crucial step. The percentage of reflectance curves that indicate the finished color are then obtained by reading each of these dyeing’s individually with a spectrophotometer. Through a direct computer spectrophotometer interface, this data can be directly entered into the computer. You may get graphical plots of the data from the system to check for correctness, spot mistakes, analyze the dyes, compare to other dyes, and more.

Reflectance Spectrophotometer

Reflectance Spectrophotometer is a UV-VIS double beam spectrophotometer that simulates the human eye. It is used to measure reflectance, surface color strength, and color differences between two sets of samples that are nearly identical or dissimilar in color. It can also be used to store and analyze databases of color values of different objects.

Importance of color measurements and matching in garment industry

Color is one of the important elements of a design. Color with aesthetics /texture of any textile fabrics / garments are as important as its physical and functional property criteria. Matching of colors, especially in specific textiles made from specific or different fibers and their blends is very very crucial in many applications. The task of communicating and measuring and matching of color becomes more difficult when colors need to be exactly matched with a given standard supplied for different textiles. More and more precision color matching is required in specialized textile products like defense dress materials, school uniform etc. and also for matching suits for consumer textiles and lifestyle products for matched furnishings, bed linen and auto Interiors etc.

Computer aided color match prediction system

Computer aided Color Match prediction system (CACMPS) is the combination of specific hardware and software for scientific use for measuring color of solid textile surface for given sample as standard for predicting the dyeing recipe or formulation for the exact shade reproduction in a textile fabric sample to produce. Hence, this technique is known by names e.g.-computer colorant formulation, computer recipe prediction, Instrumental color matching system or Computer aided Color Match prediction system (CACMPS) using reflectance spectrophotometer and associated computerized system for storing and analysis of data with specific software to predict color matching of textile substrate. A color matching computer system consists of the following three basic modules,

Color measuring instrument: A Reflectance Spectrophotometer with specific geometry of color measurement, which expresses the color in numerical form in terms of X,Y, Z or R or K/S values with L^*, a^* and b^*, ΔL^*, Δa^* and Δb^* and ΔE^* values.

Computer hardware: Usually the latest PC or Laptop based Computing and data analysis and storing system for data storing, analyzing and processing for converting and comparing etc.

Advantages of Computer Color Matching System (CCMS):

Computer Color Matching System (CCMS) has lots of great advantages in the Textile Industry. See some examples below:

Customers get the exact shade wanted with his knowledge of the degree of metamerism.
Customers often have a choice of 10-20 formulations that will match color. By taking costing, availability of dyes, and auxiliaries into account, one can choose the best swatch.
3 to 300 times faster than manual color matching.
Limited range of stock color needed.

CONCLUTION

Today textile dye plants utilize the Computer Aided Color Measuring and Match Prediction System (CACMPS) to match colors or shades to provide samples or Pantone shade numbers in order to decrease color rejection during export. Additionally, it is more scientifically sound and advantageous to grade color fastness more accurately by measuring color difference values following matching fading by washing, exposure to light, rubbing, etc. All dye plants need to execute quality control procedures and batch to batch pass/fail identification of shades created from shift to shift to ensure quality assurance on color matching, which is an essential requirement of today's clothing and fashion business.

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COLOUR SCIENCE AND COMPUTER COLOR MATCHING

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ABSTRACT

Color matching is the process of transferring a particular. color across different technologies or platforms. This may be difficult when. The two different technologies use different color modeling tools. Computer Color Matching (CCM) is the instrumental color formulation based on recipe calculation using the spectrophotometric properties of dyestuff and fibers. Generally, garment buyers give a fabric sample swatch or Pantone number of a specific shade to the garment manufacturer. Then the manufacturer gives the fabric sample to the lab dip development department to match the shade of the fabric. After getting the sample they analyze the color of the sample manually. It is a laborious, time-consuming and critical task and needs skills and expertise of the personnel developing the lab dip. On the other hand, to save time and money, they can use a computer color matching system (CCMS).

INTRODUCTION

Color science is our visual interpretation of how light reflects off of surfaces. Color is that portion of the visible spectrum of light that is reflected back from a surface. The amount of light that a surface reflects or absorbs determines its color. Computer Color Matching was commercially introduced in 1973. Now Computer Color Matching is developed by different manufacturers. CCM means Computer Color Matching. Computer color matching system is an electronic device that analyzes colors and translates them into digital codes that can be decoded again on different devices. It is driven on the basis of the basic principle that color is nothing but the reflection of light.

Computer Color Matching Importance:

The implementation of computerized color matching involves many steps to get started. The first and most important one is to make laboratory dyeing which represents multiple concentrations of the primary dyes characterizing the affinity of each dye to the fiber. These dyeing's are then read individually by spectrophotometer to obtain the percentage of reflectance curves which represent the resultant color. This data can be directly keyed into the computer through a direct computer spectrophotometer interface. Graphical plots of the data may be obtained from the system to verify the accuracy, identify errors, analyze the dyes, compare to other dyes and so on. The main function of CCMS is to predict the color of a sample. In the lab dip section, it is necessary to match the shade of the sample. CCMS makes it easy to match the shade quickly. It also makes the work of a textile engineer who is responsible for it.

The basic three things are important in CCMS

Color measurement Instrument (Spectrophotometers).

Reflectance (R%) from a mixture of Dyes or Pigments applied in a specific way.

Optical model of color vision to closeness of the color matching

Advantages

Customers get the exact shade wanted with his knowledge of the degree of metamerism.

Customers often have a choice of 10-20 formulations that will match color.

3 to 300 times faster than manual color matching.

Limited range of stock color needed.

Disadvantages

A typical issue is with objects, vision, and light. These variables affect the color of the fabric. Different material types have a tendency to reflect the same hue differently, for example, wool and silk. Despite having the same color dye, two fabrics may look different in different lighting. Metamerism is the name for this phenomenon. Color matching cabinets are now an essential component of the textile industry. These testing tools produce a bright environment for the testing. The sample can be examined in a variety of lighting situations, including ultraviolet light, white cool light fluorescent, and artificial daylight.

The second prevalent issue is with product components. For instance, there are numerous various parts that make up a garment, such as the collar, pocket, buttons, thread, embroidery, etc. It takes a great deal of accuracy and skill to match every part to the fabric's hue. There is always a difference in hue since different components have distinct textures or basic materials. No matter how much care is taken, there will be a color variation when a silk fabric is stitched with cotton thread.

The third main reason for color mismatching is product procurement. Raw materials are typically sourced from several vendors and occasionally imported into a production facility. Typically, several nations adhere to different norms. Because of this, the finished product's color constancy is never the same. This distinction, though, is not too significant to be seen with the naked eye. Such changes are easily discernible by tools like color matching cabinets.

Steps of Color Matching

The basic steps [5] involved in the application of the color matching in practice can be broadly classified as:

i. Determination of optical constants by calibration dyeing and storing dye class wise and company-wise dyestuff database for a particular type of fabric.

ii. Measurement of color value of standard samples and finding Match Recipe/formulation on computer for particular match selecting stored database for correct class of dye and putting correct/desired tolerances of color matching to be done.

iii. Batch Correction and Recipe correction to achieve better/ precise match.

Color Code

White = 0xffffff

Black = 0x000000

A "perfect" Blue = 0x0000ff

A "perfect" Red = 0xff0000

A "middle" Gray = 0x7a7a7a

Aqua = 0x00ffff

Gold = 0xffd700

Indigo = 0x4b0082

Functions of Computer Color Matching System

The following works can be done by using CCMS –

Color match prediction.

Color difference calculation.

Determine metamerism.

Pass/Fail option.

Color fastness rating.

Cost Comparison.

Strength evaluation of dyes.

Whiteness indices.

Reflectance curve and K/S curve.

Production of Shade library.
Color strength.

Color Match Prediction

Predicting a sample's color is the fundamental purpose of CCMS. It is vital to match the sample's color in the lab dip section. Quick shade matching is made simple by CCMS. Additionally, it facilitates the work of the competent textile engineer.

Color Difference Calculation

We are aware that a spectrophotometer evaluates a sample's color when it is placed in its sample holder. Additionally, it determines the color difference between the sample and the dyed sample, which was colored using the CCMS's recipe.

Determine Metamerism

CCMS also shows the metamerism of the sample color.

Pass / Fail Option

The sample that is dyed in accordance with the CCMS's recipe matches the buyer's sample, which may be determined by this system. The dyed sample receives a pass or fail judgement from CCMS depending on whether it satisfies the requirements. Therefore, CCMS has the authority to determine pass/fail.

Color Fastness Rating

Color fastness can be calculated by CCMS. There is a different color fastness rating (1-5/1-8). CCMS analyzes the color fastness and gives results.

Cost Comparison

Cost of the produced sample can be compared with others. It also helps to choose the right dyes for dyeing.

Strength Evaluation of Dyes

It is important to evaluate the strength of the dyes which will be used for production. All of the dyes do not have the same strength. Dyes strength affects the concentration of dyes which will be used for dyeing.

Whiteness Indices:

Whiteness Indices also maintained in CCMS.

Reflectance Curve and K/S Curve

Reflectance curve also formed for specific shade by which we can determine the reflection capability of that shade.

Production of Shade Library

Computer color matching system also stores the recipe of the dyeing for a specific shade. This shade library helps to find out the different documents against that shade. It is done both for the shade of sample and bulk dyed sample.

Color Strength

Computer color matching system also determines the color strength of the sample.

How does CCM work?

The CCM system consists of a light source, a spectrophotometer, and software that can interpret the data generated by the spectrophotometer.

Light source: The light source is one of the major components of the CCM system. It must be able to produce a light that is similar to the light that illuminates the object being measured. For instance, if the object being measured is viewed under natural light, the light source must replicate natural light. The light source provides a consistent and reliable light that is directed towards the object being measured.

Spectrophotometer: The spectrophotometer measures the color of the object by analyzing the light reflected from it. The spectrophotometer recognizes the amount of light absorbed and reflected. The preserved data of absorption and reflection of light is converted into digital code that can be interpreted by the software. The spectrophotometer can identify various attributes of color, such as hue, saturation, and brightness. These attributes are used to create a digital color code that can be used to reproduce the color accurately.

Software: The software is the heart of the computer color matching system. It receives the digital code generated by the spectrophotometer and uses it to create a color formula that can be used to produce the same color on different devices. The software can create a color formula for various printing methods, such as offset, flexography, and digital printing. The formula takes into account the type of ink, the type of paper or material, and the printing process used to ensure that the color is accurately reproduced on the media type.

Application of Computer Color Matching System in Textile:

To guarantee that the color is faithfully replicated across all media types, the computer color matching system is employed in a variety of businesses. For instance, color accuracy in fabric manufacture is crucial in the fashion sector. To guarantee uniformity of the finished product, the fabric's color must be the same throughout all batches. A color formula that may be used to correctly dye the fabric the desired color is created using the computer color matching system.

The CCM system is employed in the graphic design sector to guarantee that the color of the design is faithfully replicated on diverse media. For instance, a design made on a computer screen needs to be printed on paper with the same level of color fidelity. A color formula is created using the computer's color matching system so that it may be used to print the design with the same level of color accuracy on various media types.

The computer color matching system is employed in the printing industry to guarantee that the color is faithfully reproduced using various printing techniques. For instance, a design designed for offset printing must be printed on digital printing with the same degree of color fidelity. A color formula is created using the computer's color matching system so that it may be used to print the design with the same level of color accuracy using various printing techniques.

CONCLUTION

The computer color matching system is an essential component in various industries. It ensures that the color is accurately reproduced across all media types, which is crucial in maintaining consistency and uniformity in the final product.

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Recent Developments in Materials and Manufacturing Techniques Used for Sports Textiles

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ABSTRACT

In the recent era of development, the global market for the sportswear textile manufacturing industries has increased with increase the consumption of active sportswear. The sportswear manufacturing not only focused on the market trends but also focused on material diversification with technology enhancement. Different types of sports wear products required different performance characteristics. Appropriate moisture and heat manufacturing are the key factors for the endowment of the required physiological comfort level. In this review paper current market trends, highly engineered polymers, fibers, fabric , finishes, nanomaterials, and the recent developments in the manufacturing techniques of sportswear are illustrated.

INTRODUCTION

Sports are established, competitive, organized ,causal and all types of physical activities are played for the improvement of mental and physical health. The clothing (gloves, T -shirt, jacket, trouser, caps, socks shoes ,etc..)that are required for a player/athletes have been termed sports textile. Sports textile play a vital role in the existence and performance of athletes.

The market for textile related to sportswear is growing massively in the last 20 year. This market includes sports fashion wear, basic sports clothing, leisure sportswear, and footwear. The activities, related to various kinds of sports, are reported as the basics of healthier life. The increasing trend for participation in sports leads us to invent new sports for competition with world athletes and players. That why sportswear needs to have improved functionality so that the efficient of the athletes can be enhanced.

In the early 19th century, sportspersons used to wear grey linen fabric. At the end of the 19th century, dyed cotton shirts were introduced in the sports sector in different colors for them indentation. With the invention of synthetic fabric, athletes uniform, were made from nylon polyester, and spandex for better durability and elasticity. The fabric manufacturers from these synthetic fibers was uncomfortable to wear.

The textile physiology mechanism of sports clothing is the interface between clothing and the human body to offer the information regarding physiological characteristics of that particular clothing. The correct functionality of a garment decides whether it is physiologically appropriate or not. The body of a human has a temperature of 37°c and it should be maintained under all weather conditions.To avoid heat stress due to high physical activities,the heat produced by the body must be dissipated from the body through single or multiple layers fabric. There are two types of textile/clothing comfort that are enormous importantace for sportswear.

Psychological comfort
Physical comfort (tactile, theramal , ergonomic.)

Psychological comfort

Psychological comfort is a state of mind, feeling the presence of pain and discomfort human psychology, regarding clothing comfort, broadly depend upon many factors such as age, health, environment, weather, occasion, social status, economic background, profession , religion, and territory. Psychological comfort is very complex to explain because one thing which is comfortable for one thing which is comfortable for 0ne,may or may not be comfortable for anther. It was the visual comfort that includes color, luster, design, style and fashion. But this type of comfort does not have an active role in the functions of clothing.

Physical comfort

Physical comfort is usually determined in human skin. The normal internal body temperature of a human being is 37±0.5°C under different environmental condition .When the temperature of the body changes from normal body temperature.

Tactile comfort the interactions of the wearer's skin with the garment describes tactile comfort . Sports wear is usually worn right next to the skin fabric roughness, fabric softness and fabric surfaces frictional or directly related to tactile comfort. As tactile comfort is the interactions of the skin with the garment so the rough fabric will irritate the skin, soft fabric provide comfort, and fabric surfaces friction will reduce the static charge properties.

Fibers and fabric manufacturing technology used in sports textiles

Sportswear characteristics can be divided in fictional and aesthetic requirements both of which are essential in determining the clothing performance and consumer acceptability. Thermolitie fiber. Thermolitie technology is warning technology that provides superior warmth without bulk in winter sports wear. The fiber has unique hollow fiber design that provides thermal insulation by trapping the air inside and in between the fibers as shown in figures. Five different types of thermolities with special features are available, which are given below

Thermolitie active -provides thermal insulation for high energy activity and movement Thermolitie extra-provides warmthless and softness effect Thermolitie micro -exhibits warmth and water-resistant properties Thermolitie plus – provides warmth and comfort in wet conditions Thermolitie extreme – having substantial warmth and durability.

Microfiber

Microfiber are man-made fibers that are syn-The sized at very fine linear density, dtex, which Makes them extremely lightweight fibers . Microfibers-Based textile products exhibit exceptional strength, durability, breathability, and softness effect . Polyester polyamide, acrylic, polypropylene, and cellulose-based microfibers Are generally available in the market. Microfibers provide a Highly porous structure, improved water wicking, and excel-Lent thermal control properties owing to the very fine fiber Linear density. Hygra Fiber. Highly active sportswear textiles require Fabrics exhibiting highly moisture-absorbing and moisture-Releasing properties. To fulfill this need, researchers have Developed a core-sheath-based structure composed of the Highly moisture-absorbing polymer as the core part and Nylon as the sheath part. This fiber is known as Hygra fiber. The core hydrophilic polymer absorbs water 35 times its Weight with quick water-releasing properties . The nylon In the sheath provides high tensile strength, durability, and Dimensional stability properties. Hygra fiber also exhibits Antistatic properties even in low wet conditions.

Fabrics used in sports textiles

In sportswear and outdoor sports gear, there a Significant increase in the development and use of high-Performance fabrics. Many of these items' performance Requirements necessitate a delicate balance of drape, Thermal insulation, liquid barrier, antistatic, stretch, Physiological comfort, and other factors. Over the last Decade, research on this subject has resulted in the com-Mercialization of a variety of novel products for high-Functioning end uses. It is now possible to successfully Combine the consumer requirements of aesthetics, Design, and function in sportswear for various end-use Applications by designing new processes for fabric prep-Aeration and finishing, as well as advances in technologies For the production and application of suitable polymeric Membranes and surface finishes. Fabrics for activewear And sportswear are also designed with specific geometry, Packing density, and structure of the constituent fibers in Yarns, as well as fabric construction, to achieve the Required heat and moisture dissipation at high metabolic Rates. Many smart double-knitted or double-woven Materials for sportswear have been designed so that the Face closest to human skin has ideal moisture-wicking. And sensory qualities, while the outside face has optimal Moisture dissipation behavior. Naiva Fabric. Naiva fabric was created by Unitika by Mixing the Naiva yarn with a nylon microfiber. Naiva is aBi-component filament yarn made of Eval and nylon. EvalIs an ethylene–vinyl alcohol copolymer resin. 55% Eval And 45% nylon constitute Naiva yarn. Many nylon micro-Loops can be found on the surface of Naiva fabrics, which Are generated by utilizing Naiva yarn's high thermal Shrinkage feature. Naiva fabric not only has superior moisture permeability, but it also possesses lightweight, softness, And the capacity to be finished secondarily. Mountaineer-Ing and other active clothing benefit greatly from the Fabric .

Influence of different factors on comfort properties

The parameters of textiles have an immense effect on the Comfort properties of sportswear. The main parameters Affecting the comfort of sportswear are fiber parameters, Yarn parameters, fabric structures, biomimetic structures, and finishing treatments. Effect of Fiber Parameters. Moisture management, water Vapor wicking, quick-drying, and good elasticity are the features required for textile-based sportswear. The utilization of Man-made fibers in sportswear garments showed perfor-Mance improvement and an increase in comfort during Physical activity . Among the fiber parameters, the Cross-sectional shape of fiber has a significant role in moisture management. The man-made filament fibers with Higher shape factors have a higher surface area and conse Quently better wicking of moisture through the fabric thickness . Polyester-made knitted structures were reported To have higher moisture transportation in sportswear .The features of enhanced wick-ability and quick-drying. Can be imparted by using multi-channel fiber having more Surface area for moisture transportation . A large number of capillary forces are produced by the five-leaf cross-Sectional shape of the fiber, which leads to better working.

The micro-denier fibers have capillaries of smaller sizes That increase the pressure. The increasing pressure drives the Transfer of water to capillaries and results in enhanced wick-Ingo properties .Katz. M studied that polyester/cotton Blends having 10% and 15% cotton portions are better than the blends having 5% and 20% cotton portions. PC blended Fabrics reduced the textured roughness as compared to pure Polyester fabrics . The blend of thermo-regulating viscose with polyester showed good wicking properties. Excel-Lent liquid absorbency was observed with fabrics of nylon/Polyester microfiber blend .Stretch and recovery properties provide fabrics with Ergonomic comfort. Elastane fibers were also used extensively in sports clothing to get superior stretch and recovery Characteristics. The garment's immediate response to the Body's movement can be estimated by dynamic elastic Recovery. The elastane bare-plaited garments have a superior Dynamic elastic recovery as compared to spandex core-spun yarn.

Use of Electronics in sportswear

Another important domain is the continuous monitoring of Physiological and biological changes in athletes involved in High physical and risk sports. Interactive electronic textiles have Emerged as tools to detect arm action for improving the tenni or golf swing, movement of the body, calorie level, Of blood, distance traveled, and time of activity. Textile based Piezo-resistive sensors were developed for monitor Breathing rate .For monitoring chemical or physical Changes, the heart rates of athletes changes in waist circumference, time of exercise, and body temperature are useful In several applications of sports .

CONCLUSION

In the current era of development, high-active sports textile Is a very challenging field that required functionality with Comfort properties. Market growth of sports textiles was Increased day by day owing to the increase in sports participation and consumption of sports goods. The performance of the sports athlete is directly associated with the proper Moisture management property, air permeability property, and thermal insulation properties of the garment, which Was worn by the player during sports activity. The suitable Selection of raw material, fiber morphology, yarn, fabric Structure, type of finish, and garment pattern will provide the required functionality. Researchers have engineered Advanced polymers, fibers, yarns, and fabrics to meet customer demands and achieved the required performance Characteristics. Performance characteristics of the sportswear were also increased with the usage of highly elastic filaments (reduce drag forces in the garment), antibacterial Finishes (reduce microbial growth due to sweating), and Breathable fabrics (moisture management and temperature Control. Moreover, functionalized new synthetic fibers were Developed by changing the cross-section for moisture transportation. In the field of sports textiles, various innovative Products such as polymers, fibers, yarns, fabrics, and finishes Were developed with maximum comfort characteristics. To Produce sportswear exhibiting excellent thermal insulation Properties, hollow structured thermo-regulated fibers are Used. For the summer sportswear exhibiting moisture management properties, different types of functional fibers Yarns, blends of fibers, fabrics, and coatings were used in The structure of textile materials.

9.DATA AVAILABILITY

The data will be made available as per requirement.

10.Conflicts of interest

The authors declare that they have no conflict of interest.

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TEXTILE FINISHING TECHNIQUE

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ABSTRACT

Textile finishing can be defined as all processes (chemical and/or mechanical), employed subsequent to textile coloration which impart additional functionality/superior aesthetics to the textile material. Mostly, textile finishing is applied to fabrics (woven, knitted, nonwovens); however, textile finishes can also be applied to fibers and yarns.

INTRODUCTION

Textile finishing can be defined as all processes (chemical and/or mechanical), employed subsequent to textile coloration which impart additional functionality/superior aesthetics to the textile material. Mostly, textile finishing is applied to fabrics (woven, knitted, nonwovens); however, textile finishes can also be applied to fibers and yarns. The primary objectives of textile finishing are to improve the aesthetic and functional properties of textiles. In a broader sense, “finishing” relates to all processes that fabrics might be subjected to subsequent to weaving, knitting, or nonwoven manufacturing processes. The term “finishing” could include fabric preparation (e.g., singeing, desizing, scouring, bleaching, optical brightening process, mercerization process, etc.) and coloration (dyeing and printing); indeed, the combination of these processes is...

Pressing.
Folding.
Flat pack.
Hanger pack.

Keywords :
Cellulosic Fiber
Functional Chemical
Finish Agent
Wash Fastness

ORGANOMERCURY COMPOUND

Textile finishing can be defined as all processes (chemical and/or mechanical), employed subsequent to textile coloration which impart additional functionality/superior aesthetics to the textile material. Mostly, textile finishing is applied to fabrics (woven, knitted, nonwovens); however, textile finishes can also be applied to fibers and yarns. The primary objectives of textile finishing are to improve the aesthetic and functional properties of textiles. In a broader sense, "finishing" relates to all processes that fabrics might be subjected to subsequent to weaving, knitting, or nonwoven manufacturing processes. The term "finishing" could include fabric preparation (e.g., singeing, desizing, scouring, bleaching, optical brightening process, mercerization process, etc.) and coloration (dyeing and printing); indeed, the combination of these processes is...

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Steps of Finishing Process in Garment Industry Garments Finishing:

Garment finishing is very important because buyers satisfaction depends on it. Garments finishing means, mainly applies of pressing, folding and packing of garments. Sewn products are sent to the finishing department. Finishing department takes care of the following functions.

Stain removing
Repairing
Pressing

After stitching, there will be some hanging sewing threads on the finished product. Trimming is the operation of removing these extra hanging threads. Sometimes, finished products get stained during the production process. Finishing department is responsible to remove those stains by using different wetting agents. Some of the sewn products may also have some open seams or other stitching faults. The finishing department repairs such products before packing. The last objective of finishing department is pressing. The sewn products are pressed to remove the wrinkles and to enhance the look of the garment.I have also published some articles on garment finishing process. You can read these articles which are listed below of this post. In this article I will explain steps of garments finishing process with pictures.
Steps of Finishing Process in Garment Industry

Pressing

Pressing is a finishing process done by a cloth to heat and pressure with or without steam to remove creases and to impart a flat appearance to the cloth or garments. In garment industries pressing is also called ironing. After completing pressing the garments have to be folded.

Folding

After completing pressing, the garments are folded with a predetermine area. Garments are folded according to the buyers direction, requirements in a standard area. Folding classification depends on the fabric types. There are mainly four types of folding. They are –

Stand up: Collar is folded and situated at 90* angle. Semi stand up: Collar is folded with body and situated at 45 degree angle. Flat pack:Collar is separated as a hole on the body of shirt.

Hanger pack

Shirt is packed and transported by hanging on the hanger. At the end of the folding, garments are placed into a polythene packet.

Packing

After folding, garments are packing the size of polythene packet is permanent. Specially, it is needed to ensure the placement of sticker in proper place.

Barcode

Barcode is a specially Buyer wise sticker.

Assortment

After completing the packing of garments, it must be placed the garments in a predetermined pack by sorting according to the size and color then garments are packed into inner box according to the size and color. This process working in order is called assortment.

Metal Check

Checking the metal type component into the garments or with its accessories like button, zipper etc. is called metal check.

Cartooning

At last cartooning or packing the garments according to Buyer comment. The process of packing of inner boxes entered into the carton is called cartooning. The carton is properly warped by the scotch tape. Some information like carton box no, size, shipping mark and the destination are printed on the carton

Final inspection

Final inspection is made by buyer. He checks the garments according some rules like AQL.Fig: Final inspection of garment

Spot Removing

Spot removing is one of the special inspections which are done after initial quality check.

CONCLUSION:

Textile finishing is an essential step in the manufacturing process of textiles that involves a range of techniques to improve the appearance, texture, durability, and other properties of fabrics. These techniques can be classified as chemical or mechanical, and each type of finishing serves a specific purpose. Textile finishing has numerous benefits, including improved appearance, functionality, and sustainability, which are important in producing high-quality and functional textile products. Innovations and developments in textile finishing are driving the industry forward, making it an exciting and constantly evolving field. As consumers continue to demand more sustainable and durable products, textile finishing techniques will play an increasingly important role in meeting these demands.

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Mechanism of Textile Reinforced Material Palmyra Fiber

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ABSTRACT

In this research, a new type of natural fiber derived from the Palmyra Palm, also known as Borassus Flabellifer, has been introduced. This palm is native to regions like India, Southeast Asia, and the Philippines. The study focuses on utilizing Palmyra palm fruit fiber as an eco-friendly alternative for clothing and other products. The objectives include extracting the fiber, characterizing it, making yarn, and characterizing the yarn. The fiber has good dye absorption properties, making it suitable for various applications such as non-woven materials, home textiles, decorative items, disposable bags, and more.

Key words: Palmyra fiber, Borassus Flabellifer, Natural Fiber, Extraction, Characterization, Yarn Production, Dyeing, Eco-Friendly, Non-Woven, Home Textiles, Disposable Bags, Value-Added Items, Sustainability

INTRODUCTION

In recent years, people want to use things that don't harm the environment. Natural materials like cotton and others are great because they break down naturally. But, we don't have enough of them because of limited land and water. So, scientists are looking for new materials like banana and pineapple to use. One new material they're checking out is Palmyra palm fruit fiber, but we don't know much about it yet. These natural materials are good because they don't cost much and are light, so we can use them in things like cars. Researchers are trying to find more of these materials for different things.

There are five species of Borassus palms found in different parts of the world, including Africa, Asia, New Guinea, and Madagascar. Each species has its own distinct characteristics and is known by various common names reflecting their geographical locations.

Botanical Description and Characterization

The Palmyra palm belongs to a plant family called Palmae, which includes evergreen trees. It's a very long-lasting plant, capable of living for more than 100 years. In Bangladesh, it's a crucial crop for both home gardens and plantations, offering a wide range of uses. The plant's botanical details are described in various categories, as outlined by Morton.

The palmyra palm is a tall tree with a thick trunk that can reach up to 30 meters in height. It has large, leathery, fan-shaped leaves that are gray-green and divided into many segments with spiny edges. The tree produces coconut-like fruits that are initially three-sided and turn round as they mature. Inside the fruit is a hard, white kernel surrounded by fibers and pulp. Palms typically develop their inflorescences at the beginning of the dry season, with male and female inflorescences on separate trees. Both male and female inflorescences can be tapped for juice collection, and some palms also produce inflorescences during the rainy season.

MATERIALS AND METHODOLOGY

Methods of Extraction

In Komarapalayam, Tamil Nadu, palm fruits are harvested, and their fibers are extracted. The fiber extraction process involves the use of various chemicals and agents like reactive dyes, salt, acetic acid, soda ash, stabilizer, hydrogen peroxide, wetting agent, sequestering agent, and leveling agents.

The process begins with gathering ripe palm fruits. The dark husk is then removed, and the seeds are separated from the fibers that surround them. These fibers, which include the yellow mesocarp and can be consumed raw or baked, are collected. The mesocarp is washed away with water. The cleaned fibers are boiled in regular water at 100°C to eliminate any gummy substances, and they are eventually sun-dried.

Scouring and Bleaching

Both cleaning (scouring) and whitening (bleaching) of the fiber are done together in the same container, like a bath, where the fiber is placed.

Dyeing

On the base of Reactive dyes and Basic dyes

Dyeing fibers with chemicals and then drying them can result in excellent dye uptake, leading to vibrant and long-lasting color on the fibers. The quality of the dyeing process plays a crucial role in achieving this outcome.

Spinning of Fibers

Opening

Shirley openers are commonly used in textile processing to open and prepare fibers for various treatments.

Opening of fiber by Shirley opener

Carding

1. Initial fiber input into a mini carding machine.
2. Blending the initial fiber with cotton at a 60:40 ratio (60% cotton, 40% palm fiber).
3. Feeding the blended fiber into the carding machine.
4. Formation of a card web as the final output.

Carding of fiber with mini Carding

Drawing

The card web goes through a prototype draw frame to create sliver. This sliver is then twisted together into four strands. After that, these four strands are put back into the same draw frame to double them up.

Drawing and Doubling of fiber

Spinning in Ring Frame

After doubling, the sliver was directly input into ring spinning machine due to unavailability of mini simplex. The silver in ring yarn is obtained directly.

Ring spinning

Spinning in Rotor The rest amount of sliver is fed into rotor. The rotor yarn is obtained directly from the sliver.

End product

The end products derived from Palmyra palm can vary widely depending on how the fiber and other parts of the palm are utilized. Some common end products include:

Brooms
Brushes
Ropes and Cordage
Mats and Rugs
Handicrafts
Fishing Nets
Upholstery
Thatch Roofs
Construction Materials
Non woven fabrics
Woven fabric

CONCLUSION

Palm fruit waste can be used for making fibers. These fibers are good for dyeing, strong, stretchy, and can hold moisture. They can't be used alone in cotton machines but work well when mixed with cotton to make yarns. Palm fibers are a green option instead of synthetic ones that harm the environment. They're great for strong fabrics and can even be used alone with some changes. They also have uses in things like geotextiles and other special products. Palmyra fiber's strength and resistance to moisture make it valuable in various other applications, but it is not a practical choice for clothing materials.

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Mechanical Properties of Palm Fibre Reinforced Recycled HDPE

SUSTAINABE TEXTILE LASER TECHNOLOGY IN DENIM CLOTHING

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ABSTRACT
The purpose of this is to offer a general concept and overview of textile industry's environmental sustainability assessment. The textile and garment industries cause environmental damage at every stage of manufacturing, from the cultivation of raw materials through the disposal of finished goods. Chemical loading, high water consumption, high consumption, air pollution, solid waste and odor are all the key environmental concerns in textile industry. To achieve sustainable production, it is necessary to examine the performance of the textile sector while considering the three elements of sustainability. All through the life cycle of textile product, the textile sector has a sustainable environmental impact. This paper illustrates how the textile industry may use strategic ways to improve ecologically sustainable textile product usage. A discussion is focused on how to be increased sustainability in the industry. This paper introduces key principles for ecologically sustainable business practices to concern. To study and relocate recent and related works.
Keywords: environmental, sustainability, eco-design(denim), laser technology.

INTRODUCTION
Sustainable clothing materials refers to the fabric that come from eco-friendly resources, like sustainably grown fibre crops or recycled material. The major environmental effects on the textile industry are the disposal of large amount of chemical loads due to the high consumption of the water and chemicals used by the industry. As the result in the textile industry's significant environmental consequences, sustainable development has great facing key problem for textile producers operation, as well as costumers lifestyle and product purchasing decisions. Sustainable textile are of three factors-environment, economy and society Environmental sustainability from entrepreneurial standpoint, is a marketing plan for using processes that do not have negative effects throughout the life cycle of natural resources are considered. Convention textile production have accepted to the almost all the principles that were practiced in the ancient times. Depending on the increase in consumer's demand, environmental concerns are also erected here eventually. Technical study of the effect of carbon-dioxide laser surface engraving on the colour properties of denim fabric. Environmentally friendly denim processing using water-free technologies.

SUSTAINABLE TEXTILE TECHNOLOGIES

The basic techniques of yarn spinning in surface manufacturing are weaving, knitting, braiding and felting, dyeing, printing and sewing techniques and equipment's should be stated that technology improvements especially production speed increase, are uninterrupted continued to be able to respond the urge of consumption. In textile production chain every processing steps has its own environmentally harmful influence on the nature. Textile finishing can be done mechanically (calendaring, embossing, heat setting etc ,.) And chemically(flame retardant, microbal , water resistance etc).They are the common practice to enhance quality, performance and capacity. Some eco-friendly textile alternatives include recycled fibres and fibres extracted from agricultural waste such as leaves and rinds. These new Textiles innovation leads to less waste to production, longer wearing and biodegradable.

SUSTAINABLE TEXTILE IN LASER TECHNOLOGY

The textile industry has become a major sector that causes environmental damage. Nowadays, the culture of rapid consumption causes depletion of the limited resources in nature and has negative effects on ecosystem. Due to the current world order, resources are rapidly depleting, nature is being destroyed, human health is gradually deteriorating, and therefore many undesirable economic, ecological, and social problem occurrences are on the rise. One of the challenges faced by designers in the textile sector is to provide ecological production solutions while meeting the consumer demands. Finishing processes are generally applied to textile materials to provide the desired appearance and comfort features. Laser technology is a finishing of Textiles (cutting, engraving etc) that are in today's easy usage facility. Fortunately, lasers have the potential to be sustainable, depending on how they are built and what they are used for. For example, users can input their designs into a computer-aided manufacture (CAM) program to minimize waste of material. Lasers could be the manufacturing technology of the future because they provide more use options for less expense. Laser material processing systems vary widely in price depending on size and wattage

SUSTAINABLE TEXTILE IN DENIM

Sustainable denim refers to the minimum negative impact in environment, produced in a way that consider both fabric consumption and usage .The most current advancements in environmentally friendly dyeing techniques for denim has been extensively discussed. These processes include the production of indigo from bacteria and different dyeing processes, such as digital spraying, microbally assisted dyeing and foam dyeing denim with indigo. Denim is a popular fabric material has claimed high popularity over three decades. Some of the other sustainable ways of producing denim are of two ways-by using organic cotton grown without synthetic pesticides or fertilizers and adopting water like ozone washing. Denim is a zero chemical or wastes that are completely made of 100% cotton(sometimes combined with polyester and nylon).

LASER DENIM INDUSTRY

Lasers that are not eye-safe — which include all lasers used for material processing — should be observed at all times by a trained operator. The best laser cutters, engravers, and markers are designed to meet Class 1 safety requirements, which means the laser is fully contained and no operators can be exposed to laser energy — which means no getting cut in half like Anakin Skywalker. Additionally, high-quality laser processors are made from aluminium, safety glass, and other fire- and heat-proof materials, so the laser cannot accidentally ignite the unit and cause extensive damage and harm. When monitored and used appropriately, lasers are perfectly safe. Laser wash is an exceptional method that can create extraordinary jeans and reduce the environmental impact of this industry. In laser wash, there is no use of water, stones, or sand to wash the jeans.

DENIM LASER FINISHING PROCESS

The process of denim finishing starts with the creation of a digital file and illustrated in such a way that the laser can interpret. With this only, the garment becomes ready for the process. The garment can be kept on a flat surface or vertically stretched for the laser to engrave over it. This technology has redefined the future of denim as a whole. It has also made it possible to completely sync with the concept of the green industry providing cleaner production with better chemical, waste and energy management. The technology has been able to replicate most of the wash effects with the various shade like the stone wash, mill wash, moon wash, bleach, PP spray, monkey wash, cat whiskers, snow wash, holing, tinting and so on.

CO2 in denim laser technology

CO2 laser is a gas laser and usually works with evaporation. Often, gas is supplied in the cutting head or near the point where the laser beam meets the workpiece. In contrast to evaporation, oxygen is fed with the brick cutting, which supports the cutting process by oxidizing the workpiece.If an infrared photo meets a carbon dioxide molecule, a new photon is created. This stimulated emission leads to an avalanche effect that finally creates the laser beam. The CO2 laser can be used in industry for the processing of various materials. CO2 laser works with a carbon dioxide gas mixture,this mixture serves as an active laser medium. Laser finishing machines are widely used in denim finishing, giving the fabric a faded or patterned look.

CONCLUSION

The textile manufacturing process requires a lot of resources including water, fuel and other chemicals over the source of long production schedule that generates lots of waste. Pollutants generated by worldwide textile industry are wreaking on the environment in unimaginable ways. Therefore, eco-friendly products are introduced in order to reduce the impact on the change in environment. In conclusion, Denim product which a decomposable and a sustainable textile product which can made with a low cost budget. With the advanced laser technology ,we can prevent the damages and dangers that can occur. They create a new fashioned mortgage as the technology improvements occur. It could be better when all the textile industry uses the laser or CO_2 technology to minimize the wastage. Experimental results revealed that CO_2 laser treatment is an effective alternative means of producing the colour-fading effect in denim fabrics if the processing parameters can be carefully controlled. In today's research and trends are on the consumption decision of individuals which has been committed to an ambitious plan for reducing the emission of CO_2 and achieving green transition. European countries have set their goal as 'European Green Deal'-to transform Europe a first continent with a net-zero climate impact by 2050.

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TEXTILE CHEMICAL PROCESSING

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ABSTRACT

Various technical terminology used in the industry.Various types of impurities presents in the substrates. The processes involved in removing impurities. All the operations before the dyeing of fabrics are called Preparatory Process or Pretreatments. These pretreatments includes Singeing, Desizing, Scouring, Souring, Bleaching and Mercerizing. All of these Operations have the specific objectives and it is not necessary to use all the operation to all the fabrics.

KEY WORDS:
Desizing,
Scouring
Bleaching
Mercerizing

INTRODUCTION

The fabric collected from various weaving setups, can not be used directly for manufacturing various textile products. There are number of impurities present in the: fabric such as dust, dirt, oil stains, oil and waxes, starches or other sizing materials,i seed particles, and natural coloring materials. These impurities can be classified as.Natural Impurities & Added Impurities

DE-SIZING

Size are added during the weaving preparatory process. Main objective of the sizing is to provide strength to the yarn. This improves the weaving efficiency by reducing the yarn breakage. After the weaving is completed, the size material is undesirable in the fabric and it makes the fabric stiff and hydrophobic in nature. The main objective of the De-sizing is removal of starch from fabric. For this purpose, the fabric is impregnated in the de-sizing bath and stored for 8-12 hrs. The Impregnating bath contains required amount of enzyme, Wetting agent and Sodium Chloride (Nac). After this process, fabric is thoroughly washed with hot water.

In Enzyme application of De-sizing, the fabric padded with enzyme bath is then passed through steam of 96-100°C temp. This is a rapid process in which De-sizing process complete in less than one minute. The main advantage of De-sizing with enzymes is that there is no risk of damaging the fibres. The process is an eco-friendly and relatively expensive.

SCOURING

The yarn made of natural fibres contains natural oils and waxes. These oils and waxes make fabric hydrophobic and do not allow dyes and chemicals to penetrate into the fibre. The Scouring is a cleaning treatment in which oil, waxes and residual sizes are removed from the fabric by the chemicals. After scouring the fabric becomes absorbent in nature.

In this process, fabric is treated with strong alkali solution (5-10 gm/lit NaOH or mixture of NaOH & Sodium Carbonate) close to or above the boiling temp.

BLEACHING

After scouring process, the fabric is free from oils and waxes, however natural colouring matter are still present in the fibre. If this colour is not removed at this stage than it will be very difficult to attain the desired shade in dyeing process.

The main objective of the bleaching process is removal of natural coloring matter and to make the fabric perfect white with minimum damage to fibres and within the shortest possible time. Bleaching is generally carried out by oxidative process. Some of the example of the Bleaching agents are: Sodium hypo chlorite, Sodium chlorite and Hydrogen peroxide. Hydrogen peroxide is also called as "Universal bleaching agent".

Since, it is a very mild bleaching agent, It is used for almost all type of cotton, polyester/ cotton blends and silk fabrics.
Peroxide bleaching is carried out generally near or above boiling temperature, under pressure, for one hour or more. After bleaching, the fabric is thoroughly rinsed with slight amount of basic solution to avoid formulation of insoluble salts of silicates.

After bleaching, fabric may be sold as perfect white cloth. For achieving perfect white cloth, fabric is treated with Optical whitening Agents, such as Tinopal , Ranipol etc and blueing agents such as Robin blue, Ujala etc.

MERCERIZATION

Mercerization process was invented by John Mercer. He was a young chemist. One day, while he was filtering some chemical solution using cotton cloth, he observed some changes in the cotton fabrics. He studied the changes in detail to standardize the process.

In the Mercerization process, cotton fabric or yarn is treated with a cold concentrated solution of sodium hydroxide for one minute or less. In this process cotton fibers swell, untwist and their bean shaped cross section changes into a round form. Mercerization improves the following properties of the cotton fabric. Strength would be increased to 15-25% Enhanced luster. Greater affinity to water, dyes and other chemical finishes. Shrinkage control in both the direction of the fabric.

Enzyme Treatment:

Enzyme treatment is a natural and environmentally-friendly process used to soften and improve the hand feel of fabrics. It can also be used to remove impurities, such as pectin or natural dyes, from the fabric.Overall, chemical processing plays a significant role in the textile industry, providing a range of benefits to both manufacturers and consumers alike.Additionally, chemical processing techniques can also be used to enhance the functional properties of textile materials.

For example, fabric can be treated to make it waterproof, flame-resistant, or antimicrobial. This makes the fabric suitable for use in various applications such as outdoor clothing, protective gear, and medical textiles..

CONCLUSION

In summary, chemical processing is an important part of the textile industry that provides a range of benefits to manufacturers and consumers. However, it is essential to consider the environmental and social impact of these processes and to take steps to minimize any negative effects. This includes implementing sustainable and eco-friendly practices, reducing the use of harmful chemicals, and ensuring the health and safety of workers.

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New Methods in Textile Testing and Analyze

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ABSTRACT

Methods and Techniques for Textile Testing Physical testing can be performed using a range of methods, including tensile testing, tear testing, and pilling resistance testing. Chemical testing. This involves analyzing the chemical properties of textiles, such as pH, color fastness, and fiber content.

INTRODUCTION

A textile testing laboratory determines the mechanical properties of different fibers. There are various test methods that help in identifying the fibers, Fiber identification and examination includes microscopic analysis, burning tests, and chemical testing.

KEY WORDS: Microscopic analysis, Burning tests, Chemical tests

MICROSCOPIC ANALYSIS

Expert microscopy analysis services provide examination of samples & microstructures to solve a range of issues and support product development. Microscopy analysis is essential to gain an understanding of the microstructure or nanostructure of materials, chemicals or products. Data from microscopy analysis is important to progressing your research and product development programmes, conducting failure analysis where your product or material has failed or resolving contamination issues in manufacturing or other parts of the supply chain. Effective digital microscopy analysis requires precise preparation equipment, advanced microscopy instrumentation, specialist cameras and image analysis software. The results and images captured must be assessed by qualified and experienced microscopy experts to gain the valuable insight that you will need to solve problems or extend understanding of your materials.

Surface-Oriented Analysis

Our surface analysis includes particle analysis and identification, such as elemental analysis of solid samples, detection of impurities and identification of physical and chemical defects.

Particle Analysis and Testing

Our experts provide particle analysis, testing and measurement for particle size, particle size distribution, surface area measurement and more.

Microscopy Analysis Techniques

From optical microscopy through to high resolution scanning electron microscopy (SEM), the finest details can be analysed by our experts. We can access a wealth of chemical information by applying techniques such as confocal Raman mapping and SEM with Energy Dispersive X-ray Analysis (EDX) for surfaces, residues, products and processes.

With our network of laboratories spanning North America, Europe and Asia Pacific, Intertek's microscopy teams have over 20 years' experience in helping customers with their microscopy needs. By partnering with Intertek, we can provide Total Quality Assurance for all your investigational needs, helping you to progress product development and solve problems with our world-class microscopy analysis.

<u>BURNING TEST</u>

Learn all about the burning test for fabric and fibers. Do you have a burning desire to know more about your fabric? Well, then it's time to try the burning test on your precious piece of material and find out what type of fabric it really is. The burning test is a good way to check on a piece of fabric you have rummaged out of the bargain bin.

- COTTON: Burns easily, smells like burning paper, ash is light and feathery
- POLYESTER: Shrink away from flame, chemical smell, round hard beads in ash
- WOOL: Smoulders and ignites slowly, smells like burning hair and has a dark ash

Reactions To Expect In A Burning Test

<u>BURNING TEST FOR FABRIC & FIBERS</u>

Burning tests reveal the results by using a flame to burn the fabric and examining for the type of flame and ashes it produces. Different fibers will react differently to burning and reveal themselves.

Equipment Needed For A Burning Test

The basic equipment you will need for a burning test to identify fabric content is: A container to hold the piece of fabric you intend to burn Tweezers to hold the fabric and Matches to ignite the fabric

Make sure the container you use is fireproof, and don't use plastic as it will melt and produce horrible fumes. An old tin or glass ashtray will do the trick. When you are dealing with a naked flame, your safety is of utmost importance.

Make sure you are prepared in advance and keep the pieces of fabric small so there will be no huge flames as a result of your burning test. The kitchen sink is probably a good spot to choose as you can drop the fabric or container into the sink and water is at hand. You could also use a wet kitchen towel to snuff out the flame.

Use the tweezers to prevent your fingers from getting too close to the flame and long matches would also help to ensure you have time and space between you and the flame.

Don't light up in a draughty spot and if you have long hair keep it tied up out of the way.Finally see this as a chemical, science experiment and take it seriously..
Remember that 'if you play with fire you're gonna get burnt!'

GENERAL RULES FOR A BURNING TEST FOR FABRIC:
Natural organic fibers burn rapidly with a yellow flame. They smell of burning paper or hair and the ash left behind is soft and gray. Synthetic fibers shrink away from the flame and burn with an acid, chemical smell. The ash left behind is like a plastic bead and not soft.Reactions To Expect In A Burning Test: Look at the reaction to the flame, the smell of the burning test and the resulting ash.

COTTON: Cotton is a natural fiber. It burns quickly with a yellow flame and an afterglow. It smells like paper burning and the ash is light and gray. The ash should be fine and crumbly. When completed there is no melted bead.

LINEN: Burns quickly (but not as quickly as cotton) with a yellow flame. It also smells like paper burning and has light gray ash. Like cotton, it is a natural fiber but it does take a little longer to burn.

RAYON: Burns quickly (quicker than cotton) with a yellow flame but has no after-glow. It smells like paper burning and has light gray ash.

WOOL: Smolders and curls away from the flame. Wool ignites slowly. Not wanting to burn, it flickers and stops burning when it is away from the flame. It smells like burning hair and has crisp dark ash.

SILK: Also smolders and curls away from the flame. It burns slowly and splutters as it burns with difficulty. Silk stops burning when it is taken away from the flame and smells like burning hair. The ash from the burn is like a small dark bead.

NYLON: Melts and shrinks away from the flame. It stops burning when removed from the flame and smells like celery. The ash forms a round, dark bead that won't crush.

CHEMICAL TESTING

Chemical testing is basically the test of the textile samples either using chemicals or for their chemical properties, and very often both. Sometimes, a Bunsen burner (oxidation reaction) is sufficient to conduct the fiber identification, while the dye analysis may need to use an HPLC (adsorption and desorption processes).

It is also very important that the professionals involved in the chemical testing have fundamental knowledge of fibers, dyes, auxiliaries and finishing agents as well as the basic understanding of yarns, fabrics, and their formations. With the right lab facilities and well trained personnel, fabric chemical testing can be performed successfully.

The chemical testing of textile materials has continued to receive special attention from producers, manufacturers, governmental agencies, domestic and industrial consumers.

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TEXTILE FINISHING TECHNIQUES STAIN RESISTANT FINISHING

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ABSTRACT

Environmental concerns related to perfluoroctanoic acid (PFOA) led to a re-examination of the methods for imparting stain resistance and stain repellency to textiles. Non-PFOA fluoropolymer finishes have been formed on cotton knits by admicellar polymerization, a surface analogue of emulsion polymerization. Fabric samples were characterized by a drop test, contact angle measurements, SEM, elemental analysis and durability studies. Stain resistance and stain release properties were assessed by reflectance and AATCC tests with results comparing favorably with swatches from commercially available garments. Admicellar polymerization enabled the formation of durable finishes that exhibited high performance in stain resistance and stain repellency.
keywords: material product, stain resistance, results and discussion.

INTRODUCTION

In recent years, several technologies have been developed for modifying cotton blends and cotton as multi-functional textiles. Surface modification of cotton fabrics can impart wrinkle free finishes, self-cleaning properties, anti-microbial activity, UV protection, and flame retardancy [1,2]. Self-cleaning features include stain release and stain repellent or resistant finishes [3]. The latter of these, acts to block the uptake of the blemishing agent. Liquids like coffee, soda, oil and water, bead up on fabric when spilled and can be wiped off without staining the fabric. In contrast, a stain release fiber coating may allow oil and aqueous staining materials to penetrate the fabric and then, when the fabric is laundered, ideally enables the stain to be easily removed.

Materials Product

- Swatches of regular fabric
- Swatches of Nano-tex® fabric
- 16 oz. squirt bottle of water
- Waste bucket
- Paper towels
- 2 4 oz. squirt bottles for additional stains (optional)
- Additional stains (optional)

• Laundry bucket (optional)
• Laundry detergent (optional)
Macro-scale
• Fabric model
• Fuzzy die "stain droplet" with Velcro dots

PROCEDURE

Set-up

1. Lay out all supplies. You may want to protect the workspace with newspaper or a towel.
2. (Optional) If you are using additional stains, transfer samples of the stain materials to small squirt bottles. Prepare a laundry bucket by adding some laundry detergent to a small container of water.

Stain Resistance

The development of stain repellent general wearing apparel has taken place in response to the consumers' desire for easy-care garments.

Stain Repellent (or Resistant) Finish

Prevents water and/or oils from penetrating the fabric causing potential aqueous and oily stains to bead up and roll off.

Stain/Soil Release Finish

Enhances the ability of a fabric to release stains during laundering. For a release finish, liquids may not bead up, but usually soak into the fabric.

Combination Repellent/Release Finish

Provides limited stain repellency plus soil release with the objective of overall stain management. Stain repellants are used on a variety of cotton fabrics from apparel to home furnishings. The main advantage is that the fabrics resist soiling during use. When a spill occurs, it can usually be spot cleaned easily, since the stain is confined to the surface rather than penetrating deep into the fabric.

Stain Recovery and Stain Resistance Tests

Stain tests were performed on untreated control and treated fabric samples and compared to results for the commercial reference samples. Standardized measurements followed AATCC test method 130, referred to as the oily stain release method, and AATCC test method 118, referred to as the oil repellency test.

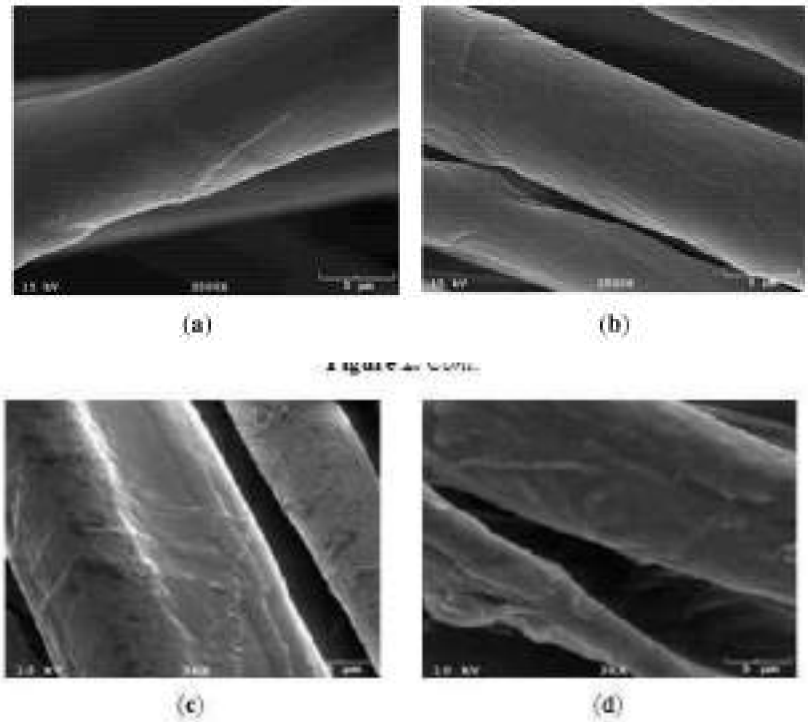
$$\text{\% Of Stain Resistance} = \frac{\text{Reflectance of stain on treated fabric after wiping}}{\text{Reflectance of untreated fabric}} \times 100$$

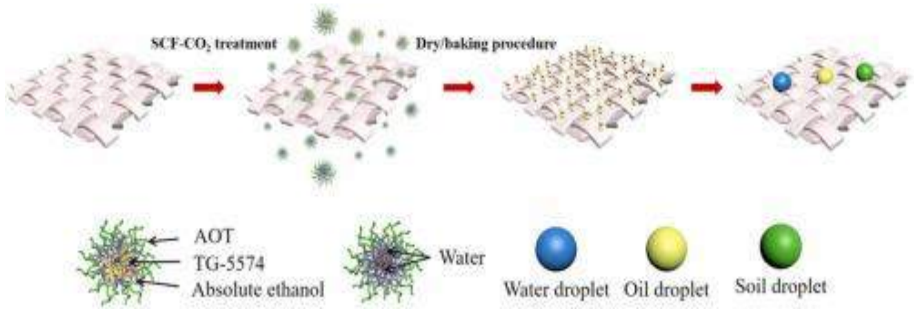
$$\text{\% Of Stain Recovery} = \frac{\text{Reflectance after one wash - Reflectance after staining}}{\text{Reflectance before staining – Reflectance after staining}} \times 100$$

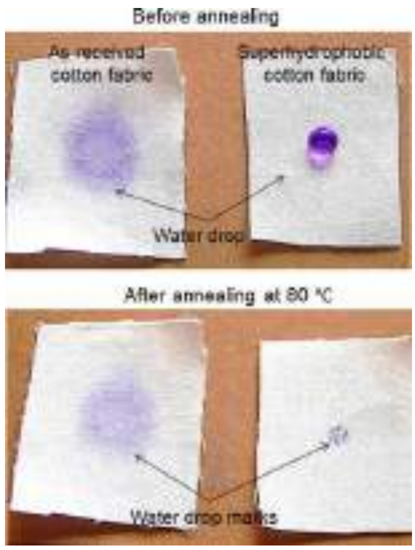
RESULTS AND DISCUSSION

Appearance of Thin Film

SEM images and elemental analysis of the fabric samples before and after admicellar polymerization were obtained. Figure 1(a,b) shows fibers in the untreated cotton fabric samples, the surface of fibers is smooth with striations evident in places. It is devoid of polymer aggregates and any other agglomerations over the surface.







CONCLUSION

Application of fluorocarbon finishes by admicellar polymerization can yield durable cotton fabrics with excellent stain resistance and stain recovery properties. Performance of these fabrics, prepared in a laboratory, compare well to that of commercial production materials examined.

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GARMENT TECHNOLOGY

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ABSTRACT

Fashion is dynamic and ever changing. It is one of the most powerful forces in our lives. It Influences every facet of our lifestyle at a particular period in time e.g. the clothes we wear, theMusic we listen, the food we eat, where we go for holiday or the car we drive in etc.Fashion is a big business and key driver for several industries e.g. apparel, accessories, textiles, Automobiles .

KEY WORDS: Product Design Automation, 3D Printing and Scanning**,** Robots**,** Recyclable Garments

INTRODUCTION

The purpose of the stream of Fashion Design and Garment technology under the broad head of Professional Competency Education is to tell the students about the fundamentals of fashion Design and production of garments. Fashion Design as profession includes the entire process of Designing and producing fashion apparels from the fibre and yarn stage to the finished product. The papers of this course will give an overview of fashion design and elaborate on different Aspects like elements of design, history of fashion, fabrics, and understanding of the body,pattern development and garment construction.

Product Design Automation

Automation helps garment brands speed up manufacturing processes, and apparel businesses can deploy automated workflows across different methods to release products faster than their competitors. In addition, the curated databases that emerge from such automated workflows provide historical product-related information, which owners can use to create effective workflows that auto-assign tasks, validate processes, and notify users.You can also automate product design using standard technologies, such as Product Lifecycle Management (PLM) software, Robotic Process Automation (RPA), Product Information Management (PIM) systems, and various other virtual solutions.

3D Printing and Scanning

Garment manufacturers can incorporate 3D designs as part of their embroidery that goes on to the apparel using CAD (Computer Aided Design) and other tools. These tools help with other printing activities, including pattern embedding, grading, nesting, marking, and determining fabric consumption.You can also create 3D models of the garments or apparel using CAD systems and ascertain their patterns and fits. Most 3D modelling tools also come with scanners that let you measure dimensions accurately and incorporate them into your designs.

Robots

Machine Learning technologies have evolved tremendously over the years, and their application in apparel design is evident. However, one cannot completely do away with handcrafted designs, owing to the skills and experience it brings. However, robotic manufacturing processes can speed up operations. These manufacturing techniques not only enhance designs but also streamline production and help get finished products out to the markets more quickly than the competition.

Recyclable Garments

Sustainability has always been at one of the forefronts of the garments industry – particularly in retail. Sustainable products supported the growth of more than half of consumer-packaged goods (CPG) between 2015 and 2019. However, it managed to capture only 16% of the market, according to the NYU Stern Centre for Sustainable Businesses. The apparel sector Is slowly moving towards the eco-friendly space, adopting production, and marketing practices, to cater to conscious customers. The movement is not limited to the materials alone and addresses almost every aspect, including labor, supply-chain management, production, and distribution.

CONCLUSION:

In summary, chemical processing is an important part of the textile industry that provides a range of benefits to manufacturers and consumers. However, it is essential to consider the environmental and social impact of these processes and to take steps to minimize any negative effects. This includes implementing sustainable and eco-friendly practices, reducing the use of harmful chemicals, and ensuring the health and safety of workers.

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A Comparative Study on Natural Fiber Extraction from Discarded Food Waste: From Scrap to Potential Raw material

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ABSTRACT

The main objective of this study was to utilize the underutilized waste into natural fibers. Food waste such as Fruit and vegetable peels, agricultural waste etc are 100% biodegradable and have potential uses but due to lack of awareness they end up without being properly treated causing greenhouse gas emissions and act as a optimal ground for bacterial growth. Corn fiber (Zea mays L.), Artocarpus heterophyllus and Mentha spicata L are low-value residue that that could be used to create value-added products. Chemical constituent analysis and basic physical parameters of the fibers has been evaluated. Further fiber evaluations could be carried out to analyze and evaluate their use in textile and paper industries.

Keywords: Natural fibers, Discarded waste, Sustainability, Corn, Jackfruit fibers, Mint fibers

1. Introduction

Sustainable according to Cambridge Dictionary is defined as ‘the quality of being able to continue over a period of time’ or ‘the quality of causing little or no detrimental effect to the environment and therefore able to persist for a long time’. Sustainable development satisfies the needs of the present without adversely affecting the ability of future generations to satisfy their needs. In practice, this indicates constant effort to upgrade all levels of the product’s life cycle, from design, raw material production, manufacturing, transport, storage, marketing and final sale, to utilizing, reusing, repairing, remaking and recycling of the product and its components. From an environmental standpoint, the aim should be to reduce any harmful environmental effect of the product’s life cycle by ensuring orderly and careful use of natural resources (water, energy, land, soil, animals, plants, biodiversity, ecosystems, etc), opting renewable energy sources (wind, solar, etc) at every stage, maximizing reuse, remake, repair and recycling of the product and its components.

Fibers are the basic component of any textile materials and today the need for sustainable Natural fibers are gaining importance in research. This century has seen major achievements in the field of natural fibers as a result of environmental sustainability concerns. Natural fibres have historically supplied mankind's clothing needs for thousands of years. Natural fibres are renewable resources that provide a superior alternative for long-term supply due to their low cost, low density, minimal processing expenditure, lack of health dangers, and mechanical and physical qualities. Natural fibres most essential properties are biodegradability and non-carcinogenicity, which have brought them back into favor while also being cost-effective [1,2].



Corn (Zea mays L.) waste fibres are lignocellulosic fibres made up of discarded corn cob, corn husk, corn stalk and corn stover. Corn wastes such as corn cobs, corn stalks and corn husk contribute for 40% of total grain output [3]. Corn production in the world was approximately 1.13 Gtonnes, ranking second only to sugarcane. Corn waste causes serious challenges to the environment because it is the second-largest source of greenhouse gaseous (GHG) emissions for landfilling and the highest GHG source among biomass burning in 2017 [4]. The jackfruit, or Artocarpus heterophyllus in Latin, is a fruit thought to have originated in the region between the Western Ghats in southern India, all of Sri Lanka, and the rainforests of the Philippines, Indonesia, Malaysia, Pakistan, Bangladesh, and China [5]. The edible portion accounts for 25-35% of the total weight and is utilized in a variety of culinary specialties including preparing meals, jelly, jam, paste, cakes, and chips, as well as flavoring drinks, ice cream, desserts, and sweets. Meanwhile, the majority of the fruit is considered trash, accounting for around 65-75% of the total weight, including the outer section (rind), inner part (rags) or perianth, seed, and core [6,7]. Mint (Mentha spicata L), a leafy vegetable of the large family of Labiatae, has shorter shelf-life than many other agricultural products [8]. Mint Stems are a common leftover ingredient that always get thrown out and do carry a slight bitterness and they lack some of the fresh-tasting qualities that the leaves have.

In this paper, the investigator is comparing three unconventional fibers i.e. Corn, Jackfruit and Mint stem which have been extracted from discarded food waste and this paper mainly emphasizes on the physical properties of different fibers.

2. Materials and Methods

2.1 Selection of Discarded Food waste

A large amount of peel waste is generated from fruit and vegetable-based industries, restaurants, household kitchen, vendors and has led to a big nutritional and economic loss and environmental problems. Hence a survey was carried out to find out underutilized waste to develop unconventional natural fibers.

2.2 Collection of Discarded Food waste

Nowadays corn is a very favorite item in shops and it is also will available on roadsides. It is just steamed and sold out. Corn cob (central core of maize ear) and corn husk (leafy outer covering of maize) are the two major by-products and constitute 20–30% of the maize plant.

Figure 1. Collection of Discarded food waste

After the corn kernels are taken these husk and cobs are discarded. Similarly, the investigator collected Jackfruit waste from vendors selling the fruit bulbs. Mint stems were collected from restaurants in Saibaba Colony, Coimbatore where the leaves are taken for Chutney and stems discarded. All three sources were cleaned before extraction.

2.3 Extraction of Natural fibers

Fibers were extracted following Water Retting method. The source was cleaned and then it was put into water for retting. Water retting, the most common procedure, involves immersing bundles of stalks in water. Water that penetrates the middle stalk section swells the interior cells, breaking the exterior layer and enhancing moisture and decay-producing bacteria absorption.

Figure 2. Retting of Discarded food waste

2.4 Evaluation of Fibers

The fibers were evaluated for various aspects like chemical constituent analysis, physical parameters etc.

2.4.1 Fiber Length of the Extracted Fibers

Fiber length is measured by using the length scale. Ten neat fibers extracted from all the three procedures where taken one of the other where stretched neatly in metallic mater scale and readings were taken and the mean value was calculated.

2.4.2 Chemical Constituent analysis of fibers

By using standard test procedures, the chemical components of Artocarpus heterophyllus fibers, including cellulose, hemicelluloses, lignin, and ash content, were identified.

2.4.3 Fibre Weight of the Extracted Fibers

After each retting the fibers were taken and dried in shade for 48 hours to ensure complete removal of moisture. The weights of the fibers were calculated to find out the yield % of the fibers extracted.

3. Results and Discussions

3.1 Length of extracted fibers

Fiber length is important in the processing of fibers and yarns, as well as in the conversion of fiber strength to yarn strength. In this study, it was found that the length of Corn fibers are higher or double the length of other fibers. Jackfruit fibers are having the lowest value and hence they are staple fibers.

Table 1. Length of fiber extracted

S.No	Sample	Length (cm)
1.	**Corn**	**19.34**
2.	**Mint stem fibers**	**10.22**
3.	**Jackfruit fibers**	**4.6**

3.2 Chemical Constituent analysis of fibers

Natural fiber chemical composition varies depending on where it is cultivated, soil, fertilizers used in production, plant maturity age, and extraction process. While comparing the extracted fibers, Mentha spicata L is having higher cellulose percentage compared to other natural fibers and lowest lignin content. The presence of more cellulose in a fibre indicates that it has a higher tensile strength and thermal stability [9]. Artocarpus heterophyllus and Zea mays are having approximately same lignin content.

Table 2. Chemical Constituent analysis of fibers

Fibers	Chemical Properties							References
	Cellulose	Hemi-cellulose	Lignin	Wax	Ash	Moisture	Pectin	
Artocarpus heterophyllus	47.79	17.37	13.60	3.69	21.58	17.27	3.49	
Mentha spicata L	70.67	36.46	8.30	0.35	12.30	8.80	10.21	
Zea mays	31.3–47	34–43.91	1.5–14.3		3.3–6.8	7.6–8.7		[10]
Sugarcane Bagasse	37	21	22	5-15	1-5		10	[11]

3.3 *Fibre Weight of the Extracted Fibers*

From Table 3. It is clear that the weight of corn fibers is higher than that of mint stem fibers and jackfruit fibers.

Table 3. Fibre Weight of the Extracted Fibers

S.No	Sample	Weight (g)
1.	**Corn**	**4.890**
2.	**Mint Stem fibers**	**3.35**
3.	**Jackfruit fibers**	**1.67**

4. Conclusion

Transitioning to a circular economy through efficient use of natural resources and increased use of secondary raw materials can provide numerous benefits, including reduced environmental pressure, improved raw material supply certainty, technological innovations, and new market and employment opportunities. Fibers are a vital commodity utilized by the textile industry that are derived from natural and fossil resources. When present supply and future demand are considered, repurposing agricultural leftovers into fibers is an eco-friendly, appealing choice that may help to reduce environmental pollution. Generally, two methods of fiber extractions are carried out i.e., retting, or mechanical processing. In some cases, a combination of retting, followed by mechanical extraction, is also used. Here by water retting the investigators have extracted fibers and its basic physical test and chemical constituent analysis have been evaluated. These fibers can find applications as fillers for bio-composites, in paper making etc.

5. Acknowledgements

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A STUDY AMONG FARMERS TO ELUCIDATE THE UTILIZATION OF AGRO-TEXTILE MATERIALS

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ABSTRACT

Agro textiles are inevitable in today's farming practices. Agro-textiles play a huge role in almost all areas of agriculture such as crop production, water irrigation, crop protection, storage, etc. The main purpose of the study is to determine the various textile materials used in recent farming practices. The farmers were surveyed for the textile materials they use and the results were consolidated. The values showed that the maximum usage of agro textiles is for water retention purposes. The farmers use Jute more compared to other fibers. They mostly prefer woven fabrics and the maximum number of farmers use agro textile for sapling development.

KEYWORDS: Agro-textiles, survey, textile materials, mulch mats.

INTRODUCTION:

The basic needs of Humans are food, water, and shelter. These basic needs are impossible without agriculture. Developing countries like India rely on Agriculture as they play a huge role in the country's economic development. The agriculture sector stands first in providing employment to the people. Conventionally, textiles were used as apparel only, but now the textile serves technical purposes. The world today demands textiles in almost all fields- engineering, automobiles, industries, etc., leading to the development of technical textiles. Agro-textiles, one among the 12 technical textiles, includes all the textile materials used in the agriculture sector such as Crop protection, horticulture, animal husbandry, fishing, packaging, shade nets, etc. The materials can be woven, knitted, or nonwoven. Agro-textile materials mostly produced are from manmade fibers either woven or nonwoven. The practice of textiles is additionally also made to safeguard plants, vegetables, and fruits from weather, weeds, and birds, preventing the soil from drying. It also gives multidimensional views and solutions to the issues being faced by the Agro-industry, from the textile sector.

By 2025, the demand for Agro-textile is expected to be 558 kilotons making it the fastest-growing sector of the textile industrial sector (4). Agro-textiles is one of the growing areas of technical textiles. The continuous increase in population leads to an increase in agriculture production, thus increasing the usage of natural resources. Textile helps agriculture by reducing soil pollution and by conserving water. Apart from this, there are other benefits that can be attained with textiles in agriculture. Thus, it is important to study the need of the Agro textile products.

OBJECTIVES

- To study the role of textiles in the field of Agriculture
- To know about the content of the various Agro-textile materials
- To know whether sustainable Agro-textile products are used

METHODOLOGY

For the study, 50 farmers were chosen from the village of Malaiyadipalayam, Sulur(tk), Coimbatore, Tamilnadu out of the total farmer population in Tamilnadu. The study consisted of many farm field visits. The sampling technique used was Non- Probability Sampling (Convenience Sampling). The Research method used was Descriptive and the method used for data collection was Interview Schedule. A questionnaire consisting of 15 items was the instrument used for collecting data. A small-scale preliminary study was conducted among 10 samples, with the help of those data the questionnaire for large samples is done with the opinions and corrections given by the samples in the initial stage. The questionnaire is framed in such a way that it takes less time and does not mundane the respondent.

The approval (AUW/IHEC/TC-22-23/XPD-02) for the survey was granted by the Institutional Human Ethical Committee, Avinashilingam Institute for Home Science and Higher Education for Women. The investigator explained to the respondents the purpose of the study and the data was collected. The information received from them was recorded and analyzed. The questionnaire included the demographic details of the farmers, the type of crops they grow, the amount and type of land they have, the Agro textile products they use, etc the details were documented and basic statistical tools were used for the analysis of data.

RESULT AND DISCUSSION

- 17 farmers were in the age group of 30-40, 19 farmers were in the age group of 40-50, 11 were in the age group of 50-60 and 3 were in the age group of 60 and above
- The study shows that 10% of farmers are uneducated, 30% of farmers completed their primary schooling, 66% completed their secondary schooling and 4% are graduates
- Most of the farmers, about 94% have their own land and 6% do farming on rented lands

- About 13 farmers have farmlands of size 1 to 5 acres. About 12 farmers have land sizes of 6 to 10 acres, 5 have the land size of 11 to 15 acres, 3 own farming land of size 16 to 20 acres and the land size of 17 farmers were above 20. The maximum number of farmers has a land size of more than 20 acre
- About 35% of farmers cultivate Seasonal crops (completes their life cycle in 1 season), 13% of the farmers grow Two-seasonal crops (complete their life cycle in 2 seasons), 15% of farmers grow Annual crops (one full year), 11% farmers grow Biennial crops (the lifetime is 2 years) and about 26% farmers grow Perennial crops (the crops that live for several years)
- Figure 1, shows that about 18% of the textile material is used for sapling development, a minimum of 2% is used to protect the crops from climatic conditions, a maximum of 17% is used to retain water for plant growth, 9% is used for storage purpose and about 4% is used as greenhouse materials
- The textile materials that are used for agricultural purposes are made of different fiber contents. Both natural and man-made fiber are used as Agro-textile materials. From Figure 2, it is evident that 27 % of the textile materials are made out of jute,24% are made from coir, 10% of the materials are made from polypropylene and the percentage of poly olefins is 19%, 8% of the textile materials is made from nylon, about 4% is made from polyethylene and polyvinylchloride ranges about 8% of the fiber consumption
- There are different types of fabric formation, agro textile products use woven, knitted, nonwoven, nets, ropes, etc., 37% of the textile materials that are used for Agro textiles are woven fabrics, 33 % of the fabrics are non-wovens and 30% are the ropes (Figure. 3)
- 52% of the Agro textile materials had a waterproof finish, 13% of materials had a moisture retention finish, 11% of the materials had a self-cleaning finish and 24% of the materials had a wind protection finish (Figure. 4).
- The cost is estimated by calculating the material per square meter. About 35% of the materials cost around Rs.500-1000 per square meter and about 20% of the materials cost around Rs.1000-2000 per square meter and about 7% of the material costs above Rs.2000 per square meter.

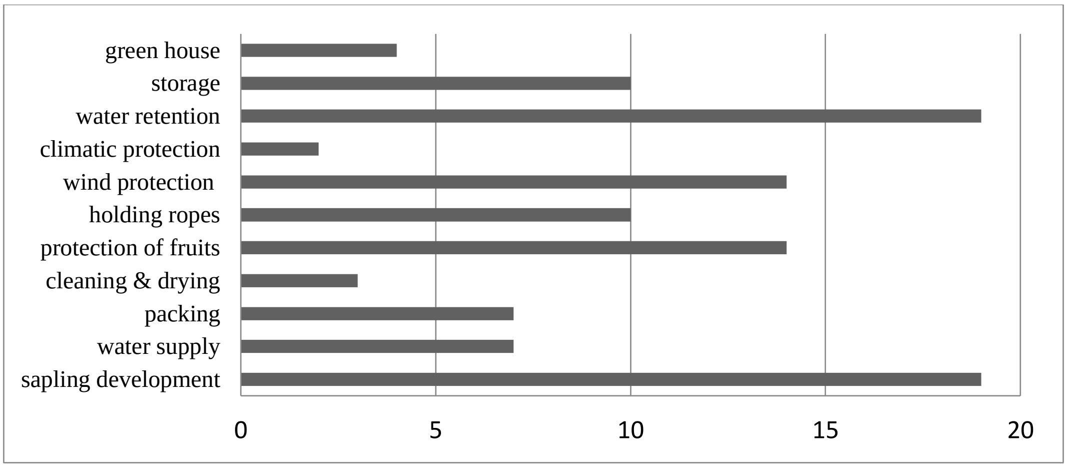

Figure 1. **Purpose of the Materials**

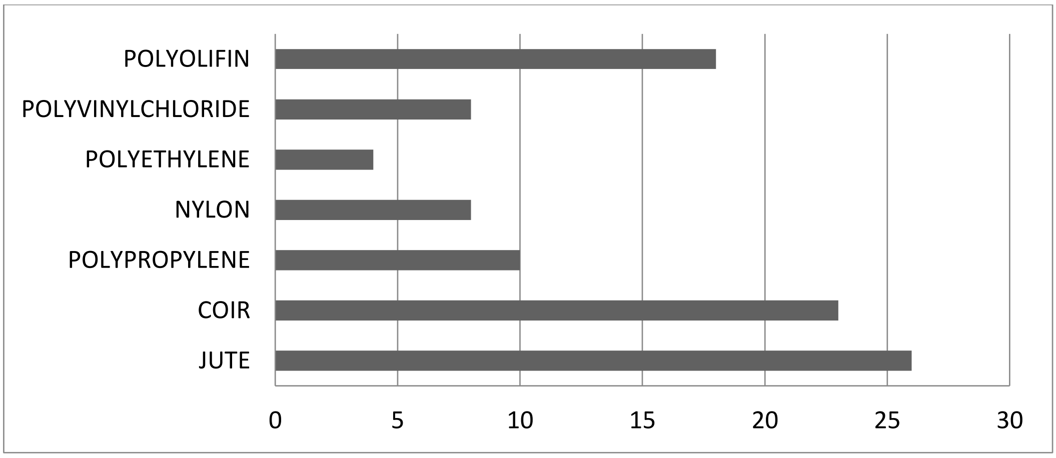

Figure 2. **Contents of the materials**

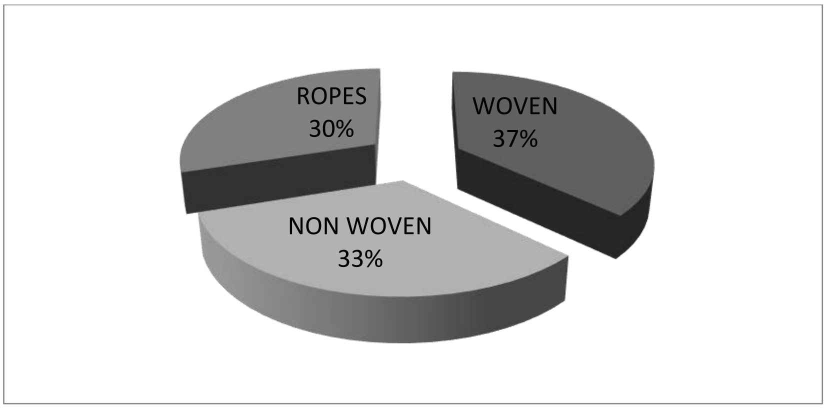

Figure 3. **Construction of Material**

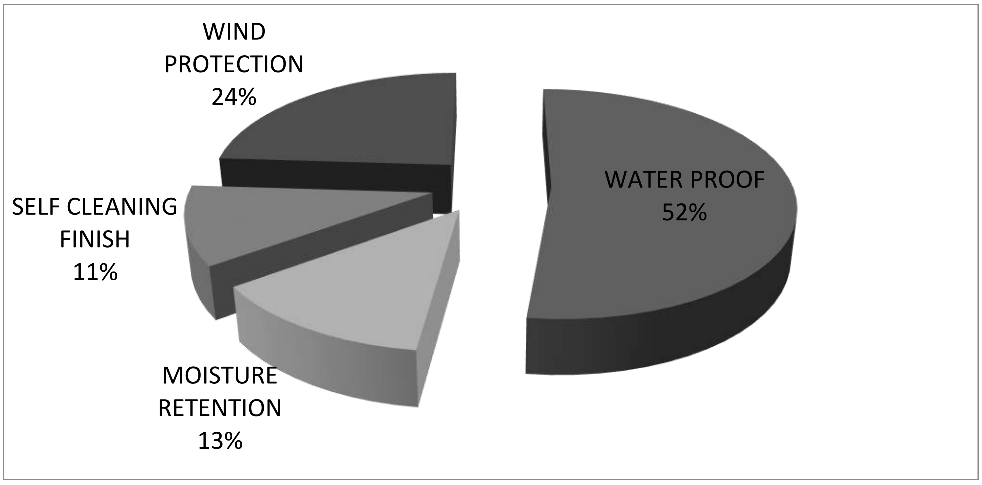

Figure 4. **Finishes**

FINDINGS OF THE STUDY

- Maximum farmers of the selected area grow Perennial crops
- The major purpose that is served by the textile materials is sapling development
- The material content of the Agro-textile materials is identified and the fiber which is used at the maximum percentage is jute
- The fabric constructions of the various textile materials are known and the woven fabrics are used maximum by the selected farmers
- The types of finishes that are given to certain specific Agro-textile materials were studied and the maximum Agro products have a waterproof finish
- The cost spent on the Agro textiles was found to be above Rs.2000
- The farmers show interest in using the new Agro-textile materials rather than conventional materials. Farmers with fewer farms prefer old textile materials since the cost is less. 70% of the farmers prefer the new Agro-textile materials

CONCLUSION

The study has led us to know the importance of Agriculture and Agro-textiles. It is necessary to support this soulful sector with new products or improvisations of the existing product with add-on property enhancements. The field demands new technologies to enhance the production and protection of Agricultural resources. With a continuous rise in population, the demand for agricultural products also increases. This can be tackled with new innovative Agro-textile products which lead not only to an increase in the production rate but also to the economic development of the Country. To make Agro textiles sustainable, importance must be given to the products that are driven from natural fibers rather than synthetic fibers.

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Features, Properties, Applications, Benefits, Drawbacks, and Market of Sustainable Fibers

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Introduction

In order to provide human needs sustainably, neither society nor environment should be overburdened. The cultivation of raw materials, mass production, manufacturing, processing, packaging, labelling, and distribution of organic textile must all be done in order to improve this. The world uses textiles extensively. Fibres, yarns, textiles, clothes, and household textile products would make up the finished product. Sustainable fibres takes a holistic approach to the topic of sustainable textiles, starting with the development of the fibre and continuing through to manufacture, low-energy maintenance, and recycling. High-level environmental and social parameters are also examined in relation to the effectiveness of sustainable fibres. In order to give consumers trustworthy assurance, it involves organic certification, labelling, and licencing to guarantee the organic status of textiles from the harvesting of raw materials to environmentally and socially responsible manufacturing units. or synthetic fibres have begun to dominate in the past 50 years. Natural fibres are used in agriculture, industry, home design, and clothing. Man-made fibres are referred to by names like acrylic, nylon, polyester, and polypropylene. The low cost and simple processing methods of synthetic fibres are the reason for their popularity. Petrochemicals are used to mass produce popular synthetic fibres with uniform strengths, lengths, and colours. that is easily adaptable to different applications for different purposes. The rising "green" economy is supported by energy efficiency, the use of renewable feedstocks in polymer products, and commercial recycling processes that reduce carbon emissions.

History of Sustainable Fibers:

Since the dawn of civilisation, fabrics have played an important role in human life. The history of fibre began with silk in the 27th century BC. Jute and coir have also been farmed as crops since the beginning of time. Siberia is where the 500-year-old wool carpet was found. The earliest wool textile, which dates to 1500 B.C., was found in Denmark. These papers show how there are now much fewer reliable fabric suppliers available. Their intent has controlled the textile industry ever since. The bulk of natural fibres are utilised in the production of clothing, packaging, home decor, and insulation. But conventional textiles are being used more frequently in industrial settings, as well as in composite materials, medical devices, and other applications. Health-conscious consumers have always chosen natural fibres, especially cotton, to synthetic clothing since cotton is one of the most environmentally friendly crops produced. Consumers can now choose from a growing selection of clothing, bedding, and other products made from organic cotton, wool, linen, hemp, and flax.

The growing clothing market has caused customers and producers to become more worried about the environment, according to the Organic Trade Association. Due to wool's inherent properties, no additives are required, hence there are no hazardous off-gassings. The size of the organic wool market has been steadily growing. The demand for nonchemical bedding materials has led to a greater focus on natural fibres than synthetic fibre. Small, local, and independent farmers favour natural wool producers who practise sustainable agriculture.

Sources and Application of Sustainable Fibers:

Jute:

Popular natural fibre known as jute is grown all over Asia, notably in India, Bangladesh, China, and Myanmar. In 4 months, the jute plant grows to a height of 15-20 cm. The fibre is gathered during the harvesting process, which happens about 4 months after cultivation. Chemical or biological processes are used to carry out the retting process. The harvested stalks are tied together in bundles and given a biological resting period of about 20 days. As a result, the pectin that helps separate the fibres from the wood core and stem is removed.

Flax:

The production of flax fibre dates back to ancient times. The plant's stems are used to harvest these fibres. Mostly, it is utilised to create linen. These are crystalline plants that produce cellulose. These fibres can be between 12 and 16 m in diameter and up to 90 cm long. The Netherlands, Belgium, and France are the top manufacturers of these fibres. These fibres are used in a variety of products, including furniture, textiles, bed linen, and home furnishings. Retting and burning, two steps in the fibre extraction process, will both change the fiber's properties. The pectin covering the flax fibre is broken down by the retting enzymes, causing the fibre to separate. The largest producer and exporter of flax worldwide is Canada.

Nettle:

With 35 to 40 different species, nettles are a well-liked herbaceous plant that may be found in Europe, Asia, Northern Africa, and North America. The plant can reach a height of 2 m and has 3–15 cm long, soft-green leaves. Usually hairy and covered in stinging hairs, the leaves and stems are covered in hair. To get the fibre, the plants are harvested when they are blossoming. Retting or decorticating the stalks removes the fibre. Common applications for nettle fibres include the textile industry, bioenergy, animal housing, and others. Currently, efforts are being made to widely use nettle fibres.

Pineapple Leaf:

One of the most popular and accessible plants is the pineapple plant. The pineapple leaf fibre is a byproduct of pineapple cultivation. It is a little tropical plant with clusters of 20–30 leaves that are roughly 6 cm wide. It can reach heights of 1-2 m. Around 90–100 tonnes of pineapple leaves are grown on each acre. Of all natural materials, pineapple leaf fibres offer the best mechanical properties. Pineapple leaves have multicellular, lingo-cellulosic fibres. The fibres were manually harvested with scrapers. It has numerous applications in the construction, automotive, textile, and carpeting sectors, among others. The processed and surface-modified fibres are used to make advanced composites, air bags, conveyor belt cable, and other items.

Sisal:

Brazil is a big producer of sisal, a popular natural fibre. It is a plant that is indigenous to southern Mexico and has a rosette of leaves that can reach heights of 1.5–2 m. The sisal yields around 200–250 leaves that are viable for commerce every 6–7 years. Sisal fibres are used in a range of mechanical applications, including civil construction, elevator fibre cores, agricultural twine or baler twine, the automotive industry, shipping (for anchoring small boats and carrying cargo), and more.

Palm:

One type of palm that is extensively grown for its fruit is the date palm. With over 19 different types and more than 5,000 farms, date palm biodiversity is present all over the world. The tallest Phoenix species, date palm trees can grow up to 23 metres in height. After the date farm fruits are harvested each year, the date palm rachis and leaves are gathered in large numbers in the agricultural areas of various countries. These fibres may be used as sources of cellulosic fibre in the future. These leaf and rachis-derived fibres can be used to strengthen both thermoplastic and thermosetting polymers. Researchers have found applications for date palm fibres in the automotive sector.

Advantages of Sustainable Fibers:

Sustainable textile reduces:

Water pollution,
Carbon emissions, and
Large amounts of waste

Sadly, the majority of the most well-known apparel brands source and manufacture their goods elsewhere. They do this because it is more economically viable, but generally speaking, rapid fashion and global production have a negative effect on the environment. For this reason, the greatest producers of environmentally friendly clothing either produce their goods here in the United States or in a small, strictly regulated (and moral) setting somewhere else in the world.

Due to their proximity, makers of Made in the USA clothing have better quality control and a smaller overall carbon footprint. Online purchases of items created in the United States help consumers avoid the significant carbon emissions that come with international shipping. It is necessary to look into new sustainable solutions in order to meet the growing demand for sustainable textiles.Due to the implementation of strict legislation to address the issue of water shortages and textile pollution, several mills in China have closed. By putting such laws into place, consumers will become more aware of the value of buying textiles that use less water, energy, and chemicals, which will lessen their impact on the environment. It is clear that the textile sector is going through a shift to increase the market for sustainable yarns and fabrics. Additionally, "going green" should not involve making huge financial commitments or aiming to fulfil unrealistic expectations. In the current climate, economic, social, and environmental stability are intricately linked to business performance. The government must also create an environment that is conducive to companies using sustainable practices.

Disadvantage of Sustainable Fibers:

Just as every coin has two sides, sustainable fibres too have some drawbacks or restrictions. The expense of the first investment or implementation is prohibitive.

It will take time for a larger audience to accept the technology because most people are still unfamiliar with it. Numerous products are still in the research and development phase due to the rapid advancement of technology. Individuals are therefore unaware of performance outcomes.

Installation or integration of products or systems based on green technology requires skilled human resources. Policies for green technology-based systems have not yet been created in the majority of countries. Long-term, it results in increased operating expenses and hence higher overall expenditures that may be out of reach for middle-class families.

Because it uses renewable resources, it must make some quality tradeoffs in the finished product.

Market for the Sustainable Textile:

According to Market Motivators, the Global Sustainable Fabrics Market will reach more than USD 69.5 billion by 2030, expanding at a 12.50% CAGR (2021-2030). the growing popularity of sustainable textiles and technology.

All fabric washings result in plastic microfibers because polyester fabric is known to be manufactured from crude oil. These are released into waterways, contaminating lakes, rivers, and other bodies of water before getting into and disrupting the cycle of life for humans and other animals. The market's growth potential may be severely hampered as a result for the balance of the present predicted timeframe, which ends in 2030.

Key Players / Companies Profiled in Relation to Sustainability:

- Grasim
- Vivify Textiles
- Foss Performance Materials
- Teijin Limited
- US Fibers
- Pure Waste Textiles Ltd
- Poly fiber Industries
- Wellman Advanced Materials
- Pilipinas Ecofiber Corp

The global fabric market will be driven by rising consumer awareness of textiles made with sustainable materials technology over the forecasted period. The implementation of government programmes run by the ministry of textiles, such as technology upgrade programmes, silk sector programmes, skill development programmes, integrated wool development programmes, handicrafts programmes, jute sector programmes, and other programmes, like power loom sector programmes, is being aided by some regional and international governments' policies and regulations, such as 100% FDI textile.

But one of the major obstacles preventing the market from growing throughout the anticipated period is the degradation of natural water sources brought on by dumping practises. Additionally, as a result of compensating for waste from the textile business and trash from the fabric industry, landfills are overloaded, which is uncomfortable and has a detrimental influence on environmental conditions and legislation. The state of the world economy has a negative effect on the environment. Researchers, manufacturers, and end users are therefore paying close attention to sustainable textile materials in order to reduce the impact.

Conclusion:

New sustainable brands are launched daily in the textile, fashion, apparel, and home textiles industries. The need for sustainable production is urgent. Thanks to new initiatives, the eco-design sector is growing more promising and could potentially grow over the future years. For instance, the alternative apparel firm Pinatex uses vendor recycling programmes and oxo-biodegradable mailing bags. It also recycles about 1.8 million plastic bottles and uses organic cotton instead of regular cotton.In India, a popular brand called Upasana uses organic cotton blended with ayurvedic herbs including tulsi, sandalwood, and neem. These fibres are used to create apparel that has both healing properties and distinctive colours. By improving resource productivity, co-efficiency, cost efficiency, customer satisfaction, brand reputation, environmental conditions, etc., as well as ensuring better health conditions for both wearers and workers, we must place a strong emphasis on sustainability in the sector in order to maintain the textile industry in the near future.

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Techniques for Sustainable Finishing in the Textile Industry

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Introduction:

The final look and aesthetic qualities of a textile are determined by textile finishing. In response to consumer needs, it can also change a variety of physical and chemical properties of textile materials. Textile finishing is the last step in altering the fabric's functionality, appearance, and handle through mechanical and chemical means. The method by which textile materials are transformed into technical textiles has modernized over time, and this is known as textile finishing. Undoubtedly, the development of multifunctional fabrics that are highly effective, long-lasting, affordable, and produced in an environmentally friendly manner will be a future trend in textile finishing. The following are a few of the environmentally friendly finishing techniques that are covered in this article for the textile industry.

Techniques for Finishing Sustainable Textiles

1.Natural Anti-Microbial Finish:

Antimicrobial fabrics are frequently used in surgical gowns, underwear, and infant wear, among other applications. Natural chemicals can provide an antimicrobial finish. Antimicrobial treatments are now being applied to conventional fabrics used for clothing and household items. Antimicrobial agents prevent pathogens from developing or destroy them while also controlling their effects. Due to the presence of carbohydrates in the fibres, bacteria can easily destroy cotton and other natural fibres. Numerous products, including athletic equipment, footwear, furniture, automobile textiles, intimate apparel, and more, use fabrics with antimicrobial finishes.

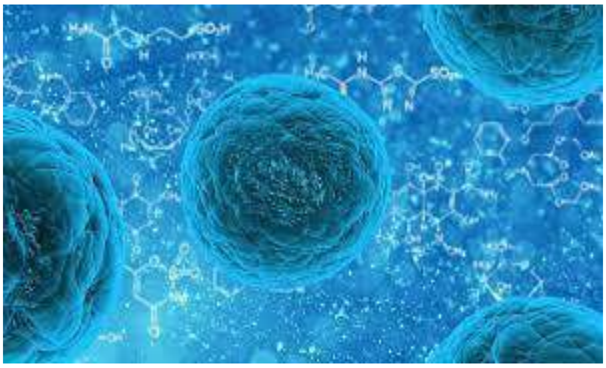
Microbes in clothes produce an unpleasant odour, discoloration, and health problems. Clothing worn close to the skin should have an antibacterial finish since microbial infections can cause irritation, allergies, and skin conditions. Natural antibacterial chemicals are the basis for eco-friendly antimicrobial textiles, which are gaining popularity. Many plants contain compounds, such as tannin, flavonoids, and terpenoids, that have an antibacterial effect when applied. They can operate as a bacteriostat (which stops the bacterium from growing) as well as a bactericide (which kills the microorganism).

Examples of natural antibacterial agents include the following:

- (Seed and Leaf) Papaya
- 'Ole Vera'
- Neem
- (Leaf and Peel) Banana
- Mango
- Pomegranate
- Sericin
- Chitosan

Combining data from several sources:

- Onion and Pomegranate
- Aloe Vera and Neem
- Neem, Turmeric, and Tulsi



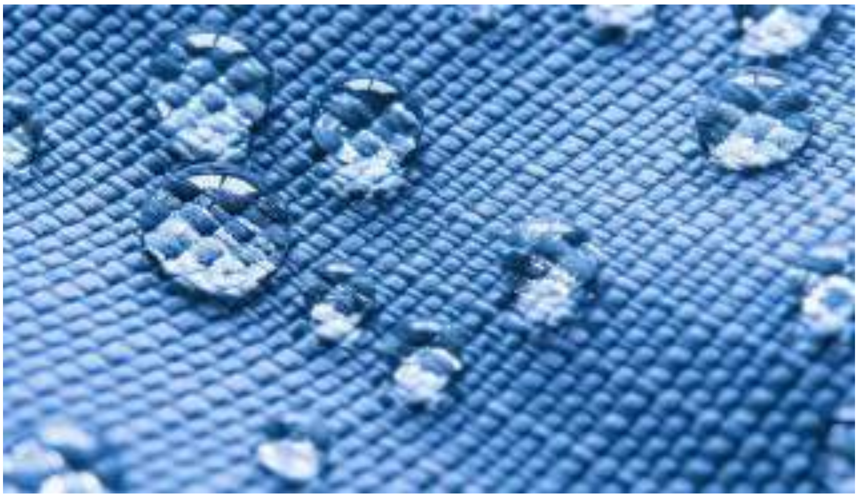
1.Anti-Microbial Finish

2. Plasma completing processing:

A physicochemical technique for surface modification called plasma treatment modifies the surface while leaving the material's bulk properties unaltered. The basic idea of plasma surface alteration is as follows:

The plasma atmosphere consists of free electrons, radicals, ions, atoms, molecules, and numerous excited particles, depending on the plasma gas in question. The interaction of these excited species with solid surfaces placed in plasma reactors results in the chemical and physical alteration of the material surface. Each active species engages in a surface reaction with the substrate to produce chemical functionality on the surface. Additionally, without changing the bulk properties of the treated substrates, the produced reactive particles directly interact with their surfaces.

Non-thermal plasmas, commonly referred to as cold plasmas, are frequently used in a range of textile applications. Either at normal pressure or in a vacuum, fabrics are treated with cold plasma. The most effective methods for surface treatment are without a doubt plasma.



2.Hydro-phobic finish using Plasma processing

The qualities listed below make plasma distinctive:

- Fabric damage is less likely when plasma is utilized because it operates at a low temperature.
- Fine customization of fabric surface treatments is possible thanks to the capability of applying plasma over a broad range of thermal, physical, and chemical temperatures.
- Due to its dry treatment methods, plasma is a sustainable option.
- Numerous textile finishes, including hydrophilic, oleophilic, hydrophobic, wool felting, self-cleaning, and flame-retardant finishes, are available by plasma treatment.

3. The use of nanotechnology:

Nanotechnology is one of the most environmentally friendly technologies in the dyeing and finishing sector. In this method, textile fibres with sizes ranging from 1 to 100 nm are employed. When utilized in textiles, nanotechnology has already demonstrated its ability to increase the surface area of individual strands. The use of hazardous and poisonous chemicals that affect the environment can be decreased by the sustainable application of nanotechnology in the textile sector.

3.Nano-Technology

Nanotechnology can be used to create the following finishes:

- anti-microbial surface
- water-repellent surface
- a self-cleaning surface
- UV-protective surface
- An antibacterial coating
- Antistatic surface
- wrinkle-resistant surface
- anti-pollen coating
- a flame-resistant surface

You might also be interested in: Contemporary Nanotechnology Applications in Textile Finishing

Nano finishing characteristics:

- Clothing that has undergone nano processing has a barrier that keeps liquids from penetrating it.
- With the naked eye, it is challenging to see through their protective coating.
- When a substance undergoes modification at sizes of about 100 nm, the structure of processed clothes becomes more compressed. As a result, clothing becomes resistant to stains and grime.

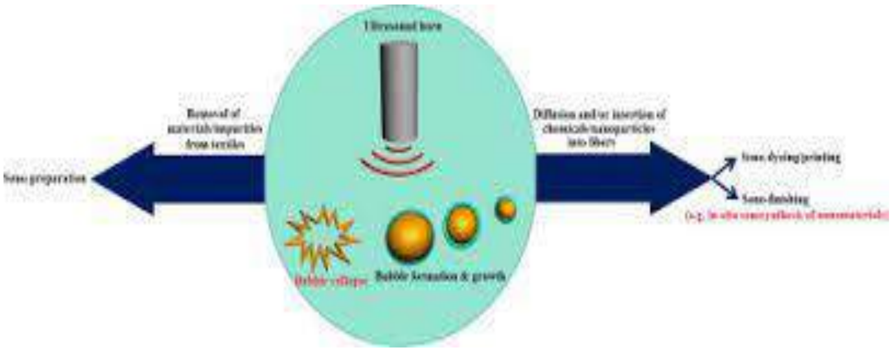
- Reduces laundry costs and time.
- Technology is embracing features that are environmentally friendly.
- Nanomaterials improve breathability while maintaining the pleasant hand feel of conventional materials by allowing for good ventilation and moisture absorption.
- Your garments will stay looking tidy thanks to the crease-resistant function.
- These Nano-processed products are toxin-free.
- Clothes are more resilient than conventional materials and maintain a bright, clean appearance.
- Low manufacturing costs lead to increased product values.

4.Nano-finishing in Textiles

4. Finishing using ultrasound:

Sono-finishing technique:

Based on the physical phenomenon of acoustic cavitation, which happens when a solution containing nanoparticles is exposed to ultrasound, the procedure uses zinc oxide nanoparticles as an active medium. The solution forms small bubbles that expand and burst in a matter of seconds. This causes high-energy microstreaming patterns to move at a speed of about 500 meters per second as a result. These move the particles and firmly ensnare them in the fabrics.



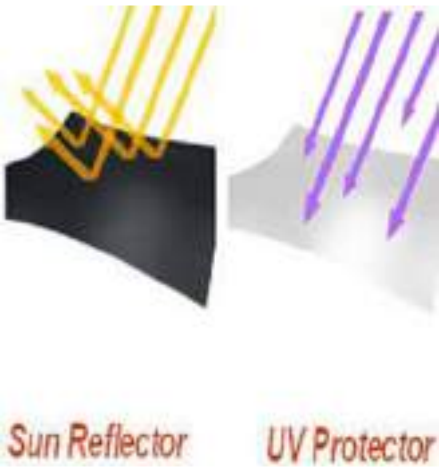
5.Ultrasound technology in textiles

Advantages:

- This ground-breaking technology makes it possible to achieve the highest levels of process dependability, productivity, sustainability, simplicity of maintenance, and cost effectiveness.
- When compared to conventional textile machinery, the novel technique not only offers longer-lasting antibacterial properties and is more environmentally friendly, but it also costs less money.
- It can be used to finish nonwovens, carpeting, woven and knit materials, as well as both.
- Virus defence against the Corona.

5. Ecological UV technology:

UV radiation is used in the sterilisation process because it kills viruses and other disease-causing microbes at low doses. People who are exposed to increasing amounts of UV radiation get skin damage, wrinkles, blisters, and ageing. Because of this, UV protection clothing has piqued the curiosity of researchers and established a demand among consumers. To counteract the negative effects of UV light, fabrics are finished with UV protective coatings. In order to promote sun protection and enhance resistance to UV rays in a sustainable manner, several natural ingredients extracted from mulberry, grapes, chitosan, Tulsa, aloe Vera, honey, almonds, and other sources are utilized in UV-resistant fabrics.



6.UV Technology

Conclusion:

Natural products used in the finishing of textiles are affordable, sustainable, and have minimal negative effects on the environment and human health. Sustainable finishing methods for textiles can conserve both energy and auxiliary resources. So, in order to improve the future, we should adopt sustainability.

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APPLICATION OF SANSEVIERIA TRIFASCIATA IN HOME TEXTILE

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ABSTRACT:

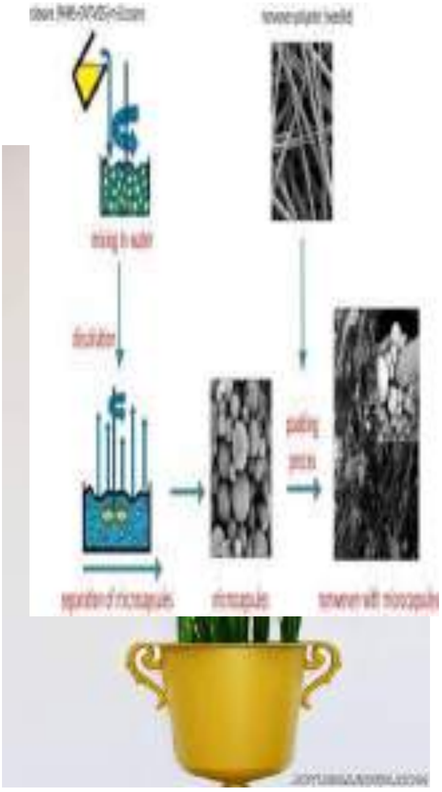
Household air pollution (HAP) is a significant form of indoor air pollution mostly relating to cooking and heating methods used in developing countries.[1] Since much of the cooking is carried out with biomass fuel, in the form of wood, charcoal, dung, and crop residue, in indoor environments that lack proper ventilation, millions of people, primarily women and children face serious health risks. In total, about three billion people in developing countries are affected by this problem.To limit the spread of toxins inside any indoor environment.The curtains contain a mazelike network of microencapsulation filled with Dracaena trifasciata which like all green plants remove carbon dioxide from the air.

Keywords:Dracaena trifasciata, Curtain,Microencapsulation

INTRODUCTION:

In recent years, all sorts of companies have focused their attention on the environment—and some have intensified efforts to correct the ills of poor air quality due to global air pollution. Now, home furnishing giant IKEA is stepping into the indoor air quality arena in a most unusual way.

It has developed a fabric curtain that helps reduce air pollution when exposed to light—both sunlight and indoor lighting. Called the GUNRID, the curtain is coated with a mineral-based treatment that acts almost like photosynthesis, breaking down surface pollutants to reduce indoor air pollution. Given that indoor air is two to five times more polluted than outdoor air—which itself is quite polluted—any measure of help in helping poor air qualityMicroencapsulation is a process in which active substances are coated by extremely small capsules. It is a new technology that has been used in the cosmetics industry as well as in the pharmaceutical, agrochemical and food industries, being used in flavors, acids, oils, vitamins, microorganisms, among others.



Dracaena trifasciata

<u>METHODS AND MATERIALS:</u>

Section snippets Phase-change materials Microencapsulation technology was utilised in the early 1980s by the US National Aeronautics and Space Administration (NASA) with the aim of managing the thermal barrier properties of garments, in particular for use in space suits. They encapsulated phase-change materials (PCMs) (e.g. nonadecane) with the hope of reducing the impact of extreme variations in temperature encountered by astronauts during their missions in space. Ultimately the technology was not taken up within the space.Polychromic and thermochromic microcapsules Colour-changing technology has been around for a number of years, generally applied to novelty application such as stress testers, forehead thermometers and battery testers. New applications are now beginning to be seen in textiles, such as product labelling, and medical and security applications.

<u>EXTRACTION OF SANSEVIERIA</u>

Extraction of Sansevieria trifasciata fibre is mainly by decortication and water retting. The composites are prepared mostly by hand lay-up and cured by either compression molding (cold or hot press) or casting. The surface treatment of S. trifasciata fibre can enhance the fibre-matrix interfacial adhesion and improve the mechanical properties of the composites. S. trifasciata fibre-reinforced composites have relatively good mechanical properties, which depend on processing methods, fibre loading, fibre length and fibre orientation. Future work is suggested in the area of detailed chemical compositions, novel preparation techniques, evaluation of electrical properties, lifecycle analysis and techno-economic analysis.

RESULT AND DISCUSSION:

This type of finishing applied on the curtains by using microencapsulation.Theresults show the control of Air pollution in home.In this method carbon di oxide converted to oxygen.And It will help to improve the health.The finishing cost also economically.

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SUSTAINABLE FIBERS AND ITS IMPACT ON THE ENVIRONMENT

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INTRODUCTION:

The textile industry is one of the longest and most complex and complicated industrial chains of the manufacturing industry. It involves actors from agricultural, chemical fibers, dyes and chemical manufacturing, textile and apparel industry, retail and service sector, and waste treatment. In recent years ecological issues have become more and more important especially in the textile and apparel industry, an industry not noted for eco friendliness. Every textile item releases toxic substances that are harmful to the environment. The traditional textile industry consumes large amounts of natural resources and pollutes the environment because their production and processing involves Chemical Intensive Applications; therefore is a stringent need for green textiles.

The most suitable definition of sustainability recommended by the World Commission on Environment and Development is 'meet the needs of the present without compromising the ability of future generation to meet their needs and desires'. Sustainable fibers provides a whole-lifecycle approach to the subject of **sustainable textiles,** from fiber production, through manufacturing and low-energy care and recycling. They are a sustainable resource, as they are renewable, biodegradable and carbon neutral and they can be used without depleting or damaging the environment. Natural fibres 'breathe', keeping the wearer comfortable in hot weather by absorbing perspiration and releasing it into the air.

ORGANIC COTTON:

Organic cotton addresses most of the environmental challenges that conventional cotton production faces. It is grown from non-GMO seeds and without the use of pesticides, insecticides, or fertilizer. Unlike conventional cotton, organic farmers use ancestral farming methods, including crop rotation, mixed farming, to preserve the soil. Organic cotton farmers are not exposed to harmful substances. Several organizations have established certifications for organic cotton such as GOTS, USDA-NOP, Organic Content Standards, IVN, and Naturland. Certification is the only proof that a product is truly organic.

Unlike conventional cotton production (the "world's dirtiest crop"), organic cotton is grown without pesticides and synthetic fertilizers and processed with no chemicals—overall using 62% less energy and 88% less water. There are several certifications used with sustainable and ethical cotton to tell us that the cotton was grown without any chemicals or machine harvesting; and processed without any chemicals leaving the final garment chemical-free. Organic cotton that's approved by the Global Organic Textile Standard (GOTS-certified for short) is most common. Other pertinent certifications like fair trade ensure fair pay and safe conditions for farmers.

5 reasons organic cotton is a sustainable choice:

1. Combats climate change

Organic farmers use natural methods to grow cotton, not fossil-fuel based fertilisers. By working with nature, farmers build healthy soils which store carbon and help to combat climate change.

2. Saves and protects precious water

Organic cotton is better for water than conventionally produced cotton. Organic farming creates healthy soils, which act like a sponge, soaking up water during floods and holding it for longer in times of drought. Hazardous synthetic pesticides and fertilisers are banned in organic farming, so rivers, lakes and drinking water are kept cleaner too.

3. Helps farmers feed their families

To maintain a balanced system on their farms, organic farmers always grow other crops alongside their cotton, which helps to keep soils healthy, encourage wildlife and protect topsoil. For cotton farmers, these crops can provide farming families and their communities with a more stable, accessible, abundant and diverse food supply and another source of income.

4. Gives control to farmers not GM companies

Genetically modified (GM) seeds are banned in organic farming, so farmers are not reliant on a handful of GM companies. Instead, they save their seeds year after year, and work with the environment in a long-term, sustainable way.

5. Eliminates hazardous synthetic pesticides

Organic farmers use natural methods like crop rotation to control pests and diseases. Hazardous synthetic pesticides used in non-organic farming can damage ecosystems, poison waterways and endanger workers who can't always afford safety equipment needed to protect them. Conventional cotton alone is responsible for 16% of all insecticides sold worldwide.

ORGANIC LINEN

Linen is one of the oldest existing textiles. The textile industries in various countries have been making use of flax fiber for ages. We obtain linen from flax grown for harvest. Farmers extract flax fiber from the skin of the plant's stem, which begins the process of creating linen. Linen is one of the most biodegradable and stylish fabrics in fashion history. It's strong, quick-drying, naturally moth resistant, and made from flax plant fibres, so when untreated (ie. not dyed) it is fully biodegradable. Its naturally-occurring colours include ivory, ecru, tan, and grey.

Linen is a natural fiber which stems from the flax plant. It uses considerably fewer resources than cotton or polyester (such as water, energy, pesticides, insecticides, fertilizers). Flax can grow in poor soil which is not used for food production. In some cases, it can even rehabilitate polluted soil. Flax plants also have a high rate of carbon absorption. Linen can withstand high temperatures. It also absorbs moisture without holding bacteria. In fact, it is actually stronger when wet than dry and becomes softer and more pliable the more it is washed. It basically ages like a fine wine.

For these reasons, we consider linen to be a sustainable material, even when it is not organically grown. Cotton is a very thirsty plant. To make one shirt from cotton requires around 4 times the amount of water than is needed to make one shirt from linen. A key reason why linen is a sustainable fabric is because the entire flax plant can be woven into a fibre, which means that almost no waste is left over from the spinning and weaving process.

The flax fiber is extremely strong, which means that linen can last decades with proper care, and when a 100-percent-linen item does reach the end of its life, it's completely biodegradable. Linen is a lightweight and robust fabric. When in its natural form and untreated with dyes, it is entirely biodegradable. Flax for linen can grow without using pesticides, herbicides, and other toxic chemicals. It can also thrive on just rainwater and no irrigation presenting many benefits over less sustainable crops.

The area of most concern both for the surrounding environment and its human population is the chemical-driven retting process. Alkali or oxalic acid are normally used, which are toxic in relatively low concentrations.

This can be avoided entirely if manufacturers opt for water retting instead, a common feature of certified organic linen. This process is much less cost-effective, however, hence the higher price point on organic garments.

In addition, because of the dense nature of the fibre, to get a pure white linen, it has to go through a heavy bleaching process. Sticking to its natural-toned hues will ensure a more environmentally-friendly garment afterlife. Although linen doesn't technically need much fertiliser or pesticides, that doesn't mean they're never used. In fact, most non-organic flax is grown using nitrates. Excess nitrates can get into water streams and harm our ecosystems. On the pesticides front, linen usually needs less than other crops, but again, unless the linen brand or product is certified organic, there's no guarantee no harmful pesticides have been used.

BAMBOO

Bamboo is known to be the fastest growing plant in the world and is naturally organic. Majority of the bamboo grown in different locations of the world is eco-friendly as it requires no pesticides or fertilizers and needs little water. Currently, bamboo fabric is considered to be the trendiest sustainable fabric in the fashion world. However, it is a debatable topic about how eco-friendly is bamboo fabric.

Bamboo plants are capable of growing up to four feet a day. Moreover, bamboo plant releases 35% more oxygen in the air compared to other trees of the same size. With its fast growth, bamboo matures within seven years. It does not need to be replanted as it has a vast root network that continuously sprouts new shoots. It helps to improve soil condition and prevent soil erosion. There are as many as 1000 types of bamboo grown in different types of climatic conditions all over the world. Owing to all these facts, growing bamboo is considered sustainable for the environment. Due to the softness, smooth flowing, gentle drape, etc., bamboo fabric has received the status of being eco-fashionable in the fashion world.

There are over 1000 species of bamboo. It is a type of grass and grows from it's roots, when it is cut it quickly grows back with most species maturing in 3-5 years. This amazing plant grows in both tropical and temperate environments and is very hardy, not needing pesticides or herbicides to grow well.

Even the pricing of bamboo is economical at least when compared with silk and cashmere. Today, the sales of bamboo garments have been boosted with increasing environmental awareness among the people. It is considered to be the new eco-chic as well as functional fabric. Theres a reason for bamboo fabrics for becoming so popular. They are softer than cotton and its texture is more like silk. In addition, bamboo clothes naturally absorb moisture from the skin and so they are apt fabrics for summer wear. It takes half the time to dry compared to cotton clothes. Therefore, bamboo bedding, towels and rugs have also picked up sales. The general belief that bamboo is eco-friendly and so is bamboo fabric is questionable.

Critics say that the process of converting bamboo into fabric takes a heavy toll on the environment and this is where it loses its eco-friendliness. Bamboo fabrics are produced in two methods: mechanical process and chemical process. The mechanical process is the same eco-friendly process used to make linen fabric from flax or hemp. In mechanical process the plant is crushed and natural enzymes are used to break the bamboo walls to get natural fibers. These fibers are mechanically scoured out and spun into yarn. Bamboo linen is produced using this process. Moreover, garments from bamboo linen are produced on a very small scale as this process is expensive and more labour intensive.

The sustainability of bamboo fabric depends on how it is produced. Bamboo clothing can be made using rayon or viscose technology but requires a large amount of energy during production. Bamboo cloth made from lyocell is more sustainable as it involves recycling of chemicals and water. The best process (called mercerization) uses natural enzymes, instead of harsh chemicals, to produce bamboo linen. Choosing sustainable bamboo is key to textile bamboo being the solution to fast fashion.

Most of the bamboo fabric considered as eco-fashion clothing today is chemically processed. In chemical process, bamboo leaves and woody shoots are dissolved using strong chemical solvents like sodium hydroxide and carbon disulfide. This process is also known as hydrolysis alkalization which is combined with multi phase bleaching. Both the chemicals are known to create serious health issues. Carbon disulfide is a toxic chemical that can cause neural disorder and pose danger to human reproductive system, while exposure to sodium hydroxide causes eyes and skin allergy. In most of the factories, the revival of solvent is 50%. This means the other 50% is discarded into the environment.

The production processes for bamboo and other regenerated fibers using hydrolysis alkalization is not considered sustainable or environment friendly because it poses severe health risks and pollutes the surrounding environment. In reality, very rarely bamboo clothing can be termed as eco-friendly or organic clothing.

JUTE

Known as the ‘golden fibre’ jute is one of the longest and most used natural fibre for various textile applications. Jute is extracted from the bark of the white jute plant (Corchorus capsularis) and to a lesser extent from tossa jute (Corchorus olitorius). It is a natural fibre with golden and silky shine and hence called the Golden Fibre. Jute is an annual crop taking about 120 days (April/May-July/August) to grow.

It thrives in tropical lowland areas with humidity of 60% to 90%. Jute is a rain-fed crop with little need for fertilizer or pesticides. Yields are about 2 tonnes of dry jute fibre per hectare. Jute is one of the most affordable natural fibres and considered second only to cotton in amount produced and variety of uses of vegetable fibres.

Jute is long, soft and shiny, with a length of 1 to 4 m and a diameter of from 17 to 20 microns. Jute fibres are composed primarily of the plant materials cellulose (major component of plant fibre) and lignin (major components of wood fibre). The fibres can be extracted by either biological or chemical retting processes. Biological retting can be done by either by stack, steep and ribbon processes which involve different techniques of bundling jute stems together and soaking in water to help separate the fibres from the stem before stripping. After the retting process, stripping begins. In the stripping process, non-fibrous matter is scraped off, leaving the fibres to be pulled out from within the stem.

Jute fibre is 100% bio-degradable and recyclable and thus environmentally friendly. A hectare of jute plants consumes about 15 tonnes of carbon dioxide and releases 11 tonnes of oxygen. Cultivating jute in crop rotations enriches the fertility of the soil for the next crop. Jute also does not generate toxic gases when burnt.The plant requires minimal fertilizer and pesticide use, particularly in comparison to cotton, which lessens the environmental side effects. In addition, the jute plant is renewable and the leftover roots and leaves that fall off the plant enrich the soil and increase its fertility. Jute is a versatile fibre. During the Industrial Revolution, jute yarn largely replaced flax and hemp fibres in sackcloth. Today, sacking still makes up the bulk of manufactured jute products. A key feature of jute is its ability to be used either independently or blended with a range of other fibres and materials. Advantages of jute include good insulating and antistatic properties, as well as having low thermal conductivity and moderate moisture retention.

HEMP

Hemp is a ‘bast’ fibre derived from the naturally soft and flexible stems of *Cannabis Sativa*. To get the fibres the outer layer of bark has to be removed along with the woody core in a process called ‘retting’. Every single part of the hemp plant is used in a variety of industries. The hemp plant is broken down using different intermediate processes and used to make sustainable, beneficial materials. There is no waste when it comes to hemp.

Hemp is naturally resistant to pests & disease. Hemp is very resilient and naturally immune to insects, fungi, and disease. Therefore, hemp does not require harsh pesticides or chemicals during its growing process. Hemp is carbon negative, meaning it traps CO_2 from the environment, neutralising its own carbon levels as it grows. For example, our 2019 crop of 500 acres captured over 1,650 tonnes of carbon from the atmosphere during its growth cycle. This is equivalent to the carbon produced in over 220 American households every year!

Compared to most crops, hemp is a less water intensive. Textile crops, such as cotton, require large amounts of water to grow. To manufacture one cotton t-shirt, it takes 2,700 litres of water! Hemp uses about 80 gallons of water, roughly X4 less than cotton, and receives most of its water from rainfall, permitting conservation of this resource instead of careless usage. The planet is suffering from environmental damage caused by fossil fuel emissions and oil extraction. Hemp is an answer to change this and replace this damage with a plant-based fuel. Ongoing studies have shown hemp biodiesel to have high efficiency and is another brilliant example of hemp’s eco-friendly status and versatility.

Deforestation is a devastating problem. It is occurring as forests are cleared to make way for agricultural crops or to harvest trees for more paper. It is estimated that the planet loses 19 million acres of forests per year. Hemp can grow in smaller spaces as it is a highly dense crop, reducing the need for deforestation. Hemp is a better option for producing paper as it grows quicker than trees (4 months vs. 20 years), so it is a better solution to produce paper as less trees will be harvested, hence, slowing down deforestation. The low lignin content in hemp and natural light colour means less chemicals and bleach are required to pulp and colour hemp paper. Overall, hemp can save trees and repair the harm done to the environment by deforestation.

The soil and land can be stripped of nutrients by improper farming techniques as the soil isn’t given a chance to replenish. This results in soil degradation which impacts the land and future crops to be planted. Hemp is known as the best phytoremediation plant in the world. Hemp nourishes the soil it grows on, improving the health of the soil and inhibits erosion. Hemp cleans the air, soil, and water from hazardous contaminants, benefiting the environment.

Almost half of all the plastic created is single-use and ends up buried in landfills, leaking harmful chemicals into the soil and groundwater. This has adverse impacts on the environment and surrounding wildlife. Hemp plastic is light, durable, and doesn’t contain chemicals found in regular plastics. In the 1940’s, Henry Ford built a car made of hemp and soy plastic. Since then, car manufacturers have changed to hemp composites for creating car elements. Hemp composites are cheaper and stronger than fibre glass and carbon fibre. Hemp plastics are environmentally safe as they are entirely biodegradable!

When it comes to sustainability, yield is an important factor. Hemp requires less land to produce the same about of fibre as other plants due to its natural density. Per acre, hemp produces more fibre than cotton (250%) and flax (600%)! Hemp is one the fastest growing crops, taking about 4 months to mature compared to cotton, which takes 6 months to fully grow. This makes hemp more feasible and sustainable to grow compared to other crops.

The construction industry accounts for 40% of the world's total carbon emissions! After water, concrete is the second most consumed resource, with cement accounting for 5% of the entire world's CO_2 output. It's evident that the construction industry has a catastrophic carbon footprint. A non-toxic, renewable and energy efficient way of replacing concrete is hempcrete. Hempcrete is created by mixing hemp fibres with lime to build complete carbon-negative construction materials. We know hemp fibres are the strongest natural fibres in the world, making hempcrete strong and sturdy. It can also regulate moisture and is resistant to insects, fire, and mould. Hempcrete provides excellent insulation, which will reduce the use of energy and heating, therefore, lowering carbon emissions. Hempcrete, without a doubt, is an excellent sustainable building material that benefits the environment and significantly lowers carbon footprint.

SOYSILK

Soysilk is a material that is exactly what it sounds like, a silk-like fiber that is made from soybean residue that would otherwise be wasted during it's manufacturing. This textile, though not widely heard of, is not a new idea. **As far back as the 1940's, textile designers and developers experimented with soy**. As a matter of fact, Henry Ford even owned a suit made of soy fabric. Soysilk is an emerging new fiber that is increasing in popularity in sustainable fashion circles. Also known as vegetable cashmere, soysilk is a relatively new fiber that has been created from soybean waste left over from the production of soy food industry. While not entirely new soy silk was manufactured as far back as 1940– it has been growing in prominence and availability only in recent years.

The manufacturing process takes waste soy residue from the processing of soybeans for food products such as tofu, therefore making use of a resource that would otherwise go to waste. It is completely biodegradable, making the impact on the environment minimal. Soysilk is usually manufactured on a closed loop system, meaning that the chemicals are captured and reused rather than wasted. This makes soysilk comparable to other sustainable fibers such as lyocell. Because soy is a natural protein-based fiber, it is suitable for dyeing with natural dyes and is an excellent fabric with which to experiment with eco-dyeing and eco-printing with leaves and flowers. This property eliminates the need for chemical dyes to color the fabric.

The soysilk is light, smooth, and kind of delicate, therefore can be employed as yarn for knitting or fine weave fabrics. For this reason, it can be used as a substitute for both silk and cashmere in garments. It is generally wrinkle-free and has little to no shrinkage when washed. It is also machine washable, meaning it is far easier to care for than silk and cashmere. Since it is a natural fiber, it takes dye very easily.

When blended with other natural fibers, such as cotton, the soysilk adds a smooth silky quality whilst the other fiber improves the strength. Moreover, thick soy fabric is warmer than wool and far exceeds the warmth provided by polyester, making it excellent for winter wear and soft, cozy cover-ups. Like real silk, Soysilk is cool to the touch, has a lovely drape and is very soft. There is a slight sheen to it as well, especially when finished. It is also generally wrinkle-free (unlike real silk which is stubborn with wrinkles), and also has little to no shrinkage when washed. Since it is a natural fiber, it takes dye very easily. Though Soysilk is not new, it is definitely a progressive fabric, and could be very interesting to experiment with.

ALPACA

Alpaca fleece is a natural protein fiber that comes from alpacas, fluffy animals in the South American branch of the camel family.There are two types of alpaca with distinct fiber types. Huacaya alpacas have crimped fleece like wool from sheep and look fluffier (thus are sometimes referred to as "teddy bear" alpacas). Suri alpacas, on the other hand, have smooth fleece that hangs down in long locks and is more silk-like in texture. Huacaya is more common, making up roughly 95% of the alpaca population. Most alpaca fiber comes from animals that live free-range in their native habitat in the Andes Mountains. Alpaca graze on grass and other foliage. Alpacas are sheared annually, usually in the spring.

Alpaca fiber is a sustainable, socially responsible, cruelty-free, and functional alternative to other textiles and fabrics on the market. What makes it so popular and unique is the way it stands out compared to other natural fibers. Among the many benefits of alpaca wool, we find that it is light, warm, soft, and hypoallergenic. Which makes it a great choice for all those who are sensitive to wool. Additionally, in the list of its benefits come the water-repellent, stain-repellent, flame-resistant properties. Alpaca wool is less susceptible to abrasion, pilling, and general wear and tear history. With so many great benefits, alpaca fiber is the Eco-friendly textile choice that cares for human health and nature. Alpacas are a great part of socially responsible fashion. Unlike cashmere production, alpaca wool is renewable, making it the top sustainable fabric. Peru is home to 80% of the world's alpaca population, which equals around 4 million animals. It is also a traditional craft that, in combination with modern technology, does not harm any animals during the process of production.

Alpaca fiber is natural. It is not synthetic or petroleum-based like polyesters, acetates, acrylics, nylon, and other filaments that affect nature. It is a natural animal protein fiber that is fully biodegradable and known for its exceptional breathability and temperature regulation. The last one refers to the ability to keep you cool on a warm day and warm on a cool day. Alpaca wool is animal-friendly derived. This means the alpacas are not harmed when their fleece is harvested. That is not the case for mink or baby seal, for example. Alpacas are shorn once a year, and shearing provides much more than wonderful fiber. It is beneficial for alpacas because by removing the fleece they become healthier. Too much fleece can contribute to heat stress in the warm summer months.

Alpaca fiber is known as one of the strongest natural fibers. This affects and contributes to its durability. As a matter of fact, it can also be very lightweight and strong at the same time. The alpaca fiber is also abrasion resistant because of the great strength that it possesses. Another point that contributes to the great durability properties is the thermal characteristics. Namely, the alpaca's thermal characteristics widely surpass the ones of wool. They are also better than the standard characteristics of mohair and cashmere. The alpaca's fiber resistance is also higher than the resistance of the other above-mentioned fabrics.
Alpacas live lightly on the earth, which makes them the most environmentally friendly animals. They have soft-padded feet that do not cut into the topsoil. Just as a comparison, sheep or goats are much harder on the earth because of the impact of their hooves. Eventually, that leads to tearing up and damaging the plant life and soil. This damage to the topsoil can decrease, in the long-term, soil fertility, increase soil erosion, and encourage the proliferation of weeds. That is why alpacas are kinder to the pastures because they do not disrupt the root systems. They also consume lower amounts of water and forage, and their efficient three-stomach digestive system metabolizes most of what they consume**.** Alpaca quality end products are present everywhere. Today, the biggest accent is put on clothes, quilts, blankets, duvets, pillows, and many other things that make our living more comfortable, sustainable, and socially responsible too.

TENCEL

TENCEL is a soft, sustainable fabric made by Austrian company Lenzing AG. Tencel is a natural fibre made from wood pulp, most commonly from eucalyptus but also beech, birch and spruce trees. It's known for its gentle texture and super soft feel. These exquisitely soft fabrics glide across the skin, making it ideal for thermal layers to outwear. It has become increasingly popular, even starting to appear in some high street fashion outlets. As well as being incredibly soft, Tencel fibres are formed in such a way that gives it strength, moisture wicking performance and flexibility. This also makes Tencel clothing breathable and great for sensitive skin, key benefits of tencel. TENCEL™ brand name is owned by the Austrian Company Lenzing AG. The company provides two types of finres under the TENCEL™ brand – TENCEL™ Lyocell and TENCEL™ Modal.

TENCEL vs Traditional viscose/rayon

There are two main ways TENCEL Lyocell differs from most other fabrics made from wood fibre. First, at the chemical treatment stage. The traditional viscose process is chemically-intensive, using harmful sodium hydroxide. TENCEL replaces it with the NMMO process. The solution of N-Methylmorpholine N-oxide is more easily recoverable, and a closed-loop solvent system means almost no solvent is dumped into the ecosystem. Instead, it is recycled time and time again to produce new fibres and minimise harmful waste. Lenzing AG says the solvent recovery rate for their version is an impressive 99%, and it also recycles the process water.

Second, TENCEL is made from responsibly-sourced wood, while around 30% of rayon and viscose used in fashion is made from pulp sourced from endangered and ancient forests. Lenzing AG states it sources from more sustainably-managed PEFC or FSC tree plantations. This is good news, considering concerns about the increasing impact of viscose production on deforestation. It requires a lot less energy and water to make compared to materials like conventional cotton. As a plant derived fibre, it is also biodegradable. The raw fabric that's produced is also pure white, meaning no bleaching is needed to strip the fibre of colour before dying (unlike cotton).

TENCEL™ has the guarantee that it sources all wood from sustainably harvested eucalyptus forests certified by the Forest Stewardship Council (FSC). This means that proper forest management is ensured to sustain, conserve and restore forests for future generations to enjoy. As a result, Tencel has won numerous awards including the European Award for the Environment. It also carries the Oeko Tex 100 certification that guarantees no harmful substances are contained within the fibres of the material. There are other materials that are deemed more sustainable, such as organic hemp and recycled cotton. Tencel is still one of the best sustainable and ethical fabrics out there, which is why a lot of sustainable fashion brands are using it.

Conclusion:

Sustainable textiles mean that all materials and process, inputs and outputs, are healthy and safe for human and environment, in all phases of the product life cycle and all the energy, material and process inputs come from renewable or recycled sources. It can also mean that materials are capable of returning safely to either natural or industrial systems and all stages in the product life cycle could enhance social well being too. The fashion industry has been accused of causing significant environmental damage, and unless we start making sustainable choices immediately, the situation will only worsen. In order to decrease our contribution to the pollution caused by the textile industry, one method is to make a more thoughtful purchase by shopping for garments made responsibly.

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A Review on Recent Trends in Various Textile Finishes

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Abstract:
In textile manufacturing, finishing refers to the processes that convert the woven or knitted cloth into a usable fabric or any material and more specifically to any of the processes performed after dyeing the yarn or fabric to improve the look, performance, or feel of the finish textile or clothing. It imparts the serviceability of the material promotion of dimensional stability of the material hence finishing is important for a textile goods before they are placed on the market all that part comes under the conventional finishing process. It's imperative to article a series of advancements in finishing of textile materials soon see the ways of process and procedures are often improved upon, to realize better performance products. Tons of interesting advancements are witnessed within the last twenty years within the clothing and textile industry
Keywords: textile finishes, application method, new trend, enhance the value of material

Introduction:

Textile finishing is the final step of wet processing technology. Textile products either are dyed or printed it needs to add some finishing feathers before marketing. By applying different finishing techniques a product becomes more comfortable to use. So finishing should be easier to apply. The making of marketable and consumer useable textiles becomes complete after fabric production, dyeing, or printing operation. Fabrics usually still need to undergo additional steps known as Finishing. Finishing is the final processing before the fabric is cut into apparel or made into any articles of textiles. Finishing is what improves attractiveness and makes fabrics suitable for use. There are different types of finishing operations. Some make the fabric stiffer, some make softener, some make fabric water repellent or waterproof, some make shrink-resistant or fire-proof, etc.

Classification Based on Their Degree of Performance:

Finishes also can be classified by their degree of performance. The following are the classification of textile finishes based on their degree of performance. They are-

Permanent Finishes: It involves a chemical change in fiber structure and do not change throughout the life of a fabric.

Durable Finishes: Usually last throughout the life of a fabric, effectiveness becomes diminished after each cleaning and near the end of normal use life of the fabrics, the finishing is nearly removed.

Semi-Durable Finishes: Usually last several launderings or dry cleanings and many are removal in home laundering or dry cleaning.

Temporary finishes: removed or substantially diminishes the first time an article is laundered or dry cleaning.

Objectives of Finishing:

- Firstly, to improve attractiveness of the fabric.
- Secondly, Finishes apply to increase the life time or durability of the fabric.
- Finally, to meet up specific requirement of the fabric for achieve the final goal.

In sum, textile finishing plays an important role in the modern age. Everyone likes to wear finished products with some special types of finishing. The finishing of the fabric depends on the requirement of the buyer. By the same token, different types of finishing machines are essential for finishing operations in the textile industry.

Recent trends in finishing processes:

Elastomeric Finish:

Elastomeric finishes are also referred to as stretch or elastic finishes and are particularly important for knitwear. These finishes are currently achieved only with silicone-based products. The main effect is durable elasticity, because not only must extensibility be enhanced, but recovery from deformation is of crucial importance. After all stresses and disturbing forces have been released, the fabric should return to its original shape.

Peach Finish:

Subjecting the fabric (either cotton or its synthetic blends) to emery wheels, makes the surface velvet like. This is a special finish mostly used in garments. The Process of receiving accurate amount of Gray Fabric from the Peach fabric Store & pilling them on a pallet to transfer to the next operation is called Lay-in.

Anti-Pilling Finish:

Pilling is a phenomenon exhibited by fabrics formed from spun yarns. Pills are masses of tangled fibers that appear on fabric surfaces during wear or laundering. Fabrics with pills have an unsightly appearance and an unpleasant handle. Loose fibers are pulled from yarns and are formed into spherical balls by the frictional forces of abrasion. These balls of tangled fibers are held to the fabric surface by longer fibers called anchor fibers. Anti-pilling finish reduces the forming of pills on fabrics and knitted products made from yarns with synthetic-fiber content, which are inclined to pilling by their considerable strength, flexibility and resistance to impact.

Aqua Tex Finish:

Traditional finishing processes for these fabrics typically require the addition of chemicals, in reality; however, these chemical compounds decrease the life span of such fabric's performance, and exclude the of recycling possibilities, and frequently engage appreciably higher additional expenses for wastewater treatments. The Aqua Tex system or for the enhancement of woven and some knit fabrics has been developed In lieu of these chemicals, which frequently are environmentally objectionable, the Aqua Tex system only uses regular water at ambient temperature to attain adequacy of such fabrics in the trade and also makes them more profitable.

Feather Touch & Ultra Soft Touch Finish:

Feather touch & ultra soft touch finishes are commercial names produced by treating with amino, carboxy, or epoxy silicones alone or in successive treatments. Amino Silicones are widely available in market are widely used in softening. They impart excellent softness with bounciness when used in concentration 2.5 3% on weight of fabric in garment finishing. Yellowing and some level of hydrophobicity are the disadvantages. Epoxy silicones, which are most compatible with most of the other finishing chemicals, impart softness without yellowing and improved fabric strength. They also play a vital role in wrinkle free finishes by imparting better tear strength.

Rubbery Touch Finish:

Rubber latex provide lustrous, brittle handle with characteristic rubbery effect, which are hard-wearing. In leather finish, it is applied as final finish treatments which are after enzyme or stone wash or after mechanical abrasion and enzyme treatments. Many catching names such as bio polished & rubbery touch finish, enzyme bio polish & rubbery touch finish, are quite universal.

Non-Stick Teflon Spray Finish:

This is a new generation multi-use lubricant based on poly tetra fluoro ethylene (PTFE). In service this lubricant forms a tenacious non-stick coating of the fluoro-polymer, which does not permit dirt and dust to settle on the fabric surface. This makes the product ideal for cement plants, textile mills and industries etc. where constant flow of dust and contaminants affect the conventional lubricants.

Nonslip Finish:

A finish applied to a yarn to make it resistant to slipping and sliding when in contact with another yarn. The main effect of non-slip finishes is to increase the adhesion between fibers and yarns regardless of fabric construction, the generic term for these finishes would be fiber and yarn bonding finishes. Other terms that can be used include anti-slip, non-shift and slip-proofing finishes.

Stain and Soil Resistant Finish:

Preventing soil and stains from being attracted to fabrics. Such finishes may be resistant to oil-boure or water-bourne soil and stains or both. Stain and soil resistant finishes can be applied to fabrics used in clothing and furniture. Scotchgard is a stain and soil resistant finish commonly applied to carpet and furniture.

Blood and Water Repellent Finish:

Fabrics used in hospitals for healthcare purposes need to be blood and water repellent. Blood repellent finish: Blood repellent finish is applied to fabrics used for surgical gowns, bed linens and drapes to reduce surgical site infections. Blood and body fluids are considered as the carriers of several microorganisms and can be transferred through the barrier materials by wicking of fluids or pressure or leaning on a flooded area of product. Water repellent finishes are surface finishes imparting some degree of resistance to water but are more comfortable to wear because fabric pores remain open.

Color Fastness Improving Finish:

Color fastness is the resistance of a material to change in any of its color characteristics, to the transfer of its colorants to adjacent materials or both. Fading means that the color changes and lightens. Bleeding is the transfer of color to a secondary, accompanying fiber material. This is often expressed as soiling or staining meaning that the accompanying material gets soiled or stained.

Plasma Finish:

Plasma treatment is a surface modifying process, where a gas (air, oxygen, nitrogen, argon, carbon dioxide and so on), injected inside a reactor at a pressure of approximately 0.5 mbar, is ionized by the presence of two electrodes between which is a high-frequency electric field. The need to create the vacuum is justified by the necessity to obtain so-called cold plasma with a temperature no higher than 80°C. This, with the same energy content that can be reached at atmospheric pressure at a temperature of some thousands of degrees C, permits the treatment of fabrics even with a low melting point such as polypropylene and polyethylene, without causing any form of damage.

Sewing Thread Finishing:

Apart from many of the above said finishes which can be applied to sewing threads also, A variety of finishes are used to improve the sewability of sewing thread, for example. Lubricants reduce friction and improve the lubricity of the thread. Lubricity refers to the frictional characteristics of thread as it passes through the sewing machine and into the seam. Good lubricity characteristics will minimize thread breakage and enhance sewability.

Glaze Finish:

This finish to increases the strength and abrasion resistance. Glaze Finish refers to a finish put on 100% cotton threads or cotton-polyester core spun thread made from starches, waxes or other additives. This coating is then brushed to give the thread a smooth surface. A glaze finish protects the thread during sewing giving better ply security and abrasion resistance.

Conclusion:

Although both of the above categories of textile finishing process are accomplished with the help of some machine, in chemical finishing the final effect obtained on the textiles is primarily due to the chemicals used in finishing. In mechanical finishing, the final effect obtained on the textiles is primarily due to some mechanical action on the fabric by the machine. Chemical finishing results in change of chemical composition of the fabric. Most of the chemical finishes do not result in change in the fabric appearance but may result in change in some other physical and mechanical properties of the fabric. However, most mechanical finishes alter the fabric appearance.

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Development of Cotton and Jute Needle Punched Nonwoven Fabric for Acoustic Applications

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Abstract:
Acoustic insulation material is designed to reduce and control the sound transmission by absorbing and blocking of sound weaves. The sound reduction materials are used in walls, ceilings, floors , theatres, recording studios and residential spaces to control noise. Natural fibre nonwovens are biodegradable, good bonding ability, thermal insulation and high level of sound absorbency. This work is aimed to develop the green needle-punched nonwoven fabrics with cotton and jute fibres. Cotton and jute based nonwoven fabrics have some added advantages in various technical applications like geotextiles, automotive interiors and insulation, etc. Nonwoven fabric combinations like 100 % jute, 100% cotton, 70:30 jute cotton 30:70 cotton jute and 50:50 jute cotton were blended and needle-punched nonwoven fabrics were produced with two different stitch densities like 300 and400 were compared.

Keywords: Ecofrinedly products, jute, cotton, blended nonwoven fabric, acoustic, sound.

Introduction

The increasing global environmental concerns and awareness of renewable green resources are continuously expanding the demand for eco-friendly, sustainable, and biodegradable natural fiber materials (Tanvir Hossain et al., 2022)

The textile industry has taken increasing interest in natural products which offer potential due to their biological activity, biocompatibility, and reduced toxicity. There is a growing in market textiles which provide biological qualities including UV protection, antibacterial or insecticidal properties, or simply greater comfort and a more pleasant odour. Natural fibers are also increasingly popular as a means of producing 'green goods'. They are biodegradable, can easily be recycled, and are not expensive to produce. Their specific weight is low, and their thermal and acoustic qualities are advantageous. They offer high hygroscopicity, and tend not to accumulate electrostatic charges on their surface. However, many natural fibers, both fabrics and nonwovens, can become biodegradable under humid conditions or high temperatures. In the construction and automotive sectors, it has been shown that microorganisms are responsible for the destructing of natural fiber-based finishing or insulation materials, so it is essential that steps are taken to prevent such bio deterioration (Alihosseini 2016)

Jute fibres are comparatively coarse in nature and have wide variation in fineness apart from its mesh-like structure. Its high moisture regain also places its suitability in certain applications. These properties make it more popular in the development of needle-punched nonwoven rather than the other nonwoven like thermal bonded and adhesive bonded nonwoven structures. Apart from these properties, the jute fibre is one of the cheapest natural fibre available commercially in countable amount. Jute includes good insulating and antistatic properties, as well as having low thermal conductivity and a moderate moisture regain. It includes acoustic insulating properties and are manufacture with no skin irritations. Jute has the ability to be blended both synthetic and natural fibers. (Sanjoy Debnath 2016)

Cotton is a key contributor in the woven, knitted and nonwoven based apparel and technical textile industry. It also has the potential to be used in the nonwoven industry as its natural structure and attributes attract the nonwoven industry. Cotton fiber is a cellulosic, plant-based natural and leading fiber among all available natural fibers. Cotton has many unique properties like softness, excellent absorbency, breathability, static-freedom, ease of blending, natural feel, and reasonable strength (Sawhney et al., 2008)

The molecular arrangement within the fiber and the conditions of fiber formation, impact the properties that make cotton fiber readily distinguished from all other textile fibers. (Aryan Rathore 2022)

In the needle-punched nonwoven fabric, the downward movement of the needle through the web pulling the entangled fiber with it has an interlocking action and changes the web structure. The structure holds together by the inter-friction of the entangled fibers. This action leads to a compressed web. After the removal of the needle, a trace of holes remains in the fabric. Its size depends on the fiber resilience and the web density as well as on the needle penetration depth, size, and shape (Magdi et al., 2023).

Acoustic insulation is an important requirement for the human life today, since noise affects the efficiency of day-to-day activities and even causes various health problems. Materials based on fibrous structures show very good acoustic insulation properties, which however strongly depends on the type of structures used. (Saravana Kumar et al., 2015)

(Thilavagathi et al., 2010) reported development of natural fiber nonwoven fabrics for acoustic absorption applications in car interiors. They studied sound insulation and other properties of needle punched nonwoven fabrics made from natural fibers (banana, bamboo and jute) blended with polypropylene. They found that a bamboo/polypropylene nonwoven provided the highest sound absorption coefficient for all levels of sound frequencies.

MATERIALS AND METHODS

Designing of needle-punched nonwoven from jute, cotton and its blend plays a very important role as far as the end product is concerned. Cotton and Jute fibres were procured from green fiber, Coimbatore, India. The collected jute fibers were cut 5-13 cm in length by customized and adjusted textile fiber cutting machine, The fibers were opened, straightened and fed into Dilo nonwoven needle punching machine. During the operation, the pre-needled web was prepared and the layers of the web were entangled by needle punching using barbed needles in the needle loom. The nomenclature of the produced nonwoven samples are given in Table 1.

Table 1: Nomenclature of the samples

S.No	Sample particulars	Sample code (Stitch density 300)	Sample code (Stitch density 400)
1	100% Cotton needle punched nonwoven fabric	CNF -A	CNF-B
2	100% Jute needle punched nonwoven fabric	JNF-A	JNF-B
3	30 :70 Cotton Jute needle punched nonwoven fabric	CJNF1-A	CJNF1-B
4	50 :50 Cotton Jute needle punched nonwoven fabric	CJNF2-A	CJNF2-B
5	70 :30 Cotton Jute needle punched nonwoven fabric	CJNF3-A	CJNF3-B

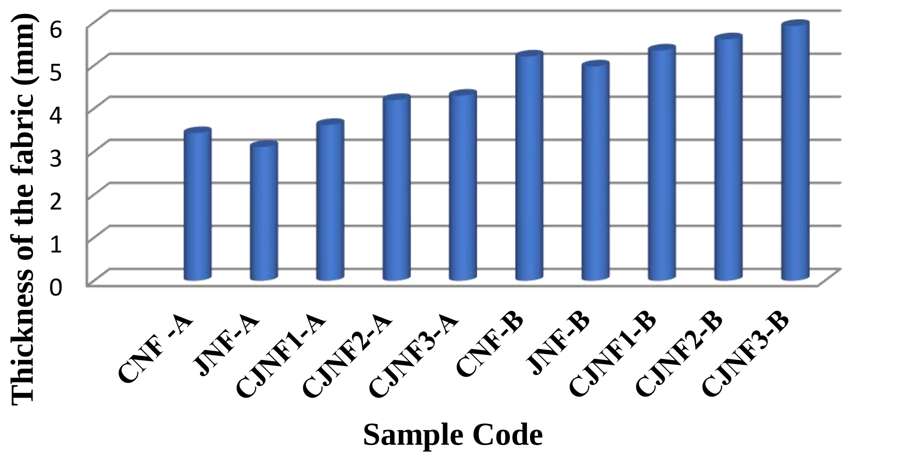
The needle punched nonwoven samples developed with stitch densities of 300 and 400 were evaluated with fabric thickness, air permeability, thermal conductivity and sound absorption tests.

RESULT AND DISCUSSION

Fabric Thickness

The fabric thickness was measured using thickness gauge as per the procedures of ASTM D1772-96 .

Figure 1: Thickness of the Nonwoven Fabrics



It is clear that from the above figure JCNF3-B have the highest fabric thickness when compared to other samples. The fabric thickness of the sample increases linearly with the increase of stitch density due to fiber blending at a short interval of space.

Air Permeability

Air permeability is measured by using the standard test methods such as ASTM D737.

Figure 2: Air Permeability of the Nonwoven Fabrics

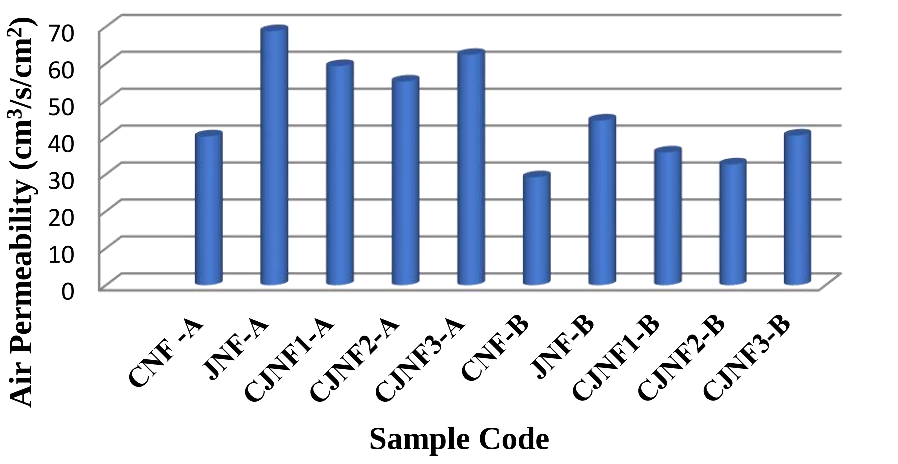


Figure2shows the influence of fiber fineness on the air permeability of needle-punched nonwoven fabrics. It is clear that the when the fiber fineness and stitch density is increased, the air permeability of the nonwoven fabric decreases. In this study, the JNF-A nonwoven fabric showed higher air permeability compared to other samples

Thermal Conductivity

ASTM C518 Lee's method is used to measure the thermal conductivity of nonwoven fabrics.

Figure 3: Thermal Conductivity of the Nonwoven Fabrics

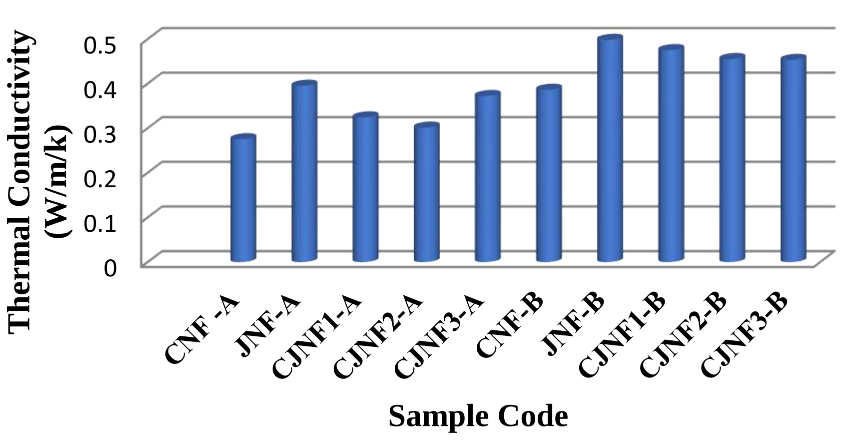
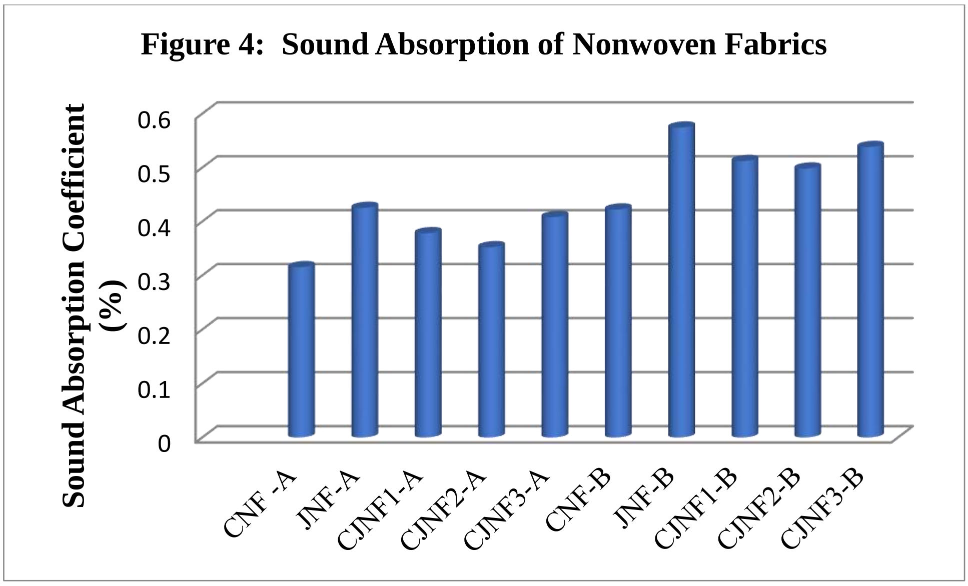


Figure3 depicts the thermal conductivity of nonwoven fabrics influenced by various blend proportions, stitch density and fabric thickness. The thermal conductivity values of nonwoven fabric increases in 400 stitch density because of short interval open space compared to other sample. Among the blend ratios JNF-B showed higher thermal conductivity values compared to other samples.

Sound Absorption Test:

The sound absorption of the nonwoven fabrics were tested by the impedance tube method - ISO 10534 - 2 – 1998



From the figure 4 it is clearly evident that increasing the stitch densities of fabric had a significant effect on improving the sound absorption capacity. JNF-B sample exhibited the highest sound absorption coefficient of 0.574

Conclusion

Noise control plays a major role in creating an acoustically pleasing environment that should be satisfied at homes as well as at workplaces as a contribution to an enhanced quality of life. The present results showed that all the developed nonwoven samples have better thermal insulation values and it is concluded that the developed samples may be used in room interiors as sound proof material. Moreover, nonwoven from jute-cotton based materials has added advantage of environment friendly disposal.

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A Comparative Study on Online and Offline Shoppingwith Special Reference to Coimbatore District

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Abstract

In today's world, technological advancements have broadened the purchasing options available to consumers. The way businesses and consumers communicate has changed as a result of the internet. Shopping is perhapsone of the oldest phrases for what we've all been doing throughout the years. Since the internet's conquest,online shopping has become a popular means of shopping. As technology advances, sellers will have more chances to reach out to customers in a faster, easier, and cost-effective manner. In recent years, online shopping hasexploded in popularity. The study aims to understand how consumers evaluate channels for purchasing. It advances a conceptual model that examines consumer perceptions of the value of online shopping vs traditionalshopping. The goal of this study is to give an idea of the online shopping decision-making process by comparingoffline and online decision-making and determining the elements that encourage customers to choose between online and offline buying. This research paper looked at the major differences in demographics, technology use, availability, and customerattitudes between online and offline consumer groups.

Keywords- Online shopping , Offline shopping, Consumer Buying Behaviour.

Introduction

Shopping is a part of everyone's daily routine. Some people get what they need from buying, while others get more. It's seen as a stress reliever, a way to fulfill a cognitive desire, or a way to spice up the mundane way of life. Shopping is perhaps one of the oldest phrases for what we've all been doing throughout the years. However, inancient times, terms like 'trade,' 'bartering,' and possibly even 'market' would have been used. Traditional shopping and online shopping are the two sorts of shopping in general. Online purchasing behaviour is also known as online buying behaviour or internet shopping. The term "buying behaviour" refers to the act of makinga purchase over the internet via a web browser. The same five processes apply to online shopping as they do to traditional shopping behaviour. When a customer needs a product or service, they typically go to the internet andbrowse or search for the items they require as well as their information. However, rather than actively looking, many potential customers are drawn to information about the product they want. They look at a variety of thingsonline and select the ideal one for them. Then consumers buy the product, and ultimately the transaction and after-sales service are provided by the internet sites. The consumer's mindset and behaviour when shopping online arelinked. Due to the widespread use of computers, an increasing number of individuals are 'going shopping' over the Internet. By typing just one phrase, thousands of objects will appear on the screen based on your selection. Top purchase a pair of beautiful shoes, there's no need to wade over a long road and elbow through throngs of people. Simply press a button on the keyboard, make your selection, and the things will be delivered on the spot.In the twenty-first century, online buying has become a more frequent way of life. Its success can be attributed to the fact that in today's environment, convenience is greatly appreciated. While on a flight or getting ready for bed,shopping online allows you to purchase anything and everything you require.

Many researchers have focused on the high-touch items that customers experience when they need to touch, smell, or test something. It necessitates offline shopping at the time of purchase because it is not possible to doitonline. Despite the rise in online shopping and the knowledge that it is more likely to put pressure on offline or conventional purchasing, online shopping continues to grow. In this topic or field, there is relatively little study.

What is Online Shopping?

Online shopping or e-shopping is a form of electronic commerce which allows consumers to directly buy goodsor services from a seller over the internet using a web browser. Alternative names are e-web-store, e-shop, e- store, internet shop, web-shop, web-store, online sort, virtual store etc. Simply put, it is any form of sale that is done over the internet. Shopping has certainly gotten a new definition since the arrival of the internet. Because of what the internet has to offer, that is, any person or company from any part of the world who is able to post and sell goods on the internet via a website is able to sell. What’s more, any consumer does not have to worry about having to find means to exchange monetary paper because not just online banking is made available; the consumer is given the option to pay through different payment methods. These days, it is even easier to find themost difficult of all products, by easily typing in the product or item that a customer is looking for. No worry about the location because logistic companies are also joining the bandwagon, so to speak, and helps in making sure that their products would be available to any and all destinations in the world. In fact, there are more and more advantages and benefits to online shopping and why people choose to do this type of shopping over traditional shopping.

What is Traditional Shopping?

Having the ability to physically choose and check out what an item or product is like, would look like, and its features are the benefits of traditional shopping. This is why some consumers still prefer the traditional type of shopping over online shopping because for one, it allows them to meticulously check out an item. E-shopping isthe place where buyers and sellers don not meet each other which result to lack of awareness about the product. Though the customer visit the online shopping site, does not show any interest for purchasing the product some of the reasons are lack of trust, lack of physical touch and feel, security issues etc.

Review of literature

Based on an analytical literature assessment, Li and Zhang (2002) assessed the representative extant research onconsumer internet buying attitudes and behaviour. This study aims to present a complete picture of the state of thissubfield while also highlighting limits and opportunities for further research. They opted to limit their research paper search to the months of January 1998 through February 2002. They searched three primary IS conference proceedings volumes: International Conference on Information Systems (ICIS), Americas Conference on Information Systems (AMCIS), and Hawaii International Conference on Systems Science. The other two criteriafor selection are that the articles are empirical in nature and that the articles measure at least one of the identifiedfactors in our taxonomy (HICSS). They also looked through the reference sections of the papers they chose to seeif there were any other noteworthy articles in this field that they might include. Three of the five dependent variables (customer attitudes, intentions, and purchasing behaviour) receive the most attention, as do three of thefive independent factors (personal traits, vendor/service/product attributes, and website quality). This appears tobe mainline of inquiry in this field. Personal qualities, vendor/service/product attributes, and website quality haveall been found to have a substantial impact on online shopping attitudes, intentions, and behaviour. These findingshave the direct implication that targeting more appropriate consumer groups, improving product and/or service quality, and improving website quality can positively influence consumer attitudes and behaviour, potentially leading to increased early purchase and replication purchases on consumers.

Chaing and Dholakia (2014) conducted a study to determine why customers purchase things online during their shopping trips. In their study, the consumer's decision to buy online or offline is influenced by three variables. These are the shopping sites' accessible features, the types of products and their characteristics, and theproduct's actual pricing. The study found that the customer's intention to buy or not buy is influenced by the accessibility and ease of shopping sites. When a customer has trouble making a purchase online, they switch to offline shopping for their purchase behaviour. When a customer has difficulty making a purchase offline, they switch to online purchasing. After comparing the two modes of buying, the consumer stated that online shoppingis more convenient for them and provides greater satisfaction, prompting the consumer to make an online purchase.

When a consumer finds it difficult to make a purchase online, they switch to offline shopping. When a consumerfinds it difficult to make a purchase offline, they turn to online shopping. Iyer and Eastmen (2014) discovered that the population of senior citizens who are more literate, knowledgeable, and aware of technology, as well asthose who have a positive attitude toward online shopping and the internet, are more into online shopping. However, seniors who are less familiar with the internet and shopping sites are less likely to use them because theyhave a negative attitude toward online shopping and are much more interested in offline shopping, while seniorswho are more familiar with the internet and shopping sites are more likely to use them. Seniors who are more knowledgeable about the internet and shopping sites compare both online and offline shopping for their purchases.

However, their understanding of the internet and how they utilize it has little to do with their age or level of enjoyment when shopping online.

Danaher et al. (2003) looked at the loyalty of 100 brands across online and offline shopping for 19 grocery products. They compared the grocery items of both shopping with the starting model, which is a new segmentation of the Dirichlet model with extremely prominent features that deliver the exact classes for brand preference as well as a real model for purchasing behaviour. The study's findings revealed that the reality of high-end companies with large market shares bought significantly more online shopping than expected. In the case ofthe tiny share brand, however, the situation is simply reversed. However, in traditional shopping, expectations and observations are unrelated to the purchase.

Tabatabaei (2009) investigated the perspectives of consumers who shop online and those who shop in person. The goal is to figure out why conventional customers choose to shop online and what factors affect their decisionto do so, as well as what factors prevent them from doing so. He conducted a survey of 264 respond entsat a localmall and then analyzed the results. This study's participants are all literate and computer and internet savvy. Someof the questions in the survey include demographic information, computer knowledge, and internet knowledge. Consumers of online shopping shop more than once a month, while consumers of offline shopping shop one to five times a year from shopping sites, according to the findings of the study.

During the information acquisition period, Chaing and Roy (2003) focused on the consumer's decision to shop onthe internet or in physical stores. Based on the popularity of internet shopping, 56 goods were designed using a convenience sample of 34 students enrolled in an undergraduate marketing class. The findings suggest that consumers consider buying offline to be inconvenient and that online purchase intention is higher for search products than for experience products.

In the United Kingdom, Soopramanien and Robertson (2007) conducted a study on internet purchasing acceptance and practice. Their research reveals that internet consumers make various decisions based on their perceived views. They discovered how sociodemographic characteristics, attitudes, and ideas about online buyinginfluence both the decision to practice and the use of online purchasing channels. They divided online buying behaviour into three categories: those who buy from online sites, those who merely visit online sites and buy in stores, and those who do not shop online at all. Buyers who choose products in stores and purchas ethem online were not included in the study.

According to Jin and Kato (2004), 88 percent of online graded cards are graded 8 or higher, based on an eBay market watch. According to the Beckett price guide, a card grade 8 is frequently worth twice as much as a card grade 7. This refers to the results of the experiment as a whole. In both the retail and online markets, it was obvious that most graded cards sold online are of substantially higher quality than ungraded cards.

Selvakumar (2014) focused on the consumer's impression of online-sold products and the concerns that are essential to online shoppers. This research was carried out among online buyers in the Tamil Nadu city of Coimbatore. Its purpose is to investigate the impact of consumer perceptions and attitudes. A questionnaire wascreated to collect data from the general public; these questionnaires were sent to college students. A total of 150 people took part in the survey. The findings of this study reveal that customer intention to shop online is influenced by improvement and accessibility

Lee and Lin (2005) looked at the relationship between internet service and the customer's total service quality, such as contentment and purchase intentions. The information was gathered from 297 customers who made purchases online. The reliability and validity of the model that assesses the factors were examined by examiningthe positive and negative factors. The structural equation modeling technique is used to validate theresearch model. The findings reveal that the web's design, reliability, timeliness, and trust have an impact on overall service quality and buyer happiness. All of this is linked to consumer purchasing behaviour and purpose. The e-service quality of the sites and user satisfaction is strongly linked to the shopping component. The study suggeststo enhance the purchase intention of the consumer, the stores of online shopping should make some strategies and give trust to the consumer about the products. The online sites should provide web-based services with dependability and dependability.

Jayawardhena and Wright (2009) looked at the antecedents of online shopper excitement, as well as the ramifications for behavioural intents such as intent to return and positive word of mouth communication. The literature was used to establish a conceptual model, and instrument item scales to measure all constructs in the model were based on the literature and adapted from previous studies. They discovered that convenience, involvement, website characteristic, and merchandising all have an impact on a customer's excitement. Positive word-of-mouth (WOM) from e-shoppers leads to increased intent to return. The study's shortcoming was that no distinction was made between the types of goods acquired through e-commerce.

Advantages of Online Shopping

1. Convenience of online shopping: Customers can purchase items from the comfort of their own homes or workplace. It is also easy to cancel the transactions.
2. No pressure shopping: Generally, in physical stores, the sales representatives try to influence the buyers to buy the product. There can be some kind of pressure, whereas the customers are not pressurized in any way in online stores.
3. Online shopping saves time: Customers do not have to stand in queues in cash counters to pay for the productsthat have been purchased by them. They can shop from their home or work place and do not have to spend time travelling. The customers can also look for the products that are required by them byenteringthe key words or using search engines.
4. Comparisons: Companies display the whole range of products offered by them to attract customers with different tastes and needs. This enables the buyers to choose from a variety of models after comparing the finish,features and price of the products on display, sometimes, price comparisons are also available online.
5. Availability of online shop: The mall is open on all time. So, time does not act as a barrier, wherever the vendorand buyers are.
6. Online shopping saves time: To attract customers to shop online, e- tailor’s and marketers offer discounts to the customers. Due to elimination of maintenance, real-estate cost, the retailers are able to sell the products

withattractive discounts to online. Sometimes, large online shopping sites offer store comparison.

Factors affecting Online Shopping

1. Delay in delivery: Long duration and lack of proper inventory management results in delays in shipment. Though the duration of selecting, buying and paying for an online product may not take more than 50 minutes, the delivery of the product to customers doorstep takes about 1-3 weeks. This frustrates the customers and prevents them from shopping online.
2. Lack of significant discounts in online shops: Physical stores offer discounts to customers and attract them sothis makes it difficult for e-tailors to compete with the offline platforms.
3. Lack of touch and feel of merchandise in online shopping: Lack of touch-feel-try creates concerns over the quality of the product on offer. Online shopping is not quite suitable for clothes as the customers cannot try themon.
4. Lack of interactivity in online shopping: Physical stores allow price negotiations between buyers and the seller. The showroom sales attendants the representatives provide personal attention to customer sand help them in purchasing goods. Certain online shopping mart offers service to talk to a sales representative.
5. Lack of shopping experience: The traditional shopping exercise provides lot of fun in the form of show-roomatmosphere, smart sales attendants, scent and sounds that cannot be experienced through a website. Indian generally enjoy shopping. Consumers look forward to it as an opportunity to go out and shop.
6. Lack of close examination in online shopping: A customer has to buy a product without seeing actually hoeit looks like. Customers may click and buy some product that is not really required by them. The electronicimages of a product are sometimes misleading. The colour, appearance in real may not match with the electronicimage. People like to visit physical stores and prefer to have close examination of good, though it consumes time.The electronic images vary from physical appearance when people buy goods based on electronic image.

Advantage of Offline Shopping

You have not to wait for the services or products which you buy. Since you buy it directly from a seller, you findyour services or products in your reach instantly. No need to wait for arrival of your bought services and things.

Since you find the products in your hands instantly in offline shopping, you can check the quality instantly and give your feedback at the time of buying. You can access after sale service part better and quicker as you can contact the seller whenever you feel a need of that. Talk to face to face and show your cause to contact them likethe faulty parts of your bought products etc. so you get quicker reaction from seller directly either it's a matter ofreturning the product or an exchanging the same.

Factors Affecting Offline Shopping

You find less variety or options for the products or services, you're buying offline. Since there are limitations ofavailability of offline shops and each shop has a limitation of space so you have not such huge choice to chooseas you find in an online shopping. You can access an endless shopping website and find huge options for a singleitem you want to buy. Since you have physical limitations to go shop to shop at once, you may end with empty hands after a shopping session if you do not find the product of your choice. And for the same product, you needto go outside frequently and make a lot of effort to find the products of your choice. It is a tiring process to find a product of your own choice. As far as money concerned, the price of same product may be costlier in an offlineshopping and even you find a discount and others similar offer, the price in online shopping will be lower one in an online shopping. Also you find fewer freebies as compared to an online shopping. In a brief, if you are moreconcerned about the money, you should go for online shopping mode and for those who are more concerned forthe service after sale or similar services; you should opt for offline shopping.

Difference Between Online and Offline Shopping

There are some differences between online and offline shopping:

1. Online shopping as the name suggest is done over internet and therefore you do not have stand in line or go anywhere from your home to purchase the stuff you like whereas in offline shopping if you want to buy you haveto go nearby mall or shop and then purchase the item you like from there.
2. In online shopping one can look many products and that too multiple times without buying them and thereforeit offers lot of flexibility whereas in case of offline shopping one does not have too much of choices as one has to buy the product which is available at shop and if that product is not available then either you buy the product which is your second choice or wait for that product to come and then buy.
3. In online shopping if one is buying products like shoes or clothes then one cannot try the product before placing the order and therefore the chances of actual product being different from perceived product is high whereas in case of offline shopping there is no such risk because consumer try it first and then buy and thereforethere is no scope of difference between actual and perceived product.
4. Online shopping is transparent in the since that one can compare the price of product over different websitesto ensure that he or she buys the product at cheapest price, however in case of offline shopping one does not havethis luxury because the buyer has to purchase the product at a price which is quoted by seller as

there is no way of finding whether the price quoted by seller is fair or not.

5. In case of online shopping thousands of different products are available at one place or website where as in case of offline shopping this is not possible and hence if you want to buy mobile and trousers then you have to go to different shops as these products are different and hence it leads to time wastage. Hence one can say that when it comes to time saving online shopping definitely scores over offline shopping.

Objectives of Study

The present study broadly compares the online and offline shopping, specifically the objectives are:

1. To analyses the significant difference between the online and offline consumer groups in terms of demographic, technology use, availability and attitude of the consumer.
2. To examine the factors influencing the consumer to switch from the offline shopping to online shopping andonline to offline shopping.
3. The factor influencing the consumer to shop solely online and solely offline.
4. To analyses whether the qualification of the consumer affect the online shopping and offline purchasing.

Research Methodology

It enumerates the description of the sampling plan, research instruments used for the collection of data pre- testing of questionnaire, the use of statistical tools and techniques for the analysis of the collected data.

Scope:

Scope was limited to the geographical boundary of the Coimbatore District, Tamil Nadu.

Need of Study:

It is very difficult task to know the consumer behavior about online shopping and offline shopping. So, I conducta survey to compare online and offline shopping modes..

Research Design

It is an arrangement of plan, which guides the collection of data and analysis of data. The purpose of research design is to ensure that the data collected is accurate and relevant. Any research work requires clarity of objectiveto be achieved effectively research. The descriptive design used for this survey.

Selection of Population

The study has been conducted in the Coimbatore area. The population for this research is student, job consumersand home consumers.

Research Instruments

For the purpose of research, questionnaire was used to interview the respondents. The questionnaire was developed so as to obtain responses relevant to objects of the research. While designing the questionnaires every attempt was made to make it precise so that the purpose of filling up the responses does not consume time.To find the general attitude, perception, beliefs and intention of people towards their perception, a questionnairewas developed. The questionnaire, which was administrated to the respondents for the purpose of collection primary data, was a structured one.

Data Collection Method

Primary Data: Questionnaire development is the critical part of primary data collection method. For this I will prepare a questionnaire in such a way that it will be able to collect all relevant information regarding the project.Secondary Data: It will be collected to add the value to the primary data. This may be used to collect necessary data and records by different websites, magazines, annual reports, journals, reference books, and newspapers etc.

Limitations of the survey

Due to resources and time constraints the study was limited to the only Coimbatore area. Since the sample size was 100. So finding and concluding of the study are only suggestive not conclusive in spite of the best and honest efforts. Lack of customer support, while asking the consumer they were behaving rudely and not responding to the questions. Basically based on primary data, hence we cannot argue that the research is applicable in each condition, time and place.

Data Analysis and Interpretation Respondents' Demographic Profile

The demographic profile has a significant impact on the factors that influence online and offline shopping. Thedemographic profile of online and offline shoppers is depicted in the following charts.

1. **Sex ratio of the respondents, Source- Primary data**

For the study, a total of 100 people were considered. The graph depicts the percentage of male and female shoppers who shop both online and offline. It is revealed that 41% of males go shopping, whereas 59% of femalesgo shopping. This suggests that the female members are more likely to participate in the shopping. This gives a basic notion of who is more involved in shopping in terms of sex ratio

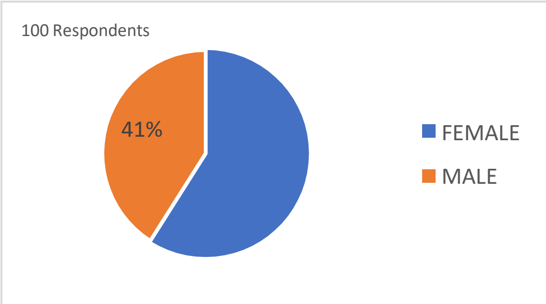


Figure-1 **Sex ratio of the respondents, Source- Primary data**

2. Age of the respondents, Source- Primary data

The graphical representation below depicts the age group of people who prefer to shop online. The majority of customers who use online shopping to meet their needs are in the 18 to 25 age group, accounting for 69 percent ofall customers. The age group of 27-40 years old is the second most frequent user of online shopping services, accounting for 17% of all users. The remaining 14 percent of consumers are in the age bracket of 40 and up. Because the majority of those aged 40 and up lack adequate knowledge of the technology in use, the population percentage is considerably low.

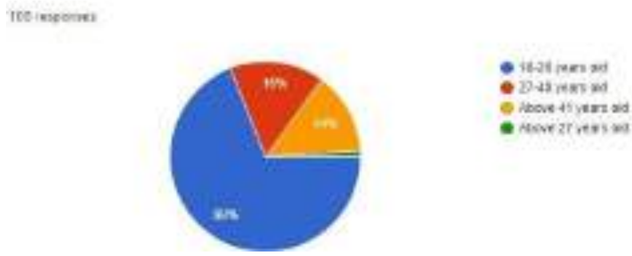


Figure:2- **Age of the respondents**

3. Qualification respondents, Source- Primary data

The below visual representation depicts the respondent's qualifications, with graduate people accounting for approximately 52 percent of the total. Then there are the others, who account for roughly 44% of the total and include Ph.D., Master's, and other degrees. The remaining is divided into two groups: intermediate and primary.Unless and until a person is qualified to access the internet, qualification is a crucial aspect of online commerce.They are unable to shop online.

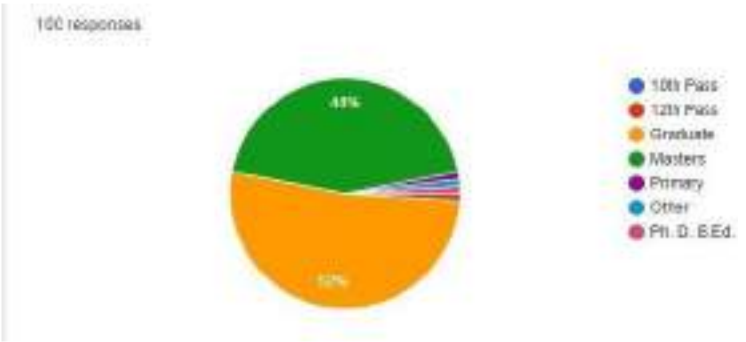


Figure:3- Qualification respondents

4. Do you trust on Online Shopping?

From the below graph , it is clear that out of 100 respondents, 82% of respondents trust online shopping and 18%of respondents trust traditional shopping more than online shopping.

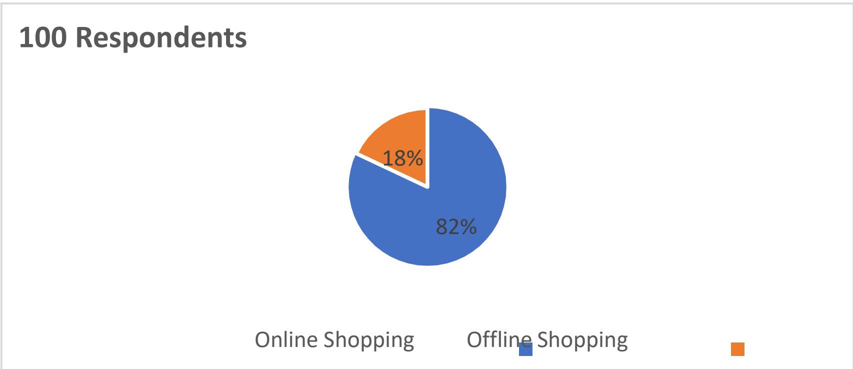


Figure:4-Respondents Trust on Online shopping

5. Which option do you prefer to choose? Preference between online and offline shopping

From the below graph, it is clear that out of 100 respondents, 63% of respondents want to go online shopping asthey find it more convenient and easier for them but 37% of customers want to go through offline shopping because they are more comfortable in the traditional market.

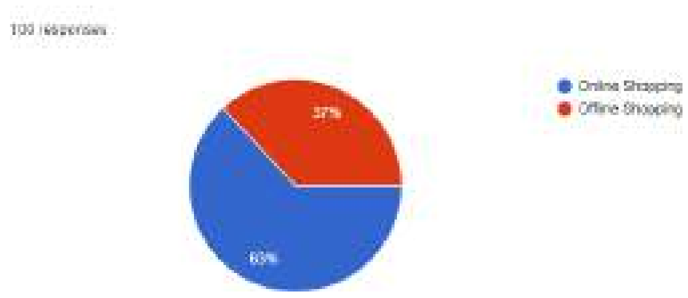


Figure:5- Preference between online and offline shopping

6. If you prefer Online Shopping on which Website did you shop ?

The graphs below illustrate which websites and stores are preferred for online and offline shopping.

Amazon is the most popular website for online shopping since its marketing is done well and its brand quality ofitems and services is superior to that of other sites. As a result, it is still able to maintain its market share. Following that is the myntra website, which is preferred by approximately 79 percent of customers. This is due to the site's recent increased marketing strategy and promise of providing superior service and quality. The next site, Flipkart, covers 69 percent of the population; it is an online shopping behemoth outside the country that is still working hard to sell its brand in the country, and it promises a significant market potential in the near future.Ajio are the next most popular online sites, with 43 percent and 12 percent of users, respectively. It has risen to prominence in the world of online buying as a result of its enticing offers and benefits. Other shopping site Shop clues have the lowest percentages at 7%.

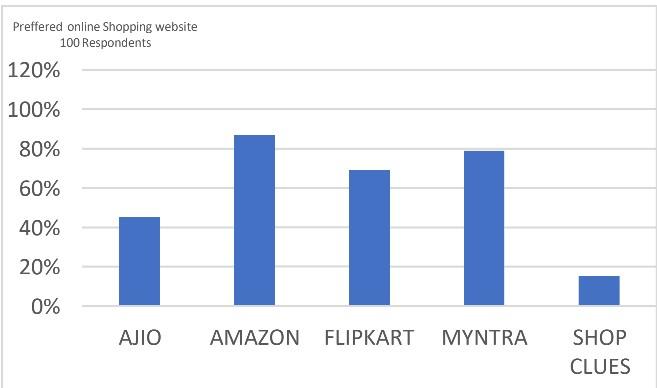


Figure:6- Preference on website for Online shopping .

7. If you prefer Offline Shopping on which Places?

It is clear from the images given below that most people prefer shopping from malls as the modern trend suggestbecause of its attractive location as well as all premium centers are opened in one go at one place. So

better to goand buy from a bunch of variety kept in front of you. It accounts for almost 84%. Next comes stores accountingfor 65% as it becomes next most valuable place for housewives and all other age groups to go and bring groceriesor any house items needed. Even though trust on items provided for street vendors might be less it still accountsfor 33% as the upper generation of 30+ has had a habit of traditional shopping from there as well. Rest all also occupy good space and percentage meaning people do still prefer buying offline depending on items and situationpresented.

Figure:7 Preference for Offline Shopping on which Places?

8. Purchase frequency from both online and offline shopping8.1Frequency of buying online

The frequency of online and offline purchases is one of the most important elements impacting online and offline shopping. The frequency of purchases from online and offline shopping is shown in the chart below.

According to a recent study, the majority of the public has switched to internet shopping due to increased societalneeds and time constraints. It is estimated that roughly 23% of the general population buys the product every quarter at the same time. Because of the availability of income and technology to do purchasing, 32% of the population does internet shopping every month. Furthermore, 33 percent of the population shops online at least once a week. And 5% every six months.

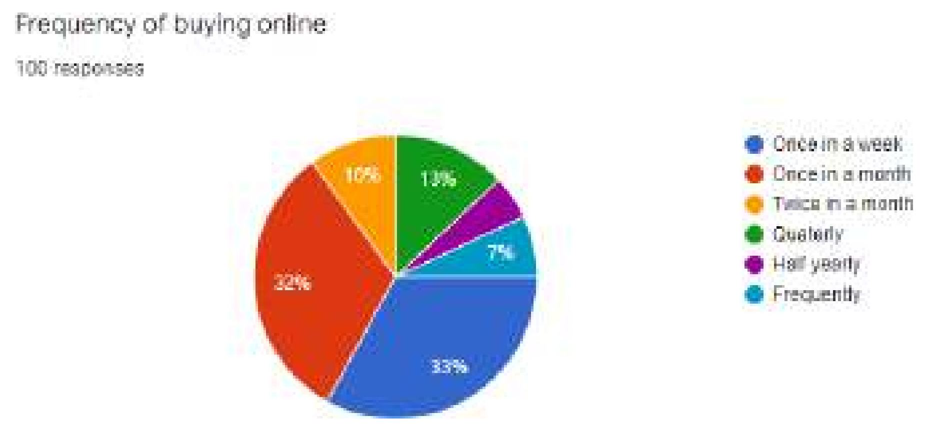


Figure:8.1.Purchase Frequency of buying online

8.2Frequency of buying offline

The same when it happens offline can be said that most people prefer buying once in month accounting for highestpercentage of 33% as they stock up goods and stay away from bothering themselves going out every next week.While the next highest turns out to be 23% of buying goods every week it can be also said that mostly housewivesstill might prefer buying frequently turning out to be the next best at 21%. The rest 10% account for people whoeven prefer buying once in two months or even quarterly. It’s rare but 3% do prefer buying offline every six months.

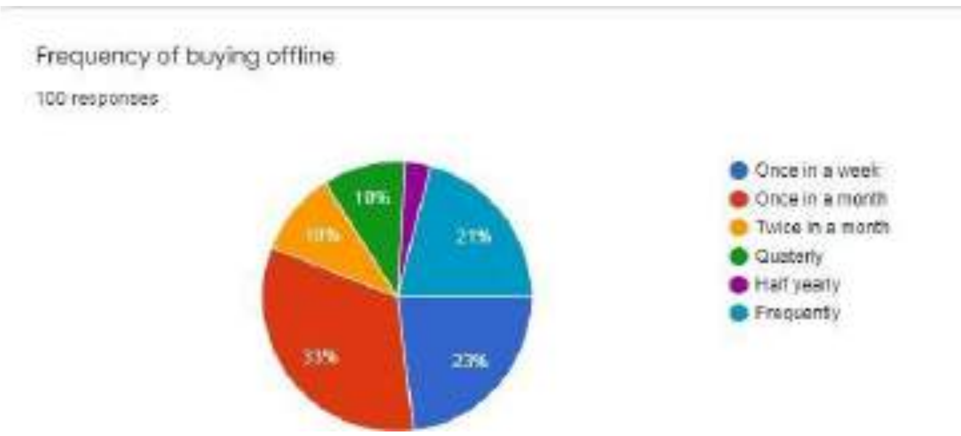
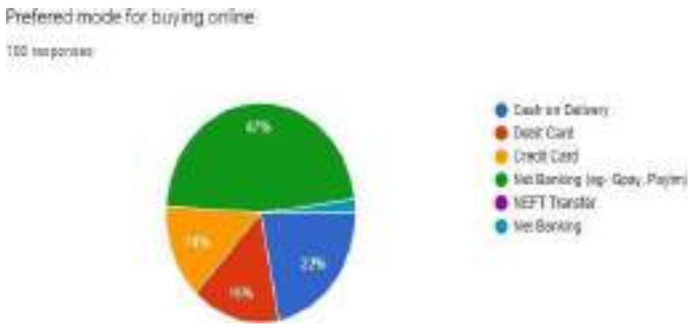


Figure:8.2.Purchase Frequency of buying offline9.Payment method preference for online and offline buying

The payment procedure preference for online and offline purchasing is one of the most critical elements influencing online and offline shopping.

The preference of the payment process for online and offline buying is shown in the chart below. It is evident from the chart that net banking is the preferred payment method for both online and offline shopping, with cashon delivery coming in second, debit card third, and NEFT transfer payment fourth. Cash on delivery took first place among offline shoppers, followed by net banking in second place, and credit t cards in third place.



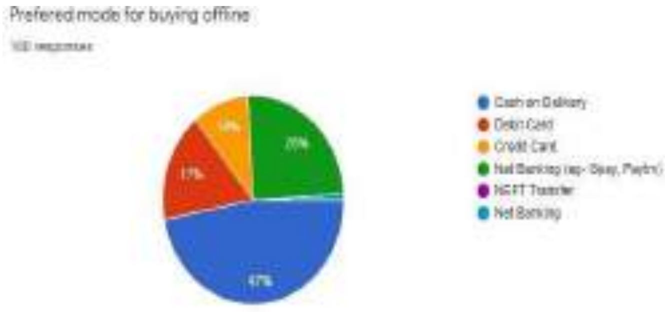


Figure:9.1.Preferred mode for buying online **Figure:9.2Preferred mode for buying offline**

10. Preference of the product with same price are both available in shop and on internet .Where do you buy from now?

According to this study, if a product's pricing is the same in a store and on the internet, roughly 58 percent of thepublic chooses to acquire the product online because it saves time and money on transportation. However, just 42% prefer shopping, which could be attributed to a lack of technological tools to make the transaction. Furthermore, it provides the client the impression of inspecting the object before purchasing it.

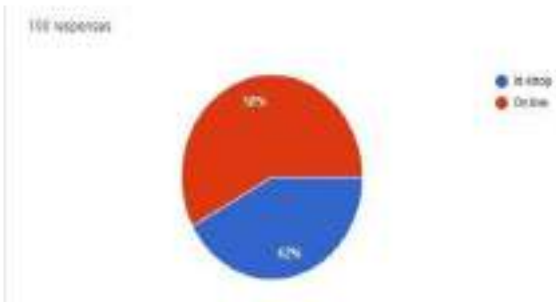
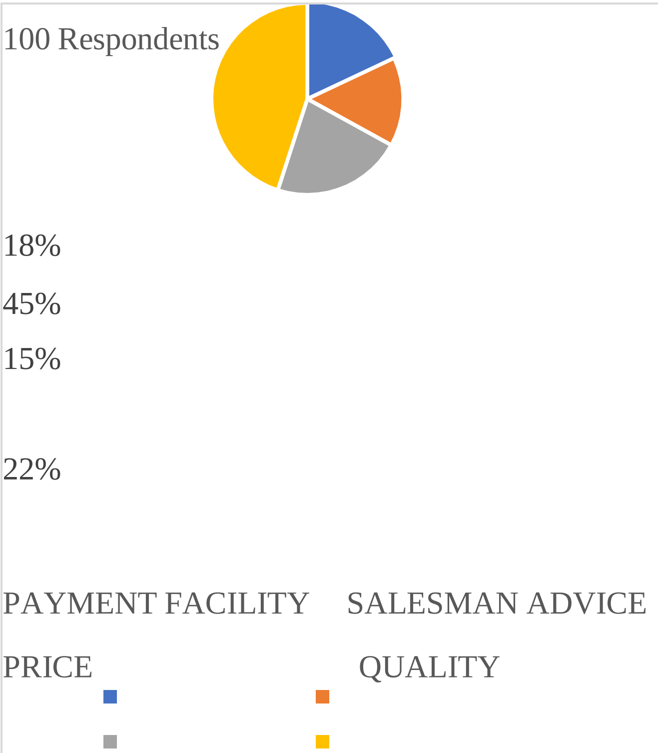


Figure:10 -Same price for both online and offline store

11. What are the most important criterion when you buy in Offline Shopping and online shopping ?

It is clear that given graph below that most important criterion in Offline Shopping peoples says that 18% of Payment facility are secure , 45% of quality satisfied , 15% of Salesman advice are clear ad matured, 22% probably price can be related. When its comes to Online shopping people says 23%of quality , 20% Payment Security, 42% for delivery facility, 15% probably price can be related.



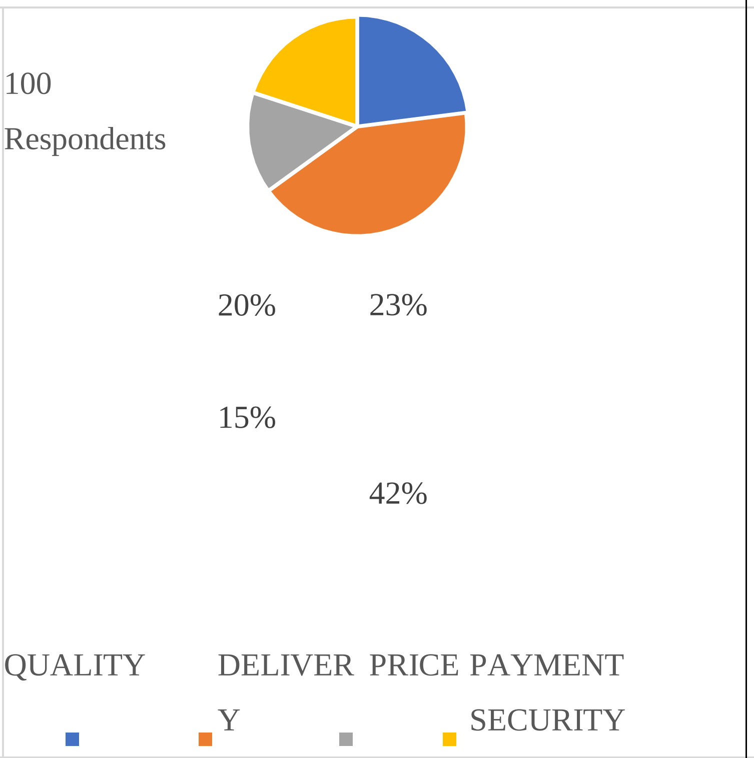


Figure11.1 Important criterion in Online Shopping **Figure11.2 Important criterion in Offline Shopping**

FINDINGS OF THE STUDY

Consumers between the ages of 18 and 27 are more comfortable with online buying than the rest of the population,according to the findings and analyses. The group under the age of 40 and above is unaware of the numerous shopping sites available, and because they are not technologically advanced enough to do online shopping, theyare concerned about whether the product they are ordering will be genuine or not, so they prefer traditional marketsover online shopping. As a result of the findings, it is apparent that the youth prefer to shop online.

SUGGESTION OF THE STUDY

Males are less likely than females to shop online, according to the survey. Females like internet shopping becausethey enjoy shopping in general, whether it is traditional or online. Because of the technological revolution amongthe younger population, they are more likely to purchase from online sites, and they are better equipped to usetechnology for their well-being than any other age group category. Amazon is the purchasing site that the youngergeneration prefers. The popularity of online shopping is growing due to the wide range of options available toconsumers, all at a fair price, often even less than the market. There are various things that are not delivered byshopping sites in the preferred location; however, it is clear that as technology advances, the preference for onlineshopping will grow. People used to shop more traditionally in the past. People who are not aware of the variousshopping sites and who are not technologically advanced are now less interested in purchasing on the internet.

CONCLUSION

The findings of this study on the factors that influence offline and online shoppers are mixed. A user-friendly website or electronic retail business encourages more behaviour. Easy-to-use online retail businesses may enablecustomers to receive necessary information about their purchases, lowering the risk associated with new purchasingmediums. As a result, customers will have a more favourable attitude and will be more likely to recommend andrepurchase from the same online company. As a result, perceived simplicity of use might be critical when buildingonline buying platforms. The study's most crucial and surprising finding is that perceived utility has no bearing oninternet purchase intentions. It is obvious that the sample members' behavioural intentions toward online buyingwere not motivated by its utility, but rather by other factors. This conclusion is very relevant for internet companies since it necessitates their efforts to communicate and educate clients about the advantages of online purchasing if they wish to grow traffic to their websites. Because it is based on specific region reactions, this paper's weakness may limit its capacity to generalize findings. A comparative study is being conducted to determine the differences in people's perceptions of internet shopping in various geographical areas. Because online websites provide more convenience to customers, offline shoppers are decreasing. Additionally, because of technological advancements, more than 95 percent of people in India own a mobile phone, making it simple forthem to evaluate online websites from the comfort of their own homes.

The overall results prove that the respondents have perceived online shopping in a positive manner. This clearly justifies the project growth of online shopping in the country. However, the frequency of online shopping is relatively less in the country. Online shopping organizations can use the relevant variables and factors, identified from the study, to formulate their strategies and plans in the country. The organizations canprioritize the consumer implicit and explicit requirements in online shopping environment. The results can also be used by various organizations to identify their target customer segments. The results of the study canbe utilized by practitioners in relooking or revamping their strategies for online shopping. Online websites should pay more attention to the female segments as results prove that females shop more in online shoppingas compared to men.

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DEVELOPMENT AND SENSORY EVALUATION OF RAGI WHEAT COMPOSITE CAKE

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ABSTRACT:

In India, ragi (Eleusine coracana) is the most common and important finger millet. Because of its high calcium content (380 mg), dietary fiber content (18 g), and phenolic compounds content (0.03–3 g) per 100 g, ragi is nutritionally superior to wheat and rice.The experiment was carried out to improve the procedure for creating more palatable ragi-wheat composite cakes. Children and women, especially during pregnancy and lactation, need a lot of calcium. The level of Rag flour and refined Wheat flour was optimized using an orthogonal array design. During the experimentation, four different grades of refined Wheat flour and Ragi flour were experimented.A standard set of techniques was used for the product’s chemical analysis.

Keywords: Sensory; Wheat-Ragi; cake; orthogonal array design

INTRODUCTION:

Ragi (Eleusine coracana), a plant belonging to the Gramineae family, is the name given to finger millet. People from the arid and semi-arid regions favor finger millet above other cereal crops as a main source of nutrition. However, millets satiate the desire of countless people, particularly those who reside in hot, humid climates.1 Millets are a staple crop in many underdeveloped nations where agricultural productivity is negatively impacted by unfavorable climatic conditions like insufficient rainfall. Ragi’s grain resembles reddish mustered. It is typicallycollectedbetween December and January. Only ragi makes up 25% of the whole duction of cereal grains. India and South Africa are two of the biggest ragi-producing nations in the world. While Tamil Nadu (1630 MT), Maharashtra (161 MT), and Karnataka (161 MT) (1630 MT), Tamil Nadu and Maharashtra (161 MT) are leading state of Ragi.2

Low-income communities in a southern region of India consume ragi balls and unleavened bread/roti as part of their daily diet.2 Because of its high levels of calcium and iron and dietary fiber, finger millet is now more important than ever. Additionally, because of its high calcium content (380 mg), dietary fiber content (18 g), and phenolic compounds content (0.03–3 g) per 100 g, it is nutritionally superior to wheat and rice.

The polyphenol and dietary fiber content of ragi is credited with providing health advantages. It has anti-diabetic, anti-tumorigenic, anti-atheroclerogenic, antioxidant, and other positive health benefits.3 Because ragi takes a long time to digest, giving the carbohydrate more time to be absorbed, it is the perfect food for diabetics and obese people.4,5 There are three variables that are detrimental to nutrition in the Paraphrase without limits.

Namely, tannin, phytic acid, and trypsin inhibitor. As a result, ragi malt and fermented ragi drink are well-known traditional foods.6 Finger millet's digestibility, sensory quality, and nutritional value are all improved by the malting process, which also reduces its anti-nutritional elements. In addition to unleavened bread and ragi balls, other popular items in the market include ragi idly, pasta, ragi malt, ragi dosa, etc.

Improved nutritional security is achieved through processing and value addition of finger millet.6 The cake is a product made by baking a batter that contains flour, sugar, shortening, egg, milk, or other liquids as well as leavening and flavoring ingredients.2 The cake is a significant and delectable food that is consumed worldwide for various occasions. Due to a shift in attitude, a change in lifestyle, urbanization, a busy lifestyle, greater employment of women, and higher per capita income, the globalization environment has raised demand for cakes. Malting has a number of advantages, including the development of vitamin C, enhanced phosphorus bioavailability, and the synthesis of lysine and tryptophan.6 Consequently, an effort was made to substitute Ragi flour for Wheat flour when making cake.

OBJECTIVES:

- Nutrient Fusion: Combine ragi and wheat to create a nutrient-rich cake.
- Healthy Indulgence: Offer a guilt-free and tasty dessert or snack option
- Gluten-Friendly: Provide an alternative for those with gluten sensitivities.
- Balanced Flavor: Achieve a delicious balance of flavors and textures.
- Nutritional Diversity: Benefit from the nutritional advantages of both grains in a single treat.

METHODOLOGY:

The methodology pertaining to the study **``Analysis of nutritive value of ragi cake from finger millet and wheat flour"** are as follows:

SELECTION OF RAW MATERIAL:

Selected millets, especially finger millets, were sourced from local markets in Erode, Tamil Nadu, India. The millet is properly cleaned and stored in airtight containers until it is used in various processing methods. The remaining raw materials such as wheat flour, sugar, oil, baking powder and salt were purchased and prepared from the local market.

INGREDIENTS:

Ingredients	Quantity
Ragi flour	125g
Wheat flour	125g
Sugar	90g
Oil	54g
Baking powder	1tsp
Salt	a pinch

PREHEAT:

Preheat your oven to 180°C (350°F). Grease and flour a cake pan.

MIX DRY INGREDIENTS:

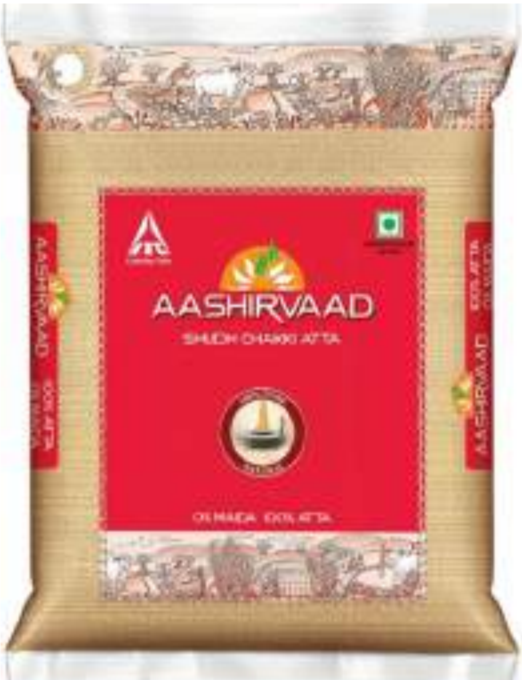
In a mixing bowl, combine 1 cup ragi flour, 1 cup wheat flour, 1 cup sugar, 1 teaspoon baking powder, and a pinch of salt. Mix them well to ensure even distribution.

INGREDIENTS:

Gradually add 1/2 cup of oil or melted ghee to the dry mixture. Mix it in until the mixture.

ADD WATER:

Slowly add water while stirring the mixture. Continue to add water until you achieve a smooth batter consistency. The batter should be thick but pourable.



POUR BATTER:

Pour the batter into the prepared cake pan. Smooth the top with a spatula to ensure even distribution.

BAKE:

Place the cake pan in the preheated oven and bake for approximately 30-35 minutes, or until a toothpick inserted into the center comes out clean.

COOL:

Allow the cake to cool in the pan for about 10 minutes. Then, remove it from the pan and place it on

a wire rack to cool completely.

SLICE AND SERVE:

Once the cake has cooled completely, slice it into pieces and serve.

FLOW CHART:

Selection of raw materials

⇓

Ragi millet flour, wheat flour

⇓

Mixing dry ingredients

⇓

Ingredients

⇓

Add water

⇓

Pour batter

⇓

Bake

⇓

Cool

⇓

Slice and serve

NUTRITIVE ANALYSIS OF RAGI WHEAT CAKE:

Here the nutritive analysis of ragi wheat cake was calculated using the standards values given by NIN(National Institute of Nutrition)

RESULT AND DISCUSSION:

NUTRITIVE ANALYSIS FOR RAGI WHEAT CAKE:

INGREDIENTS	QUANTITY	ENERGY	PROTEIN	CHO	FAT	FIBER
Ragi flour	35g	225kcal	6.5g	40g	1.72g	1.35g
Wheat flour	50g	176kcal	13.2g	30.05g	1.75g	5.35g

CONCLUSION:

Incorporating Ragi flour to replace Wheat improves the nutritional quality and palatability of the cake compared to the control sample, according to a study on the development and sensory evaluation of a Wheat-Ragi Composite cake. Based on the study's findings, the sensory panel approved a 20% level of Ragi flour inclusion in Wheat flour for cake production. The created Wheat-Ragi composite cake will benefit growing children, teenagers, expectant mothers, nursing mothers, and anemic patients. More research will therefore be needed on the nutritional makeup of this food, particularly with regard to some crucial micronutrients as calcium, iron, vitamins B1, B2, B6, B9, and B12.

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SPAGHETTI FROM UNGERMINATED AND GERMINATED VACONITIFOLIA

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ABSTRACT

It was decided to initiate the research work as comparative study as both ungerminated V.aconitifolia and germinated V.aconitifolia Legume. Legume powder was used to formulate and develop Spaghetti. It was standardized with multiple trails. Sensory analysis was done to screen the most acceptable product among the developed recipes. The selected recipe was analyzed to determine the proximate analysis.The best selected variety was taken to work with food costing, storage study. There was an increased acceptability of the ungerminated V.aconitifolia Incorporated Spaghetti and it might be used for consumption more than the period of 60 days.

Key words: Ungerminated V.aconitifolia and germinated V.aconitifolia Legume powder - Product development - Sensory analysis - food costing, storage study.

MATERIALS AND METHODS

Processing of Vigna aconitifolia into powder

In Tamilnadu, there were two genotypes of V.aconitifolia (mothbean) which includes TN 12 (wild type) and TN 27 (cultivation) was cultivated (Tomooka et al., 2008 and 2009). Based on the cultivation and availability throughout the year; the investigator selected TN 27 for the research purpose. The selected variety was procured from the farmers from the district of namakkal. The ungerminated V.aconitifolia was sun dried and made into flour. Sameway with the ungerminated V.aconitifolia was sun dried and made into flour.

Formulation

Both ungerminated and germinated V.aconitifolia flour was utilized for the development of Spaghetti. For the preparation process, both the flours were incorporated with various percentages Instead of adding cereals. Totally 5 Variations in each product was developed with the percentage difference of 5% (From 10% to 50%).

Development

Mixing

Mixed flour was moistened in the initial step of the procedure by adding 25–30% water. In the mixing chamber, the calculated amount of durum refined flour and water was added along with V.aconitifolia flour. To avoid the development of white specks or dried pasta streaks, good mixing was done efficiently.

Extrusion

Durum Refined flour, germinated and ungerminated V.aconitifolia flour (Table – VII & VIII) and water were thoroughly combined to create stiff dough that was then allowed to flow through a die under intense pressure. Spaghetti shape was generated by modifying the shape of the die. To produce good cooking in the finished product, water of 20°C was pumped in water jackets around the extrusion cylinder. Fresh spaghetti and macroni was collected and taken to drying process.

Drying

The extruded Spaghetti was dried in a pre-dryer where the moisture of the "long pieces" was present. After all, It was dried to further reduce the moisture content to about 12.5 percent.

Cooling

In the case of "long products", stabilization is performed after the dampening process to increase the moisture content. It lightens the contents and also stabilizes the product and protects it from cracking. Goods (12.5 percent humidity) are cooled to a temperature of 28-32 °C, close to ambient temperature

Table – I

Percentage of variation of ungerminated and germinated V.aconitifolia legume powder incorporated Spaghetti

S.No	Ingredients	Control	V1	V2	V3	V4	V5
1.	Durum Refined wheat flour	100	90	80	70	60	50
2.	V.aconitifolia legume powder	-	10	20	30	40	50

3.	Salt	As needed	As needed	As needed	As needed	As needed	As needed
4.	Water	As needed	As needed	As needed	As needed	As needed	As needed

Sensory analysis

The developed recipes were undergone for its organoleptic evaluation with 25 panel members inclusive of faculties and students were semi trained with the standard procedure as in ISO 13299:2016 The concern ISO manual was distributed to the panel members to train them accordingly the 9 point hedonic scale was utilized to assess the food products. The score card used for the sensory analysis is given in appendix – VIII. The scale begins from extremely dislike to extremely like (1-9) which includes the evaluation of characterization of appearance, colour, flavor, taste, texture, after taste and overall acceptability. The responses received from sensory characterization of all the recipes for its attributes were graphically plotted. The best selected variations were taken for further research.

Determination of proximate analysis

The best selected two recipes out of six were taken to determine the proximate analysis. The test procedure used is mentioned in the below table.

Table –ll

Test methods used to determine the proximate analysis

Test parameters/100g	Test method
Moisture	Basic method
Ash	Direct method
Fat	Indian standard
Fiber	Dry weight
Protein	Kjeldahl
Carbohydrates	DGHS manual
Energy	4-9-4method

Food Costing

Cost calculation was done for the same recipes to prove its feasibility. Utilizing the cost of raw ingredients, equipment, and operating expenses, the price of the composite V.aconitifolia (germinated and ungerminated) flour was estimated. The expense of the depreciation of the equipment, gasoline, water fees, manpower, transportation, packaging, and labeling were all included in the operation cost.

Storage study

Both germinated and ungerminated V. aconitifolia flour was made, packed in polyethylene, and kept at room temperature in airtight high density polyethylene boxes. Using established methods, the parameters' storage stability was evaluated every 15 days during the course of six months (180 days).

The selected variety of Spaghetti (dried form) was carried out to storage study process which undergoes storing the same with the temperature of 300C and refrigeration temperature. Depending on the amount of moisture in the flour, spoilage during storage may occur. The Food Safety and Standards Authority of India (FSSAI) 2016

According to Cenkowski, (1993), the shelf life of food items is the maximum amount of time during which they maintain their predefined properties. According to Saravanan M, Ignacimuthu S (2015), each specific food has a limited shelf life after production during which it can be stored while maintaining the appropriate degree of safety and organoleptic quality. Since they have an impact on consumer safety, the storage conditions for flour after milling and packing have been determined to be significant in influencing the keeping quality.

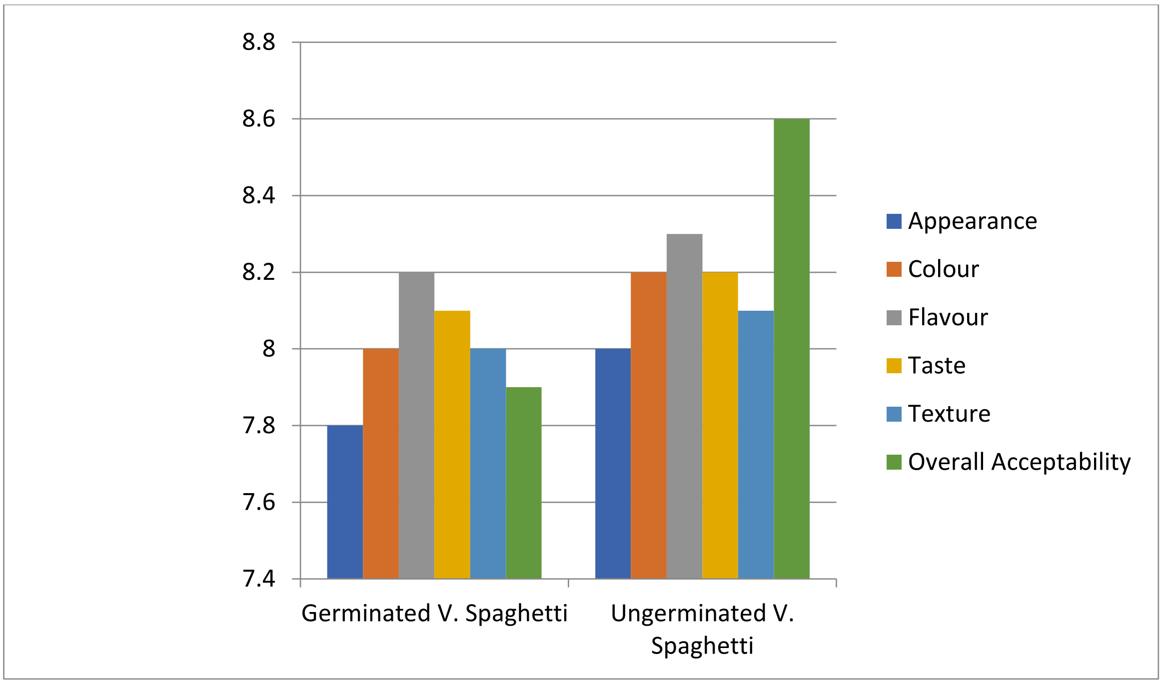
RESULTS AND DISCUSSION

Sensory analysis

The sensory evaluation of a product is a crucial step in its development. Murray (2001) asserts that sensory assessment is a branch of science where responses to dietary qualities are elicited, quantified, analyzed, and interpreted. The senses of sight, smell, touch, taste and hearing all contribute to the perception of reactions. A panel of chosen semi-trained panelists conducted sensory assessments of the supplements to determine their acceptability.

Fig – I

Sensory analysis of developed Germinated & Ungerminated V.aconitifolia flour fortified Spaghetti



The above table reveals that overall acceptability of Ungerminated V.aconitifolia flour fortified Spaghetti scored high points when compared to germinated V.aconitifolia flour fortified Spaghetti

Both essential and non-essential bioactive chemicals exist in nature and have a positive impact on human health (Biesalski et al., 2009). A large class of biologically active substances known as "bioactive components" enhances human health while also adding to the sensory appeal of food. According to Chikara et al. (2018), the maturity index, the age of the fruit, and the plant's age all affect the makeup of the bioactive components.

Nutrient analysis of raw ungerminated and germinated spaghetti (uncooked)

Food and Drug Administration (FDA) and Food Safety and Standards of India (FSSAI), both of which published 2016 reports, state that nutritional factors must be evaluated in a product and must be displayed in the packaging. The nutrients that were calculated to be present in the created products are detailed in Table - I.

Table - III

Nutrient analysis

S. No	Testing parameters/100g	Nutritive value of Ungerminated spaghetti	Nutritive value of germinated spaghetti
1	Crude fiber	BDL(DL-0.1)	BDL(DL-0.1)

2	Protein	20.27	16.61
3	Fat	0.68	1.13
4	Carbohydrate	69.01	70.34
5	Ash content	1.63	1.57
6	Energy	363.24	357.97
7	Moisture	8.41	10.35

The above table shows that nutritive value of moisture and carbohydrate was increased gradually. Protein and energy levels were decreased. Fat and ash was slightly different. Crude fiber was same values of tremendously due to germination. Most of the fat in the spaghetti is made up of unsaturated fatty acids. Spaghetti is a low-fat, moderate-protein, high-carb food that is ideal for a daily diet that is in balance. Noodles and spaghetti are carb-rich foods that are frequently consumed by athletes who engage in strenuous, prolonged sports, such as triathlons or marathons. Before engaging in these activities, eating a lot of carbs is referred to as "carbohydrate loading," which raises the quantity of muscle glycogen and helps to prolong energy levels (Azzi A., D. Battini., A. Persona,F. Sgarbossa, 2012).

The variations in the various ingredients utilised to prepare the supplementary products were the cause of the protein discrepancies in the various trial goods. Bhadkaria, et al. (2022) pointed highlighted the significance of protein consumption in mounting immunological response, which is of utmost importance during convalescence, in nutritional guidelines (Tapsell etal, 2016). Benefits in weight control were found in those who followed the recommended higher-protein regimen, but not in those who did not, dietary compliance appears to be the main factor contributing to the inconsistent results.

Cost calculation

Table- IV

Cost calculation of the selected germinated and ungermiinated V.aconitifolia incorporated spaghetti

Spaghetti (500g)	Quantity (g)	Amount (Rs)

Ingredient cost V.aconitifolia Maida	 150 350	 30. 00 35. 00
Processing cost	-	10. 00
Packaging cost (price of packaging material; sealing and labeling)	-	10.00
Profit percentage - 15%	-	20. 00
Total Cost of V.aconitifolia Incorporated Spaghetti		105 .00

The cost of the composite germinated and ungermiinated V.aconitifolia incorporated spaghetti was Rs. 105.00 per 500g whereas the cost of the commercially available Spaghetti without incorporation of any quality ingredients or fortification of nutrients starts from Rs. 125 per 500g in approximate and hence It is evident that the cost the developed breakfast recipes was much more lower than that of the commercially packed products available in the market without incorporation.

Storage study

Storage stability was decided by the virtual way assessing the quality and the texture of the product stored It was good enough for the period of 90 days. At an interval of every 15 days it was checked for its quality.

CONCLUSION

It is evident that the developed recipe was much lower than that of the commercially packed products available in the market without incorporation. There was an increased acceptability of the ungerminated V.aconitifolia Incorporated Spaghetti and it might be used for consumption more than the period of 60 days. Further research can be done to utilize the V.aconitifolia among people.

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TITLE-FOOD PROCESSING A BOON TO PRODUCT DEVELOPMENT

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ABSTRACT

In the era of 21st century rapid urbanization, climate change, increased population, scarcity of water and increased dry land or the factors responsible for the worldwide agricultural and nutritional challenges. Now-a-days people are very conscious about their healthy living practices to overcome metabolic disorders and lifestyle disease solution to the global challenges because of the their rich vitamins, minerals,phytochemicals and antioxidants content.Researchers are proving that millets has a better option to other cereals. In addition to vitamins, millets are rich source of flavinoids such as apigenin, cathechin, orientin, vitexin, iso orient, lutolin, querutin, isovetexin, myriatin, & tricin . Value added product of millets are possible to solve negative effect of agriculture and food security. Further the presence of essential amino acids and enriches the nutritive potential of millets . Several bioactive principles in millets are known to reduce cardiovascular disease, diabetes, aging and even cancer. The processing of millets are there in traditional ways. An extensive literature review articles related to processing techniques of millets such as fermentation, germination, dehulling, extrusion,cooking, puffing, popping, milling etc.. In the millets germination and fermentation showed a positive improvement in the overall nutritional characteristics of millets whereas excessive dehulling, polishing and milling resulted in reduction of the dietary fibre and micronutrients understanding the changes happening in the nutrient value of millets due to processing can help the food industry, researchers and customers select a suitable processing techniques to optimize the nutritive value increase the bio available of nutrients and help combat food and nutrition security.

COMBINED EFFECT OF MUNTINGIA CALABURA L FRUIT POWDER WITH FOXTAIL MILLET ADDITION ON ANTIOXIDANT CAPACITY OF BAKED DOUGHNUTS

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ABSTRACT

The present research work examined Muntingia calabura L fruit powder (MFP) with foxtail millet addition as a potential functional food ingredient in baked doughnuts. The composite flour was developed using wheat flour, refined wheat flour, and foxtail millet flour to prepare doughnuts. MFP blends of 0% was termed as 'control', 5%, 10%, 15%, 20% and 25% (w/w) were prepared by replacing equivalent amount of composite flour were analyzed for proximate compounds such as ash, carbohydrate, protein, crude fat, crude fibre, total Phenols, vitamin-C, vitamin-E, and tocopherol and antioxidant activity in DPPH form. Results showed that different MFP substitution in doughnuts showed a significant increase in ash, protein, crude fiber, and a decrease in carbohydrate and crude fat content. As the percentage of MFP substitution increased, a significant ($p<0.05$) increase in total Phenols, vitamin-C, vitamin-E, and tocopherol and antioxidant activity was observed. Therefore, MFP could be utilized as an active component to develop high-quality composite flour-based baked doughnuts with health-promoting properties to the consumers.

INNOVATION AND MANUFACTURING TECHNIQUE FOR NOODLES DERIVED FROM BARNYARD MILLET

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ABSTRACT:

Barnyard millet (Echinochloa frumentacea) is belongs to the family Poacea and it is self-pollinated crop. Barnyard millet is the oldest domesticated small millet. In India it is mainly cultivated in Orissa, Maharashtra, Madhya pradesh, Tamil Nadu, Bihar, Punjab, Gujarat and hills of Uttarakhand. Available methods of preparing foods from barnyard millet at home are laborious, time consuming, **and people are reluctant to prepare** foods from barnyard millet even though barnyard millet is a nutritionally important food item. Also, there are hardly any food items prepared from barnyard millet in the market, **and less attention has been given to barnyard** millet. As a solution for this problem, a study was carried out to develop a medium scale method for manufacturing of noodles from barnyard millet with maximum substitution, and tests were conducted by using a process line used to manufacture rice noodles with modifications. Flours were mixed with water to increase the moisture content up to 35% and pellets were formed. Paste prepared by steaming the pellets was extruded to make sheets, and they were sent to an extruder to form noodles. Formed noodles were sterilized at 100°C, cut to 4 inches length pieces and sent to a dryer. Temperature of drying air was

maintained about 40-45°C. It was found that the moisture content and percentage total solids in gruel of both types of produced noodles were satisfied the maximum allowable level for rice noodles i.e.12% and 8% according to SLS 858. Sensory evaluati**on results revealed that both** types of noodles produced with barnyard millet were highly acceptable and 100% barnyard millet noodles were shown a higher acceptability in colour than 50% barnyard millet noodles. Developed barnyard millet noodles packed in PET/LDPE bags can be stored. Barnyard millet is a good source of protein about 10.5%, highly digestible and an excellent source of dietary fibre. Barnyard millet is the minor kharif crops in Uttarakhand and grows under rainfed conditions. Barnyard millet contains about 8.7 – 9.63% moisture. The carbohydrate content in barnyard millet is low and also slowly digestible. It is ideal foods for the patient suffer from diabetes mellitus. Even though barnyard millet is nutritionally superior to cereals and has the potential to provide food and nutrition but their utilization is still limited.

KEYWORDS: *Barnyard millet (Echinochloa frumentacea), Extruded product(noodles), Health benefits.*

DEVELOPMENT OF A VALUE- ADDED BURFI WITH KODO MILLET

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ABSTRACT

Burfi, prepared from khoa, is a popular sweet confectionery of Indian subcontinent. The present study was undertaken to develop value added burfi with khoa and kodo millet for better nutritional profile. Value added burfi was prepared by incorporating popped kodo millet flour at 10% (KBK1), 15% (KBK2) and 20% (KBK3) based on the weight of khoa. Sensory evaluation study revealed that KBK1 was best accepted among the variations and obtained an overall acceptability score of 8.55.Millet incorporated burfi (KBK1)-Kodo millet incorporated khoa had a shelf life of 5 days at room temperature and 10 days. At refrigeration temperature kodo millet can successfully be incorporated to khoa based burfi with highly acceptable sensory attributes.

***Keywords**: Burfi, Kodo millet, Sensory evaluation, Cost calculation*

1. INTRODUCTION

Kodo millet (**Paspalum scorbiculatum L**.) is also known as ditch millet. It is grown only in India, although the wild grass is a widespread tropical weed that is harvested as a wild cereal in West Africa. The species was domesticated in India some 3000 years ago. Known as **Varagu in Tamil.** Kodo millet or millet also referred to as “nutria-cereals”, contains a high amount of vitamins, minerals, and phytochemicals containing sulphur. It is also rich in essential amino acids, like lysine, threonine, isoleucine, valine, and sulphur rich amino acids. Kodo millets are rich in vitamin B3, vitamin B6, and folic acid, as well as minerals, such as calcium, potassium, magnesium and zinc.

Burfi, prepared from khoa with an appropriate content of sugar, is a popular sweet confectionery of Indian. The simplest burfi consists only of milk solids and sugar, and its preparation involves evaporating milk in a wide mouthed open pan to obtain a thick pasty mass known as khoa and then blend khoa with sufficient quantity of sugar. A combination of milk product (burfi) and millet (kodo) in the present scenario has synergistic effect, where, deficiency of lysine in kodo millet and deficiency of dietary fibre and iron in milk product are being complemented by each other.

2. METHODOLOGY

2.1 Selection of Kodo Millet Flour

For the present study, the selection of good quality kodo millet is selectedand it should be visually checked to be free from in insects &infestation. The millet used for the study was procured from a departmental store of Erode.

2.2 Formulation of kodo Millet Flour Incorporated Burfi

Kodo millet incorporated burfi seemed to hold in more moisture and an attempt to continued desiccation yielded a product that was dry and crumbly in appearance and had hard body and coarse texture. The Kodo Millet Flour incorporated in burfi at different proportions of 10%, 15%,20 % and the composition of various burfi is presented in the Table 1

Table 1

Formulation of khoa based burfi

Particulars	**BRF1**	**KBK1**	**KBK2**	**KBK3**
Khao(g)	100	90	85	80
Kodo Millet (g)	0	10	15	20
Sugar (g)	30	30	30	30

Kodo millet flour incorporated burfi is a delicious and nutritious sweet that can be enjoyed by people of all ages. It is a good way to incorporate millets into your diet and reap their many health benefits. The burfi should be stored in an airtight container to prevent it from becoming dry and hard.

2.3 Procurement of raw ingredients

Ingredients like full cream milk, millets, sugar and ghee were procured from local markets of Erode

2.4 PROCEDURE

Kodo Millet Incorporated Burfi Procedure

Khoa was prepared from pasteurized full cream milk (6% fat and 9% SNF)

It employed heating milk in an open pan with constant manual stirring-cum-scraping, till it reached a semi solid consistency.

Ground sugar was added at 30% based on the weight of khoa and mixed well.

Kodo Millet hurihittu was then added at 10%, 15% and 20% rate

The millet hurihittu was previously boiled in four times its quantity of water

And gelatinized to a thick paste consistency in order to ensure uniform blending with khao.

↓

The mixture was then worked thoroughly using a flattened ladle to avoid any lumps and uniform distribution was ensured.

↓

The hot mass was then transferred to a stainless steel plate smeared with ghee, spread evenly and cut into pieces.

↓

The product was kept in a cool dry place (26- 28 °C) for 8-12 h for setting.

2.5 Sensory evaluation of kodo millet flour incorporated burfi

A study by Sahana HS and Vijayalaxmi KG (2022) found that kodo millet flour incorporated burfi was highly acceptable in terms of its sensory attributes, such as color and appearance, texture, taste, and overall acceptability. The study also found that the burfi was a good source of nutrients, such as protein, fiber, calcium, and iron.

Food sensory evaluation is the scientific discipline used to evoke, measure, analyze, and interpret human reactions to the properties of foods and materials, as perceived by the six senses: taste, smell, touch, flavour and apperance.

Sensory Evaluation:

Sensory evaluation is an important tool for the food industry, and it plays a vital role in ensuring that food products are of high quality and meet consumer preferences.Sensory evaluation was carried out using nine-point hedonic Scale. The score card was based mainly on appearance, Colour, texture/consistency, taste and overall acceptability. Twenty-two semi trained judges having good health status and interested in sensory evaluation.

Table 2

Mean scores for sensory attributes of kodo millet incorporated khoa based burfi

Sample	Appearance	Colour	Texture/ Consistency	Taste	Overall acceptability
BRF1	8.84	8.90	8.68	8.68	8.77
KBK1	8.85	8.92	8.70	8.71	8.85
KBK2	8.32	8.08	8.05	8.30	8.32
KBK3	7.98	7.76	7.82	7.97	7.97

Significant at 5% level, BRF1-Control burfi, KBK1-Kodomillet incorporated khoa based burfi (10%), KBK2-Kodo millet incorporated khoa based burfi (15%), KBK3-Kodo millet incorporated khoa based burfi (20%)

2.6 Cost Calculation

The cost of market products can vary widely depending on a number of factors, including the type of product, the materials used, the manufacturing process, and the brand. The first step is to identify all of the costs associated with the product .Once all of the costs have been identified, they need to be added up to get the total cost of the product.

3. Result and discussion

The scores for khoa based burfi incorporated with kodo Millet ranged from 7.98 to 8.84 for appearance, 7.76 to 8.90. For colour, 7.82 to 8.68 for texture/consistency, 7.97 to 8.68. For taste and 7.97 to 8.77 for overall acceptability. Sensory scores were observed to decrease with increasing incorporation levels. Highest score in all of the sensory characteristics was observed for the (7 ºC). So the kodo millet incorporated burfi is safe & healthy to eat instant of other flour burfi. Results revealed that the kodo millet could successfully be incorporated to a dairy product like burfi, with highly acceptable sensory attributes.

Table 3 Variation

Sensory score	Variation10% KBK1	Variation15% KBK2	Variation20% KBK3
Appearance	8.85	8.32	7.98
Colour	8.92	8.80	7.76
Texture/consistency	8.70	8.05	7.82
Taste	8.71	8.30	7.97
Overall acceptability	8.85	8.32	7.97

4. Conclusion

Milk and dairy products are considered as 'nearly complete' foods as they contain a wide array of nutrients. However, it is well known that milk is not a good source of iron and fibre. Millets, in contrast, are deficient in essential amino acids like lysine, compromising the protein quality. An effort was therefore made in the present study to formulate food products from milk-millet combination. Thus, development and consumption of such products from milk-millet combination can be encouraged among all healthy sectors of population and the enhanced nutritional profile can be exploited.

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TEXTURE AND SENSORY CHARACTERISTICS OF LITTLE MILLET BASED ON RTC (Ready-To-Cook) NOODLES

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ABSTRACT

Millets are a group of small-grained grasses that are widely cultivated throughout the world as grains. Ready Cook (RTC) and instant food are widely used mainly due to today's lifestyle and its demands Food ready to serve. Millet was collected and pre-processed to produce a ready-to-cook mixture. The millet was cleaned and washed under running water, and the soaked millet grains were boiled for 30 minutes. Cereals (10-12 minutes). Pre-cooked grains were dried to a moisture content of 14%. Grain was ground into flour and sifted As millet flour. The physical and nutritional properties of millet powder were examined. Mixture of millet At levels (60%, 70%, 80%) you will see recipes. B. Cooked pasta considering its physical, nutritional, structural and sensory properties Determine the characteristics of the developed product. Results can be derived from nutrient analysis Millet and noodles are very nutritious, especially the fiber content and the consistency of the noodles ensure consistency and stickiness.Suitable for texture and sensory analysis of all variations. RTC instant noodles are doing well at 80% level Approved by committee members. The research results are good and nutritious products and recommend nutritious products. Breakfast.

KEYWORDS: *grains, RTC, ready mix, instant noodles and sensation, texture*

1.INTRODUCTION

Little millet is famous for its drought tolerance and is considered one of the most water-poor plants. Demanding lectures. As the first harvest of the season, it produces tape good grains. Among babies and is staple of millions of people in many parts of the world. It is a good source of protein (7.7g/day). 100 g), is rich in carbohydrates (67.0 g/100 g), fats (4.79 g/100 g), minerals, and vitamins and must Considered an essential food to ensure nutritional security. Fatty millet (4.7 g), Crude fiber (7.7 g), iron (9.3 mg) and phosphorus (220 mg) per 100 g, equivalent to cereals and others Millet (Gopalan et al. 2010). The fiber content in pearl millet is a contributing factor to its low glycemic index. And a recent study conducted on pearl millet indicate hypoglycemic effects due to Higher fiber ratio (Itagi et al. 2013) The fiber content in pearl millet is a contributing factor to its low glycemic index and a recent study on pearl millet indicated that it has a hypoglycaemic effect due to its higher intake rate. Fiber plays an important role in providing significant amounts of antioxidants and antioxidants Photochemistry in food (Ushakumari and Malleshi 2007), due to increasing awareness among people Consumers about the health benefits of millets, it is necessary to meet the diverse needs of millets. Food products are based on food products. 'Ready to Eat (RTE) and 'Ready to Eat' (RTC) Indian food segments have emerged Since they started a secondary alternative to home-cooked meals or restaurants people are fast-paced Lifestyle, the growing popularity of the nuclear family structure, the growing disposable income, which is getting bigger and bigger The number of Indianstraveling around the worldwith an experimental palaterefavorable demography c factorsheadoption of RTE and RTC foods in India. In addition, the development of modern retail has increased the visibility of brand categories of ready-to-eat foods. (Rahman Tazyn,2012),(Henry C.J.K,1993) in his articleStates that convenience foods can be broadly defined as "foodsthat have undergone extensiveprocessing by manufacturers such that they require little or no secondary processing and looking before consumption. This means that aside from reheating, defrosting, cooking, frying, thinning, andmixingthe food isready to eat.Noodles are widely consumedaround the worldand global consumption is second only to bread. Instant noodles are widely consumed worldwide and are a rapidly growing noodle industry. (Owen, 2001). Indeed, invented noodles are very practical, easy to cook, and have a relatively longdurationof conveyance. Wheat, commonlyused to make instant noodles, is notonly low in fiber and protein but also pooressentialamino acids,lysine flour of hard wheat (Triticum aestivum) is the mainredient (Phuc, 2008). Pastis a basic goodproud train only by mixing durum wheat semolina and water. Pasta is consumedaroundthe world anditsglobal consumption is second only to bread. Instantly Fettuccines widely consumed worldwide and are a rapidly growing sector of the pasta industry. (Owen, 2001). The objectives of the research are as follows: Research on physicochemical and nutritional properties Composition of millet grains, to develop ready-to-cook millet dishes (RTC), and study the Sensory acceptability, texture assessment, and nutritional composition of RTC noodles.

2. MATERIALS AND METHODS

COLLECTION OF SAMPLES

Selected millets, especially little millets, weresourcedfromlocal markets in Salem, Tamil Nadu, India.The millet is properly cleanedand stored inairtightcontainers until it is usedinvariousprocessing methods The remaining rawmaterialssuch asflour, eggs, and saltwere purchasedand prepared fromthe local market.

3. ANALYSIS OF FUNCTIONAL, CHEMICAL, ANTI-NATIONAL PROPERTIES OF SELECTED LITTLE MILLETS FLOURS

3.1 PHYSICAL CHARACTERIZATION OF SELECTED LITTLE MILLET

Convenience foodanalyzing the physical characteristics of selected little millet is essential for understanding its suitability for various uses.

Thousand Grain Weight: This measurement provides valuable information about the weight of a thousand grains of little millet. It helps in estimating the yield potential and density of the millet.

Thousand Grain Volume: This parameter gives insights into the volume occupied by a thousand grains of little millet. It can be useful for assessing the millet's bulk density and processing requirements.

Hydration Capacity and Index: Hydration capacity indicates the ability of little millet grains to absorb water, while the hydration index may suggest how efficiently they do so. These properties are significant for cooking and food preparation.

Swelling Capacity and Index: Swelling capacity measures the ability of millet grains to increase in volume when soaked or cooked. The swelling index may provide information on how much they expand during cooking, affecting their texture and mouthfeel in prepared dishes.

Cooking Quantity/Characteristics: This parameter involves examining how little millet grains behave when cooked. It can include factors like cooking time, texture, and overall cooking quality, which impact the end product's acceptability.

3.2 FUNCTIONAL PROPERTIES OF LITTLE MILLET

Little millet's functional properties, including bulk density, water absorption capacity, oil absorption capacity, swelling power, solubility, and solid loss, were thoroughly examined in this analysis. These properties play a crucial role in determining how little millet can be utilized in various food processing applications, influencing factors like texture, hydration, oil retention, swelling when heated, dissolvability, and material loss during processing. Understanding these properties is essential for optimizing the use of little millet in different food products and refining processing techniques to achieve desired results.

3.3 NUTRITIONAL PROPERTIES OF LITTLE MILLET

The nutritional properties of small grains were established, including pH, total titratable acidity, water content, carbohydrate and energy values, crude protein, ash, total starch, amylose content, soluble amylose, total sugars, dietary fiber, and mineral composition. The evaluation was performed according to the following steps. And standardized procedures.

3.4 ANTI-NATIONAL PROPERTIES OF LITTLE MILLET

Anti-nutritional properties of millet, specifically tannin, total phenolics, and trypsin inhibitor levels, were measured through established and standardized procedures.

4. STANDARDIZATION AND DEVELOPMENT OF MILLET BASED RTC (Ready-to-cook) NOODLES

The development of millet-based cooked (RTC) noodles included an important aspect: standardization. Convenience plays an important role in determining when, where, what, and how to consume food. The dry milling process began with the first step of washing the grain. Below, we will discuss the specific process that millet goes through.

Millet grains (little millet)

↓

Cleaned and washed under running water

↓

Soaked millet grains (5-6 hrs)

↓

Parboiling of soaked grains (10-12 min)

↓

Parboiled grains were dried to14% moisture

↓

Milling

↓

Millet Flour

Let's outline the process flowchart for millet processing."

5. PREPARATIONS of RTC INSTANT NOODLES FROM PROCESSED LITTLE MILLET FLOUR

RTC instant noodles were made from processed millet flour in three different variations. These variations included incorporating small amounts of millet and flour in different proportions. The standard version consists of 100% wheat flour, while his three other types of instant noodles use millet flour in amounts of 60%, 70% and 80%. The composition of different ingredients for producing instant noodles is shown in Table 1. The prepared samples were then cooled, packaged and stored under normal conditions.

Table 1

Variation for the preparation of RTC instant noodles

S. No	INGREDIENTS	CONTROL	V1	V2	V3
1	Refined wheat flour (g)	100	40	30	20
2	Millet flour (little millet)(g)	---	60	70	80
3	Egg(no)	1	1	1	5
4	Water (ml)	40	40	40	40
5	Salt(g)	2	2	2	2
6	Gram masala (g)	3	3	3	3
7	Chilli powder (g)	2	2	2	2

6. PREPARATIONS METHODOLOGY FOR MILLETS RTC (Ready-to-cook) INSTANT NOODLES

Noodles processed in a noodle making machine.

↓

Millet flour + refined flour

↓

Dough prepared with the required level of water

↓

Roller compressed: Dough passed through the noodle extruder

↓

Sheeting

I Stage (4 mm thickness)

II Stage (2 mm thickness)

↓

Cutting: dough sheet passed through noodles cutting machine

↓

Noodles steamed for 15 minutes at 100°C

↓

Noodles cooled to room temperature

↓

Added taste maker pouch

↓

Packed and sealed in polyethylene pouches

7. METHOD TO COOK

To prepare this dish, start by heating 200ml of water in a saucepan until it reaches a boiling point. Once boiling, add the instant noodles and the provided seasoning packet to the boiling water. Cook the noodles over low heat until they are tender. After cooking, remove the pan from the heat and serve the noodles while they're still hot.

8. PHYSICAL ANALYSIS OF DEVELOPED NOODLES

8.1 Cooking characteristics of developed noodles

Cooking characteristics of pasta The cooking time of the pasta was determined as described in [14]. Noodles (10 g) was boiled in 200 ml of boiling distilled water until the particles disappeared by squeezing. Between two glass slides. Wash the cooked noodles in cold water for 1 minute and drain immediately. I weighed it. After determining the cooking time, the cooking water was evaporated and dried at 105 °C until constant weight.

8.2 Cooking loss and water absorption rate of developed noodles

Cooking losses and water intake were measured in part using the AACC method [15]. Change. Cooking loss (%) and water absorption rate (%) were calculated according to the formula of [16]. Cook Loss (%) = (Weight of dry residue in cooking water / Weight of fresh pasta) x 100 Water absorption rate (%) = ((Weight of cooked noodles - Weight of raw noodles) / Weight of raw noodles) x 100

8.3 Analysis of cooking time of the noodles

"The evaluation of noodle cooking time can be determined through visual inspection or image analysis, as outlined by Sozer et al. (2007), following the standard procedure specified by AACC (2000)."

8.4 Analysis of length of the noodles

"To assess the length of the noodles before and after cooking, a Vernier caliper is employed for precise measurements."

8.5 Nutrient composition of the developed millet based RTC (Ready-to-cook) noodles

Nutritional composition of the developed millet-based RTC (Ready-to-Cook) noodles The nutritional profile of the developed millet-based noodles was analyzed. Key nutrients such as energy, protein, carbohydrates, fat, fiber, soluble and insoluble fiber were calculated using standard methods for all developed recipes (Gopalan et al., 2011).

8.6 Sensory evaluation of developed little millet instant noodles (RTC)

Sensory quality evaluation of a product plays an important role in its acceptability and preference. Of food. Sensory evaluation is performed on all variations. The quality of sensation is made up of various sensations Preparing instant noodles. All his RTC foods developed were evaluated for acceptability by a semi-team.A trained jury of 10 people. The sensory quality of a product is determined by its appearance, color, Aroma, taste, texture, and overall acceptability using a 9-point hedonic scale by a panel of 10 judges (Larmond, 1977) scorecard with values between 9 and 1. 1 = I don't like it at all, 5 = I neither like it nor dislike it. 9= How extreme was it used? Samples were coded and presented to panelists in random order.

8.7 Texture evaluation of the developed RTC noodles

Texture is a very important quality feature that greatly contributes to the overall result. Acceptance of food quality. This was one of the top 3 adoption factors used by consumers The other two aspects of food evaluation are appearance and taste (Bourne, 1990). Variations of pasta are Texture analysis was then performed using a texture analyzer (TVT-300XP, Perten Instruments, Sweden). Preparation. Measure parameters such as elasticity, cohesion, chew ability, and stickiness. Texture profile analysis (TPA) using software provided by the company. All dimensions Texture analysis of each sample was performed at least three times and the average value was determined.

8.8 Statistical analysis

Data will be compiled and analyzed using statistical techniques such as mean, SD, and ANOVA. That's everything Was performed and the results were separated using multiple range Duncan test (P 0.05) and statistics.SPSS16 software .

9. RESULT AND DISCUSSION

9.1 PHYSICAL PROPERTIES OF LITTLE MILLETS

Physical characteristics such as thousand grain weight, thousand grain volume, hydration capacity and Index, swelling capacity and index, cooking quantity/characteristics were discussed below

Thousand grain weights of little millet were 2.59 g respectively. The thousand Grain volume of little millet was 3.06 ml. Grain volumes change significantly and most often, regularly at Varying moisture contents. The hydration capacities of the little millet were 1.61 g/1000 seeds with the Hydration index of 61.5% respectively. The little millet grain was found to have swelling capacity of 0.21ml/1000 seeds stated that the presence of high protein, lipid, fiber and larger amount of amylose-lipid complex in flour could inhibit the swelling of starch granules.

Table 2

Physical properties of Little millet

9.2 FUNCTIONAL PROPERTIES OF LITTLE MILLET

The functional properties such as bulk density, water absorption capacity, oil absorption capacity, swelling Power, solubility, and solid loss discussed below:

9.3 PHYSICAL PROPERTIES OF DEVELOPED NOODLES

The cooking properties of the developed Noodles such cooking yield is given in the table

From the above table it shows that the developed Noodles cooking yield for standard 166% and in Varation-3(80%) there is increase cooking yield because of the water absorption capacity of millet the other Varation-1(266%), varation-2(283%).The cooking loss is various in all variation of prepared noodles and length Is decrease in varation-3 because of the presence of fiber content in millet.

9.4

PHYSICAL PARAMETERS	LITTLE MILLET
Thousand weight grain (g)	2.39±0.005
Thousand volume grain (ml)	3.06±0.1
Hydration capacity (g/1000 seeds)	1.61±0.02
Hydration index (%)	6.61±0.05
Swelling capacity (ml/1000 seeds)	0.21±0.01
Swelling index (%)	6.77±0.02
Cooking quantity	193.3±11.9

VARIATIONS	COOKING YIELD (%)	COOKING LOSS (%)	LENGTH OF THE NOODLES
Standard	166	150	15
Variation 1	266	148	10
Variation 2	283	147	8
Variation 3	300	149	7

NUTRITIENT-DEVELOPED RTC DEVELOPED NOODLES

Table 5

Nutritional development of RTC developed noodles

As can be seen from table ,the available carbohydrate content (34.3g) High protein content (7.51g) the high fiber content (8.07g). The soluble and insoluble fiber content in standard (4.49g, 1.43g) V1 (4.2g, 1.18g), V2 (4.36g, 1.95) V3(4.36g,1.94g). Nutritional evaluation of the selected fiber-rich food items revealed That the fiber-rich product has good nutritional value and was found to be a good source of minerals (Bora and Kulshreshtha, 2014) The amount of fat content found in standard noodles (9.81g) is high when compared to Other variations. Similar results were reported by Sambavi et al. (2015)

10. CONCLUSION

To increase millet utilization and add to diversification in the market, which is mostly dependent on Products from wheat and rice. Therefore, an attempt was made to develop a Ready-to-cook recipe from little Millet by incorporating different levels of raw little millet (Panicum Milliard L.). A developed noodle is the best Substitute for people who seek varieties and want foods with high fiber and low fat for good health. The Increasing participation of women in the working workforce and the interest of consumers in healthy foods has increased The demand for instant foods, ready-to-eat snacks, and ready-to-cook products with good nutritional profiles. The Millet is highly nutritious and rich in fiber content. The prepared ready-to-cook noodle is more nutritious and Highly accepted by the panel members. The texture is excellent for all variations of noodles. The mix is Recommended for all age groups for nutritious breakfast because of the presence of fiber content in noodles.

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NUTRIENT CONTENT AND PHYTONUTRIENT COMPOSITION OF GRAPE SEED POWDER INCORPORATED MULTI MILLET COOKIES

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ABSTRACT

The primary purpose of the present study was to develop multi-millet cookies incorporated with grape seed powder and to investigate the nutrient content and phytonutrient composition. The millets, namely Ragi (finger), Kambu (Pearl), Thenai (foxtail), Varagu (kodo) and Saamai (little) and grape seed were used for the development of cookies. Five variations of the multi-millet cookies were prepared with different proportions of ingredients and coded as variation 1 (V1), variation 2 (V2), variation 3 (V3), variation 4 (V4), variation 5 (V5) and a standard was prepared with refined white flour and (S). The nutrient content and phytonutrient composition were analyzed using standard procedures. The result of the present study shows that among the multi-millet cookies, V4 and V5 had the best sensory score. Among the two, V5 had the highest nutrient content, namely ash (0.68±0.02%/100g), protein (7.25±0.20g/100g), crude fibre (16.90±0.04g/100g), vitamin C (12.87±1.40mg/100g), iron (4.50±0.21mg/100g), calcium (66.55±0.54mg/100g), sodium (78.16±0.21mg/100g), potassium (128.30±0.54mg/100g) and phosphorous (45.86±0.27mg/100g) respectively. Phytonutrients, namely flavonoids, anthroquinone, glycoside, phlorotannins and steroids, were absent, whereas saponins, terpenoids and tannins were present in the multi-millet cookies, but the phytonutrients were absent in the standard. Thus, the results concluded that the multi-millet cookies had a promising nutrient and phytonutrient composition and could be used as a value-added product and an alternate healthy snack item for children and adults.

Key words: Kambu, Saamai, Anthroquinone, Glycosides, Palm sugar.

1. INTRODUCTION

Cookies are a popular food, consumed widely, characterized by long shelf-life, and can be used for active compounds fortification such as proteins, fibres, etc. **(Jyotsna, 2015).** Among the bakery products, cookies are most significant since they are widely used as snacks by children and adults **(Dhankar, 2013).** Cookies are convenient for consumers because they have a broad range of choices to be enjoyed as a snack with longer shelf life and low cost. Attempts are being made to improve the nutritive value of cookies by modifying their composition **(Abdel-Moemin, 2015).**

Cookies enriched with antioxidants from grape seed extract have an antioxidant level about ten times higher than a regular cookie. Grape is one of the vital fruit crops grown in India. Grape is the third most widely cultivated fruit after citrus and banana. Grape (*Vitis vinifera*) is the fruit most people consume. Due to its high nutritional and medicinal properties, Grape is known as the "queen of fruits" **(Demir, 2006).**

One of the significant bio-waste of the grape industry is grape seed. Grapes have approximately 40 per cent fibre, 11 per cent protein and 7 per cent complex phenols, including tannins, sugars, minerals, salts, etc. Proanthocyanidins of grapes contain a group of polyphenolic and bioflavonoids, which possess broad pharmacological and therapeutic activities **(Bagchi et al., 2002).** In addition, grapes are rich in minerals such as potassium, phosphorus, magnesium, calcium, and vitamin C. Grape seed powder can be used for baked goods at home and baking bread and preparations. The grape seed powder can be added to sweet preparations **(Bewley, 2006).**

Fortification is done mainly to maintain the nutritional quality of the products, to keep nutrient levels adequate to correct or prevent specific nutritional deficiencies in the population, to increase the added nutritional value of a product from a commercial viewpoint and to provide certain technological functions in food processing **(Dukwal, 2004).** Instead of refined white flour, flours of pearl millet, foxtail millet, kodo millet, little millet and finger millet were utilized in cookie preparation to improve their nutrient quality.

Millets are hardy plants that grow in areas with low rainfall and poor irrigation facilities. Apart from maize and sorghum, the major millet crops of India are pearl millet, called bajra; italian millet known as foxtail millet (thinai); little millet known as samai; varagu known as kodo millet and finger millet known as ragi. Nutritionally millets are essential as they are rich in protein, dietary fibre, B vitamins (especially niacin, B6 and folic acid) and minerals such as calcium, iron, potassium, magnesium, zinc, and carbohydrate sources **(Srilakshmi, 2010).** The millets, namely ragi (finger), kambu (Pearl), thenai (foxtail), varagu (kodo) and samai (little), were selected for the development of cookies. Therefore, the study developed multi-millet cookies incorporated with grape seed powder to estimate the nutrient content, phytonutrient composition, and acceptability.

2. MATERIAL AND METHODS

2.1. Selection and Collection of the Ingredients

Grapefruit is a local produce and abundantly available; fresh mature grapes were purchased from the local farms near Gandhigram, Dindigul District, Tamil Nadu and the seeds were separated from grapes. Millets, namely Ragi (finger), Kambu (Pearl), Thenai (foxtail), Varagu (kodo) and Saamai (little), were selected and purchased from the local market at Chinnalapatti for the development of cookies.

2.1.1. Preparation of grape seed powder: Fresh mature grapes blanched in salt water for 5-7 min at 17° C± 2° C, de-seeded and washed with fresh water, sundried for three days and finally powdered using a mixer grinder.

2.1.2. Preparation of multi-millet flour: Millets were washed with fresh water, sundried for one day, roasted and powdered using a mixer grinder sieved at (150 microns).

2.2. Development of multi-millet cookies

A cookie was prepared without adding millet flour and grape seed; it was kept as the standard. Five variations of the cookies were multi-millet and coded as variation 1 (V1), variation 2 (V2), variation 3 (V3), variation 4 (V4), and variation 5 (V5).Variation 1 (V1) [45 g maida + 5 g grape seed powder + 10 g palm sugar + 20 g cane sugar + 25 g butter], variation 2 (V2) [35 g maida + 10 g millet flour + 5 g grape seed powder + 10 g palm sugar + 20 g cane sugar + 25 g butter], variation 3 (V3) [25 g maida + 20 g millet flour + 5 g grape seed powder + 10 g palm sugar + 20 g cane sugar + 25 g butter], variation 4 (V4) [15 g maida + 30 g millet flour + 5 g grape seed powder + 10 g palm sugar + 20 g cane sugar + 25 g butter], variation 5 (V5) [5 g maida + 40 g millet flour + 5 g grape seed powder + 10 g palm sugar + 20 g cane sugar + 25 g butter]. The grape seed powder incorporated multi-millet and standard (S) cookie were standardized. The variations were decided by carrying out an optimization process.

2.2.1.Method for preparing standard cookies: Initially, beat the butter well and add powdered white sugar until it reaches the creamy consistency; then add refined white flour; mix well and make a soft dough. Knead the dough, cut the dough into a desirable shape, and bake at 150° C for 15 minutes.

2.2.2. Preparation of grape seed powder incorporated multi-millet cookies: First, beat the butter well and add powdered palm sugar and white sugar; beat till it reaches the creamy consistency and then add multi-millet flour, grape seed powder, refined wheat flour and other dry ingredients; mix well and make a soft dough. Knead the dough, cut the dough into a desirable shape, and bake at 150° C for 15 minutes.

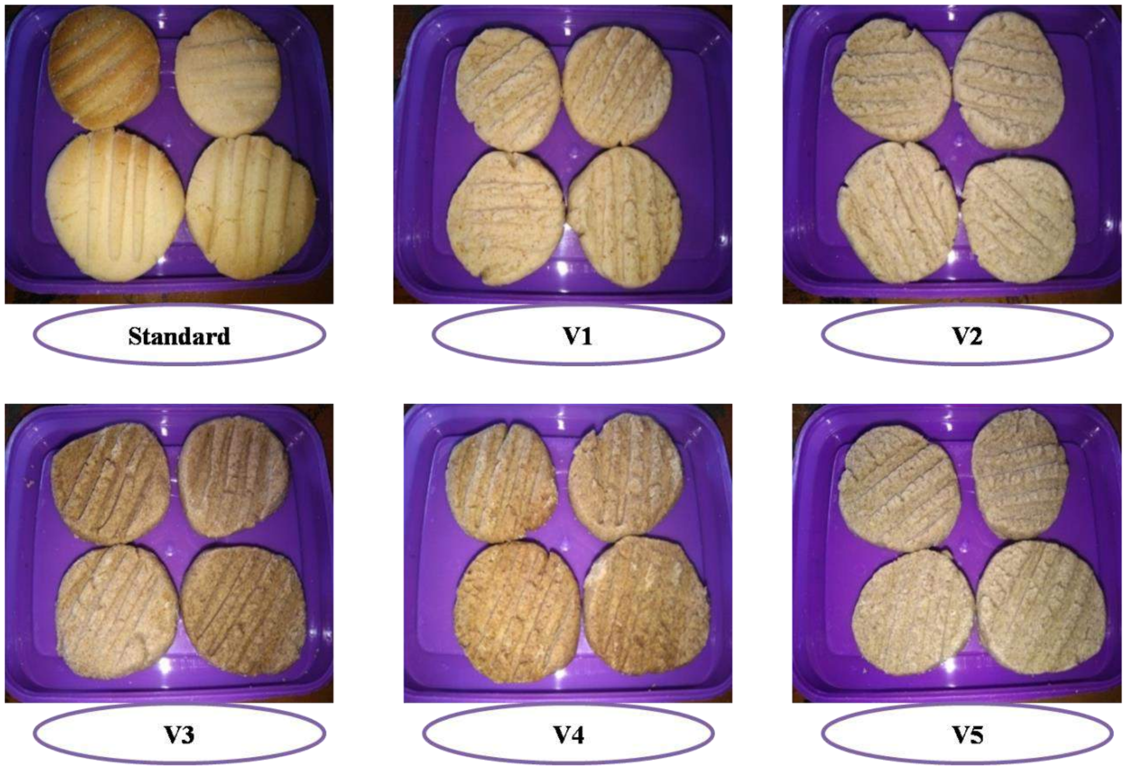

FIG.1. grape seed powder incorporated multi-millet cookies

2.3. Sensory evaluation and consumer acceptability: The prepared standard and grape seed powder incorporated multi-millet cookies were subjected to sensory evaluation. Five semi-trained experts evaluated the products using a 9-point hedonic scale. Consumer acceptability of the products was also carried out with fifty college-going students to assess the overall acceptability.

2.4. Estimation of nutrient content of the standard and multi-millet cookies: The proximate nutrient content namely, moisture **(AOAC, 1990),** ash **(AOAC, 1990),** carbohydrate **(Dubois et al., 1956),** protein **(Lowry's et al., 1951),** fat **(AOAC, 1990),** crude fibre **(Maynard, 1970);** vitamin C **(Harris and Ray, 1935)** and minerals such as iron **(Raghuramalu et al., 2003),** phosphorous **(AOAC, 2005),** sodium **(AOAC, 2005),** potassium **(AOAC, 2005)** and calcium **(AOAC, 2005)** were analyzed using standard procedures.

2.5. Determination of phytonutrient composition of the standard and multi-millet cookies

2.5.1. Preparation of extract: Aqueous extract was taken for the multi-milletcookies that had best sensory scores namely(V4 and V5) and standard. Five gram of the cookies was extracted with 30 ml of water in a shaking incubator cum water bath at 45° C for 6 hr. The mixture was filtered through a muslin cloth, and the extract was used to determine the phytonutrient composition.

2.5.2. Evaluation of phytonutrient composition: Qualitative analysis was carried out to know the presence offlavonoids,saponins, anthroquinone, phlorotannins, glycosides, terpenoids, tannin and steroid using standard procedures given by **Harborne (1973).**

2.6. Statistical analysis

All the analysis was carried out in triplicate, and the results obtained were expressed as means ± standard deviation.

3. RESULTS AND DISCUSSION

3.1. Sensory evaluation and consumer acceptability

A sensory evaluation and consumer acceptability result of the standard and multi-millet cookies is presented in Table 1 and 2.

Table.1. Sensory evaluation

Attributes	Standard	V_1	V_2	V_3	V_4	V_5
Appearance	7.20±0.8	5.81±0.8	5.24±0.8	7.28±0.5	8.02±0	7.40±0.4
Color	7.00±0.7	6.62±0.8	5.69±0.8	7.46±0.5	8.21±0.4	7.64±0.5
Flavor	6.80±0.4	5.85±0.8	6.04±0.7	7.65±0.5	8.21±0.4	7.62±0.8
Texture	7.21±0.8	5.65±0.8	6.65±0.8	7.40±0.8	8.80±0.4	8.06±0.7
Taste	7.00±0.7	5.64±0.8	5.82±0.8	7.45±0.8	8.40±0.5	7.68±0.8
Overall acceptability	6.80±0.4	6.40±0.8	6.61±0.8	7.66±0.5	8.25±0.4	8.09±0.7

Table 3 shows that the overall acceptability of the standard and multi-millet cookies V1, V2, V3, V4, and V5 had 6.80±0.4, 6.40±0.8, 6.61±0.8, 7.66±0.5, 8.25±0.4 and 8.09±0.7 respectively. Two variations V4 and V5 of the multi-millet cookies had the highest score. A study carried out by **Lina et al., (2011)** incorporating grape seed in bread and reported that grape seed incorporation enhanced the product's flavour rather than the product's texture and colour. On sensory evaluation of the control and grape seed-incorporated bread, the results showed higher preference units for the flavour of the grape seed bread.

Table.2. Consumer acceptability

Attributes	Standard	V_1	V_2	V_3	V_4	V_5
Appearance	7.00±0.5	7.02±0.7	6.60±0.8	7.30±0.5	8.18±0.6	7.80±0.4
Colour	7.02±0.6	7.02±0.7	6.66±0.8	7.40±0.6	8.28±0.7	7.74±0.5
Flavor	6.90±0.7	6.74±0.8	6.48±0.6	7.12±0.8	8.26±0.7	7.90±0.5
Texture	7.32±0.7	6.40±0.8	6.46±0.6	7.32±0.8	8.32±0.8	7.96±0.6
Taste	7.38±0.5	6.36±0.7	6.40±0.6	7.50±0.7	8.16±0.7	8.06±0.5
Overall	7.06±0.6	6.58±0.7	6.64±0.6	7.40±0.7	8.40±0.6	7.98±0.4

acceptability						

The above table shows the overall acceptability of the standard and multi-millet cookies V1, V2, V3, V4, and V5 had 7.06±0.6, 6.58±0.7, 6.64±0.6, 7.40±0.7, 8.40±0.6 and 7.98±0.4 respectively. It is evident from the table that the variations V4 and V5 had highest overall acceptability.

3.2. Nutrient content of the standard and multi-milletcookies

The proximate nutrient content namely moisture, ash, carbohydrate, protein, fat and crude fibre. Minerals such as iron, phosphorous, sodium, potassium, calcium and vitamin C for the standard and multi-millet cookies (V_4 and V_5) were analyzed and the results are presented in Table 3 and Fig. 2 to 5.

Table.3. Nutrient content

Nutrients	Standard	V_4	V_5
Moisture (%)	7.50±0.41	7.11±0.58	6.60±0.09
Ash (%)	0.15±0.01	0.55±0.02	0.68±0.02
Carbohydrate (g)	68.40±0.02	56.20±0.50	55.45±0.03
Protein (g)	3.87±0.10	6.95±0.30	7.25±0.20
Fat (g)	15.95±0.05	13.31±0.10	12.70±0.13
Crude fibre (g)	4.01±0.80	15.80±0.61	16.90±0.04
Vitamin C (mg)	9.91±0.69	11.90±1.40	12.87±1.40
Iron (mg)	1.42±0.90	4.14±0.61	4.50±0.21
Calcium (mg)	28.83±0.24	60.83±0.71	66.55±0.54
Sodium (mg)	34.83±0.77	70.16±0.25	78.16±0.21
Potassium (mg)	71.83±0.21	115.50±0.53	128.30±0.54
Phosphorus (mg)	30.83±0.24	42.16±0.25	45.86±0.27

The above table shows the proximate nutrient content (i.e.,) moisture, ash, carbohydrate, protein, fat and crude fibre. It is apparent from the results that moisture content ranged from 7.50±0.41% to 6.60±0.09%/100g; standard cookies had maximum moisture content (7.50±0.41% /100g), followed by variation 4 (V4) (7.11±0.58% /100g). In contrast, variation 5 (V5) had minimum moisture content (6.60±0.09% /100g). Ash content of the cookies ranged between (0.68±0.02% and 0.15±0.41% /100g);

variation 5 (V5) had a maximum (0.68±0.02% /100g) ash content. The maximum carbohydrate (68.40±0.41g /100g) was found in standard followed by variation 4 (V4) (56.20±0.50g/ 100g) and variation 5 (V5) 55.45±0.03 g/ 100 g respectively.

The highest protein content (7.25±0.20g/100g) was found in variation 5 (V5), followed by variation 4 (V4) and standard. The fat content ranged from 15.95±0.05 to 12.70±0.13 g/ 100g, whereas maximum crude fibre (16.90±0.04g/100g) was found in variation 5 (V5), followed by variation 4 (V4) (15.80±0.61g/100g) respectively. The results revealed that the multi-millet cookie V5 had higher nutrient content (ash, protein, and crude fibre) than variation 4 (V4) and standard.

From the results, it is found that mineral and vitamin content of the cookies variation 5 (V5) had maximum iron (4.50±0.21mg/100g), calcium (66.55±0.54mg/100g), sodium (78.16±0.21mg/100g), potassium (128.30±0.54mg/100g), phosphorus (45.86±0.27mg/100g) and vitamin C (12.87±1.40mg/100g); followed by variation 4 (V4); whereas standard had minimum mineral and vitamin content. The result shows that the multi-millet cookie V5 had higher mineral and vitamin content than variation 4 (V4) and standard.

(Thejaswini, Divya Ramesh and Jamuna Prakash2017) revealed that the fat content of sugar cookies was high in both refined wheat flour and little millet flour cookies because of added fat (i.e.,) margarine, and slightly lower fat content was found in salt cookies as lesser fat was used than sugar cookies. The addition of millet did not change the protein content significantly in salt and sugar cookies, though between the products, salt cookies had more protein than sugar cookies. According to **(Kumar et al., 2015; Hemalatha et al., 2006)** report addition of millet flour increased the protein and fibre content in the biscuits**.**

Millet-incorporated cookies have higher calcium content than refined wheat flour cookies, and more calcium content was found in little millet salt cookies. This enhancement could be due to the addition of curd, which hasa higher calcium content **(Gopalan et al., 2009). (Hemalatha et al.2006)** also reported a content of 3.30 mg of iron and 23 mg of calcium/100g in the 20% little millet incorporated cookies. **Shiny et al., (2012)** also reported an improved nutrient profile in the millet incorporated biscuits. Little millet contains phenolic compounds, which function as powerful antioxidants and increase the shelf life of cookies by preventing them from rancidity.(**Florence et al.,2014)**reported that replacement of refined wheat flour with semi-refined pearl millet flour in cookies significantly increased the levels of iron, calcium and phosphorus from 2.48%, 18.26% and 86.7% to 6.71%, 29.36% and 208.1%, respectively.

The nutrient content increased as the concentration of grape seed extract increased. Grape seed extract is suggested for the following conditions as alzheimer's, diabetes (blood sugar control), improving night vision, protecting collagen and elastin in skin (anti-aging), treating hemorrhoids, protecting against oxidative rancidity and bacterial pathogens **(Preuss *et al*., 2002).**

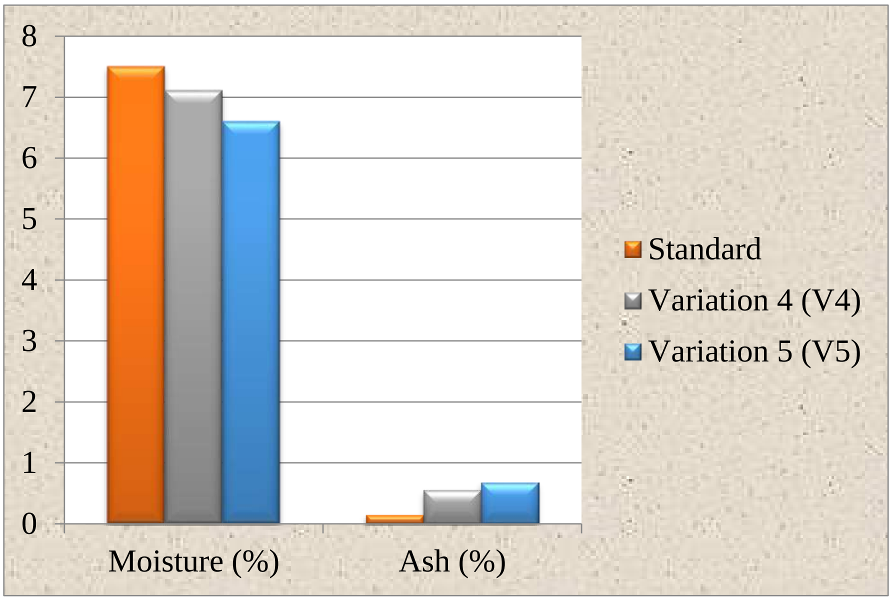

Fig.2. Moisture and ash content

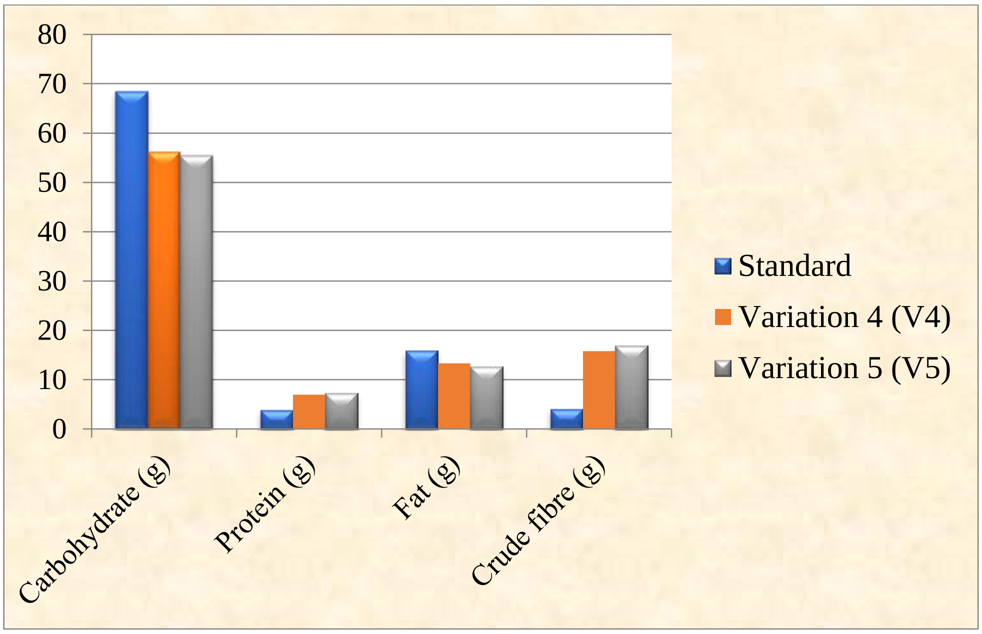

Fig.3. Proximate nutrient content

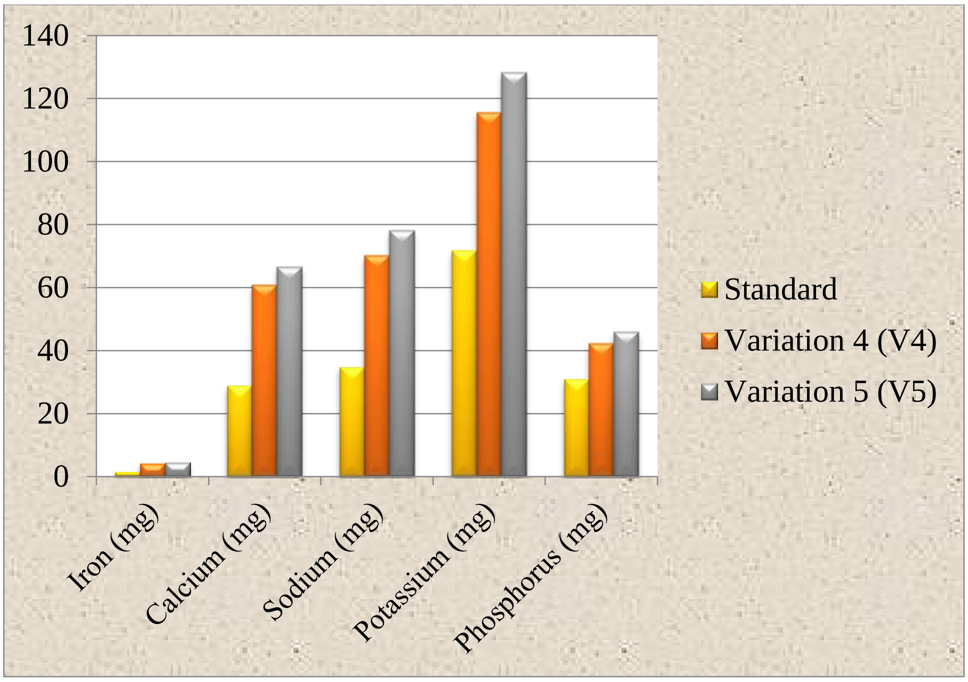

Fig.4. Mineral content

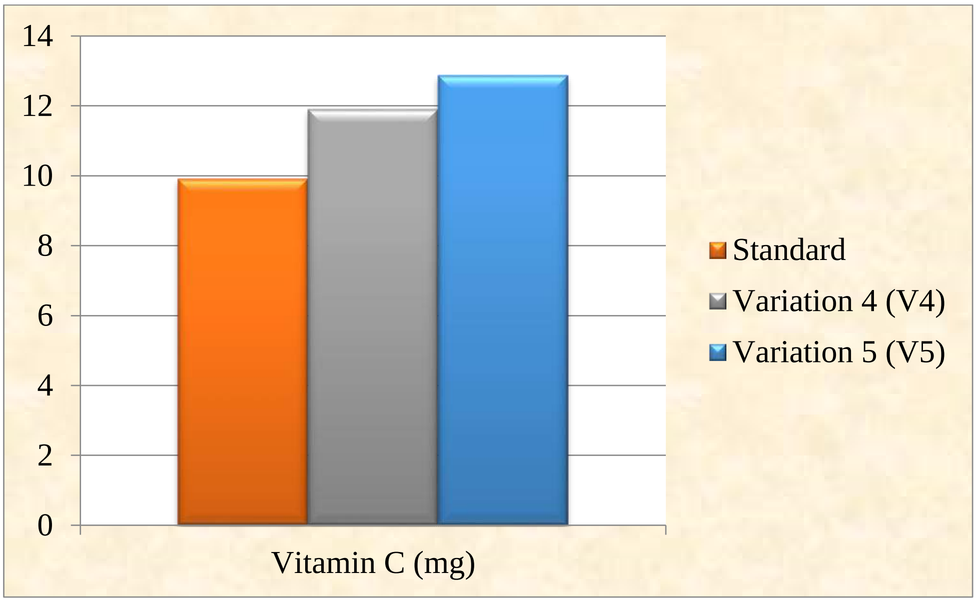

Fig.5. Vitamin content

3.3.Phytonutrient composition of standard and multi-millet cookies

Phytonutrient screening was done to understand the presence of flavonoids,saponins, anthroquinone, phlorotannins, glycosides, terpenoids, tannin, steroid and the result is presented in Table 4.

Table. 4. Phytonutrient composition

Phytonutrients	Standard	Multi-millet cookies	
		V_4	V_5
Flavonoids	-	-	-
Saponins	-	+	+
Anthroquinone	-	-	-
Glycosides	-	-	-
Terpenoids	-	+	+
Phlorotannins	-	-	-
Tannin	-	+	+
Steroid	-	-	-

Note: (+) Presence, (-) Absence

It is evident from the above table that the phytonutrients (i.e.,) flavonoids, saponins, anthroquinone, phlorotannins, glycosides, terpenoids, tannins, and steroids were absent in the standard. Saponins, terpenoids and tannins were present in the multi-millet cookies V4 and V5, whereas flavonoids, anthroquinone, glycosides, phlorotannins and steroids were absent. Phenolic compounds, including flavonoids, are safe and non-toxic antioxidants. High dietary intake of natural phenolics is strongly associated with longer life expectancy, reduced risk of developing chronic diseases like cancer, diabetes, and obesity, improved endothelial function and reduced blood pressure **(Halliwell et al., 2007; Yan et al., 2010).**

3.4. Total Bacterial Count (TBC)

The results of the total bacterial count for standard and multi-millet cookies on the 5^{th}, 7^{th} and 10^{th} day are presented in Table 5.

Table.5. Total Bacterial Count (TBC)

Samples	Total Bacterial Count Cfu/gm			
	0^{th} day	5^{th} day	7^{th} day	10^{th} day
Standard	Nil	Nil	Nil	Nil
V_4	Nil	Nil	Nil	Nil
V_5	Nil	Nil	Nil	Nil

The above table shows the total bacterial count for shelf life assessed for the variation V4 and V5 of multi-millet cookies and standard. It is noticeable from the results of storage stability of multi-millet cookies (V4 and V5), and the standard had no bacterial growth on the 10th day of storage at room temperature. Thus, the standard and multi-millet cookies had a storage life of 10 days.

3.5. Cost calculation of the multi-millet cookies

Best-rated variations (V4 and V5) of grape seed powder incorporated multi-millet cookies and standard. The ingredients used for 100g multi-millet cookies, and cost is presented in Table 6.

Table. 6.Cost calculation

Ingredients	**Quantity (gm)**	**Cost of Ingredients**
Ragi	10	0.30
Thenai	10	0.50
Saamai	10	1.40
Varagu	10	1.20
Kambu	10	1.50
Grape seed powder	5	2
Maida	10	0.50
Palm sugar	10	11
Cane sugar	10	0.50
Butter	20	2.20
Total		**21**

The total cost of 100g of multi-millet cookies was Rs. 21, and the standard cookie available in the market is sold for Rs 15. The multi-millet cookie cost was high due to its ingredients' quality. Thus, the multi-millet product is healthier than the standard cookie.

4. CONCLUSION

The multi-millet cookies have a substantial amount of nutrients and phytonutrients compared to the standard. The overall acceptability of multi-millet cookies was high for V4 and V5. The consumer acceptability of multi-millet cookies was also high for V4 and V5. The multi-millet cookies' proximate nutrient content and phytonutrient composition were higher than the standard. Thus, multi-millet cookies can be a value-added and alternate healthy snack item for children and adults. Millet consumption in the form of traditional recipes is on the rise. This would substantially increase millet production, processing and the mushrooming of cottage industries to deal with millet-based value-added products.

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ANALYSIS OF NUTRITIVE VALUE OF EDIBLE SPOON FROM KODO MILLET AND JAMUN SEED FLOUR

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ABSTRACT:
Nearly 3,000 years ago, the Kodo millet (Paspalumscrobiculatum) was cultivated in India.The whole kodo millet grain has a very high level of fiber and about 11% protein.Kodo millets are suitable for people who are gluten intolerant because they don't contain gluten. Because it has a higher level of lecithin, which is important for the health of the neurological system, kodo millet is very simple to digest. Postmenopausal women with signs of cardiovascular illness, such as high blood pressure and excessive cholesterol, can benefit greatly from regular use of Kodo millet. About a third of all food is wasted, according to the United Nations Food and Agriculture Organization (FAO).Food is wasted at every stage of production, from farming to distribution to retail to consumption. For the edible portion of this, there were 1.3 billion tonnes of food wasted altogether. Given that the product is composed of a variety of flours, it is typically recognized as being EBO (eco-friendly, biodegradable, and organic). Diabetes, allergies, viral infections, inflammation, and gastric ulcers are all treated with jamun seeds. Additionally, it has hypothermic, diuretic, anti-nociceptive, chemoprotective, and cardioprotectiveeffects.Jamun seeds are very useful and good for human health since they include anti-bacterial, anti-inflammatory, anti-oxidant, and anti-diabetic properties **(Taylor et .al,2008)**..The edible spoon trends in India are made of millet (kodo millet) blended with jamun seed flour and are 100 percent natural and do not contain artificial preservatives**(Roy&Morya,2022)**. These 'Millet Spoons' come in various flavors, like plain, sweet and spicy, in different taste.Edible spoon is a fast moving product around the world. Edible spoons are consumable and biodegradable. They can be eaten without serving anything in it. Edible spoon is considered to be very healthy.

KEY WORDS: *Kodomillet, Dietaryfiber, Jamunseed, Edible spoon*

1. INTRODUCTION:

Millet belongs to the family Poaceae, which can grow well under dry, high-temperature conditions as grasses with small seeds, and has been used as fodder and human food for around 10,000 years. According to the Food and Agriculture Organization of the United Nations (FAO), Asia and Africa are the predominant growers, while India, Niger, and China are the three most high-yield countries. Cultivated varieties of millet include pearl millet, finger millet, proso millet, foxtail millet (FM), etc.. In millet, several macronutrients, minerals (iron, zinc, phosphorus, calcium, potassium), and vitamins are higher than those in rice and wheat. Antinutrients such as phytates, polyphenols, and tannins reduce mineral bioavailability by chelating cations. Nevertheless, phytochemicals of millets such phenolic compounds exhibit antioxidant action via scavenging reactive oxygen species (ROS), reducing power, and/or metal-chelating activity towards ferric and ferrous ions. The abundance of protease and amylase inhibitors affects the grains' digestibility. Some important characteristic features are inherent in millet, such as hypolipidemic, low-glycemic index, and antioxidative characteristics. Because of its nutritional value, millet is used to make noodles, nutritious soups, hard drinks, pancakes, and cereal porridges worldwide.

Kodo millet or *Paspalumscrobiculatum* belongs to the family Poaceae, and is locally known as rice grass, ditch millet, cow grass in English, araka in Telugu and kodra in Marathi. Kodo millet grains are annual grains ranging from light red to dark grey. The cultivation of kodo millets started in India about 3000 years ago. Apart from India, it is cultivated in Russia, China, Africa and Japan. In India, it is widely grown in Madhya Pradesh, Tamil Nadu, Karnataka, Gujarat and Chhattisgarh. Among all millets available, it is well known for the highest drought resistance and produces high yield in a short duration thus is of great economic value. India is the world leader in the production of kodo millets, and thus its cultivation is of great economic significance. Kodo millets are cultivated in the kharif season (monsoon season) and are available in different varieties, namely Indira kodo, Jawaharkodo, TNAU, etc. Kodo millets are processed into high-value foods and drinks. Apart from economic and culinary benefits, kodo millets have numerous health benefits. Let us explore more about this superfood's nutritional value, health benefits, and side effects.

Jamun (*Syzygiumcumini* L. Skeels) is highly perishable with a very short shelf life, hence, jamun fruit is either consumed fresh as soon as it is harvested or converted to value-added products such as jam, wine, juice, and jellies. The processing of jamun fruit generates a large quantity of seeds as the primary waste. Jamun seeds are a rich source of macronutrients such as carbohydrates, proteins, lipids, minerals, and vitamins, thus making them an important ingredient in the food industry. The valorization of underutilized, nutritionally rich byproducts of the food processing industry has been providing new ways for unlocking their potential in the functional food industry or therapeutic food formulations. This review presents a detailed nutritional profile of jamun seeds and its potent application in the food industry as a possible functional ingredient. Along with its beneficial nutritional profile, the review also throws light upon the safety aspects associated with jamun seed consumption along with its acceptable daily intake**(Kumar,et,al,2022)**. Safety and toxicity studies have motivated researchers and industrialists to search for possible applications in the food industry. Jamun seeds with array of nutritional benefits can be an important functional ingredient; however, further extensive research is necessary to find suitable levels of application of jamun seed in food products for harnessing its nutritional potential without affecting the products' sensory palatability.

FIGURE:1.1

2. OBJECTIVE:

- To provide a nutritious and sustainable alternative to plastic spoons.
- To control the blood glucose level in diabetes patients.
- To promote weight loss.
- To create a new product that is both functional and delicious.

METHODOLOGY:

The methodology pertaining to the study "**Analysis of nutritive value of Edible spoon from kodo millet and jamun seed flour**"are as follows:

3.1.PROCESSING METHODS:

3.1.1.SELECTION OF RAW MATERIAL:

Four raw materials are required to manufacture edible spoons, i.e., sorghum flour, rice flour, wheat flour, and water. Manufacturing process begins with mixing all the raw materials into a dough. The dough is rested for about 6–10 minutes to settle the gluten. Afterward, the dough is converted into thin sheets. The sheets are placed on spoon molds and sent for baking process. After baking, the manufactured spoons are cooled for 5–10 minutes and then packed into a box. There are three machines required for the manufacturing process:

1. Dough kneading machine — Required to mix the raw materials into a dough.
2. Dough sheeter — Required to make the dough into thin sheets.
3. Molder and baking machine — The dough sheets are spread on the molds and sent for baking process.

3.1.2. INGREDIENT:

Measure 150g of kodo millet and rinse it well, drain water.Spread on a plate and dry it completely. Then grind it into fine powder.Sieve it, discard the coarse mixture. Transfer the flour to a clean dry container.Add 35g of kodo millet flour and 35g of wheat flour then add 30g of Jamunseed powder.

TABLE 1

INGERDIENTS REQUIRED FOR EDIBLE SPOON

INGREDIENTS	KWJSES
Kodo millet flour	35g
Wheat flour	35g
Jamun seed flour	30g

KWJSES-Kodo millet flour,wheatflour,Jamun seed flour,Edible spoon.

3.1.3. MIXING:

Dough mixing is a process in which flour and water are mixed until gluten is developed, a result of the enhanced interaction between dispersed and hydrated gluten-forming proteins. It’s quite different from batter mixing due to differences in their respective formulations—specifically, the proportion between dry and liquid ingredients.

FIGURE:3.1

3.1.4.ADDITION OF WATER:

The addition of water in the right amount can form a dough with optimum viscoelasticity properties so that the resulting gluten is also optimal This gluten ultimately hold the fermentation gas so that the dough is developed so that the optimum volume is generated .

FIGURE:3.2

3.1.5.KNEADING:

Kneading is the process of working a dough mixture to form a smooth and cohesive mass. It can be done by hand or mechanically. Proper kneading is essential for the formation of dough with adequate viscoelastic properties including:

- Gas retention capacity
- Breads with fine grain, texture and crumb.

FIGURE:3.3

3.1.6. MOULDING:

The material to be moulded is in a viscous form and is fed into the appropriate mould. As the moulding process progresses the material becomes firmer and solidifies, up to the point that it becomes a fixed shape.

FIGURE:3.4

3.1.7. BAKING:

Baking, process of cooking by dry heat, especially in some kind of oven. It is probably the oldest cooking method. Bakery products, which include bread, rolls, cookies, pies, pastries, and muffins, are usually prepared from flour or meal derived from some form of grain. Bread, already a common staple in prehistoric times, provides many nutrients in the human diet**.**

FIGURE:3.5

PACKAGING:

Food packaging is defined as a co-ordinated system of preparing food for transport, distribution, storage, retailing, and end-use to satisfy the ultimate consumer with optimal cost. Food packaging is an essential part of modern society; commercially processed food could not be handled and distributed safely and efficiently without packaging.

FIGURE:3.6

3.1. FLOW CHART:

Selection of raw material

↓

Kodo millet flour, Wheat flour and Jamun seed flour

↓

Mixing of all ingredients

↓

Addition of water/ oil/milk

↓

Knead to make smooth dough

↓

Fill into the spoon mould

↓

Bake the spoons at 160ºC for 20 mins in microwave oven

↓

Allow to cool

↓

Packing in airtight container

↓

Store in dry place

FLOW CHART:1

3.2. NUTRITIVE ANALYSIS OF EDIBLE SPOON:

Here the nutritive analysis of edible spoon was calculated using the standards values given by NIN(National Institute of Nutrition).

4. RESULTS AND DISCUSSION:

TABLE 2

NUTRITIVE ANALYSIS FOR KWJSES

INGREDIENTS	QUANTITY	ENERGY	PRTN	CHO	FAT	FIBRE

Kodo millet flour	35g	309	8.3	65.9	1.4	9.0
Wheat flour	35g	121.1	4.235	24.29	0.595	0.665
Jamun seed flour	30g	75.3	2.55	12.42	0.2905	5.07

The analysis for single edible spoon is

- The Energy found in edible spoon is **50.5kcal.**
- The Protein found in edible spoon is **1.505g.**
- The Carbohydrate found in edible spoon is **10.1g.**
- The Fat found in edible spoon is **0.21g.**
- The Fibre found in edible spoon is **1.46g** respectively.

5. CONCLUSION:

Edible spoons made from varagu rice and jamun seeds are a nutritious and sustainable alternative to traditional plastic spoons. They are a good source of carbohydrates, protein, fiber, vitamins, and minerals. They are also low in calories and fat.Varagu rice is a type of millet that is high in nutrients and fiber. It is also a good source of protein. Jamun seeds are a good source of vitamins and minerals, including iron, calcium, and phosphorus.So this Edible spoon helps to keep the Blood glucose level in control.It is recommended for Diabetic patients. These Edible spoon to make the as a Healtheir one.

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QUALITY EVALUATION OF COMPOSITE MILLET FLOUR INCORPORATED PIZZA BASE USING DESTRUCTIVE AND NON- DESTRUCTIVE METHODS

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ABSTRACT

Background : Millet flour provides a high quantity of essential amino acids especially the sulphur-containing amino acids (methionine and cysteine), fatty acids, minerals, vitamins, dietary fibre and polyphenols. In addition to the rich in nutrients , millet is used not as often in processed foods. Therefore, the Incorporation of millet flour could be used as value addition in the preparation of the pizza base.

Aim of the study : The present study aimed to develop a nutritionally rich composite millet flour incorporated pizzabase by optimizing the major ingredients like foxtail millet, little millet, sorghum, finger millet, kodo millet and refined wheat flour.

Materials and Methods: To lead this study, the millets mentioned above were optimized into composite millet flour. The nutritional, sensory and physical attributes notably image acquisition and analysis (Non-destructive method) were evaluated for the developed composite millet flour pizza base.

Results: It appears from the study that, V_2 formulation is prepared with the 24g of composite millet flourand 62.2g of refined wheat flour is standardized as it had the highest sensory score and consumer acceptability score of 8.5 and 8.8. Along with this, the nutrient composition of V_2variation pizza basecontains carbohydrate (101g), protein (15.72 g), fat (5.78g), crude fiber(7.04g), calcium (43.85mg) and iron (18.3mg) that arehigher than standard in terms of crude fiber, calcium and iron.The results of the image acquisition and analysis show that the composite millet flour incorporated pizza had a lower proportion (gas cells to the total area ratio) than the standard pizza and that the crumb pores of the composite millet flour incorporated pizza were larger as a result of the high fiber content of millet flour. The energy content was found to be 496.41 kcal/100g of the pizza. The cost of producing per composite millet flour incorporated pizza base was found to be Rs 10. Thus, the developed product is cheaper and healthier.

Conclusion: All this shows that the developed composite millet flour incorporated pizza is highly nutritious and acceptable with maximum retention of sensoryand physical attributes in comparison with standard.

Keywords:millet flour; pizza base; image acquisition and analysis; sensory attributes; physical attributes; overall acceptability

I. INTRODUCTION:

Millet is most important cereal after rice, and wheat and it is a ancient food crop in many parts of Africa and India. The following attributes about millet indicate that it is a highly significant crop: it has a shorter cultivation period than other main cereals and is recognized for its tolerance to pests and diseases as well as drought**(Devi et al., 2014)**.

Millets are attracting special attention in the emerging nations (including USA, China, & certain countries from the African Continent) in terms of use as food due to the above-mentioned positive attributes**(Sarita Singh, 2016)**. Millets are small, round shape grains that are packed with nutrients. They are mostly composed of crude fiber (2-7%), protein (7-11%), and fat (1.5-5%). Additionally, millets are rich in zinc, magnesium, iron, calcium, and vitamin B and lack of gluten**(Majid & Priyadarshini C G, 2020)**.

India has the third largest area under small millets cultivation in the world. The six small millet species grown are finger millet (*Eleusinecoracana*), little millet (*Panicumsumatrense*), Italian or foxtail millet (*Setariaitalica*), barnyard millet (*Echinochloacrusgalli*), proso millet (*Panicummiliaceum*) and kodo millet (*Paspalumscrobiculatum*)**(Anagha KK, 2023)**.

Foxtail millet boosts numerous of health benefits, including the prevention of cancer and cardiovascular disease, assistance with weight loss, and a decrease in blood cholesterol levels**(Abedin et al., 2022)**.

Little millet is also known as Heart millet as it is rich in magnesium which is an excellent source for maintaining steady blood pressure and heart rate, besides it is a nutritional powerhouse and an excellent source of protein, fibre, B vitamins, iron, zinc,and phosphorous **(Giri & Bhatia, 2021)**.

Sorghum has a unique phenolic profilewith simple phenolic acids, flavonoids, and tannins being the dominant groups conferswith a number ofhuman health benefits such as reducing oxidative stress and cancer prevention**(Xiong et al., 2019**).

Finger millets (Ragi) are a good source of minerals, dietary fibre, protein, and carbohydrate**(Kumar et al., 2023)**. Finger millet is favorable for small children, the elderly, and pregnant women since it is rich in calcium. Moreover, it is highly beneficial for lactating women as it aids in the production adequate breast milk**(Sunil et al., 2013)**.

Kodo millet rich source of bioactive compounds such polyphenols as well as potential functional properties such ashighest level of free radical activity (DPPH) followed by sorghum and finger millet**(Bunkar, 2021)**.

The United Nation officially recognizes 2023 as the "International Year of Millets" in response to India's request. The "National Year of Millets" has previously been celebrated in India during 2018. These statements tend to raise community awareness of millets' significance for nutrition as well as to develop millet-based food products for a healthy lifestyle. After a lot of deliberation, we opted for pizza which is a classic example of junk food, so in this study we attempt to develop a millet-based product that could motivate adolescents to eat well and live healthy lifestyle.One of the most often consumed products at fast food outlets was pizza, which increased in popularity while maintaining its market share despite the processed food industry's shifting dynamics**(Bhavya et al., 2020)**.Pizza is not a smart choice for adolescents who might end up with obesity and an increased risk of heart disease at a very young age due to its high in calorie, saturated fat, and sodium content and it is also low in fiber. However, adding millet flour to the pizza base will improve the nutritional value of the food and make it a better choice for a healthy lifestyle.The developed pizza base is believed to be rich in nutrient content and dietary fiber. Hence the study entitled **"Quality evaluation of composite millet flour incorporated pizza base using destructive and non- destructive methods"**as undertaken.

II. MATERIALS AND METHODS:

Good quality raw materials i.e., foxtail millet, little millet, sorghum, finger millet, kodo millet and refined wheat flour, yeast, sugar was procured from the local market of Dindigul, Tamilnadu, India.

Raw material Processing

The millets were cleaned manually to remove dust, broken seeds, other extraneous materials and sun dried. The dried millets were milled into flour using a pulverizerto obtain millet flour and theflour was further sieved through a 100 -mesh sieve (BSS).The millet flourwere kept in airtight polythenebags and stored at room temperature (18°C-33°C) in a cool and dry place until further use.

Physicochemical properties of compositemilletflour

Moisture, bulk density, water absorption capacity, oil absorption capacity and swelling capacity are the important physicochemical properties were studied using the standard **(AOAC, 1998)** and from this study **(Sunil et al., 2013).**

Development of composite millet flour incorporated pizzabase

The composite millet flour incorporated pizzabase was developed according to the results of the nutrient content and the physicochemical properties of the millet flour. The flour that had highest bulk density, water absorption capacity and swelling capacity was taken in higher concentration than the other millets. So, the millets namely foxtail millet, little millet sorghum, kodo millet, finger millet, were taken in the proportion of 30:30:30:5:5 for making composite millet flour for preparation of the pizza.

Formulation for composite millet flour incorporated pizzabase

The composite millet flour incorporated pizzabase was prepared with the following formulations.

Table 1 Formulation composite millet flour incorporated pizzabase

Ingredients	Standard (gms)	Variation (V_1) (gms)	Variation (V_2)(gms)
Maida	86.2	68.96	62.2
Millet flour	-	17.34	24
Yeast	3.45	3.45	3.45
Sugar	3.45	3.45	3.45
Oil	6.90	6.90	6.90

Fig1 Composite millet flour incorporated pizza base

Sensory evaluation of composite millet flour incorporated pizza base

A semi-trained panel of members evaluated the samples for sensory attributes such as appearance, colour, flavour, texture, and taste using a nine-point hedonic scale**(Singh-Ackbarali& Maharaj, 2014).**

Consumer acceptability of composite millet flour incorporated pizza base

Additionally, consumer acceptability was evaluated. Twenty-five adolescents college going girls were chosen to evaluate the consumer acceptability of the developed composite millet flour incorporated pizza base**(Singh-Ackbarali& Maharaj, 2014).**

Determination of physicalattributes of composite millet flour incorporated pizza base

The standard approach from the **(Covino et al., 2023)** was used to evaluate the spread ratio, specific volume, diameter, and thickness for the composite millet flour incorporated pizza base.

Spread ratio: The prepared dough (100 g) of standard and composite millet flour incorporated pizza were placed separately in a measuring cylinder and rested at room temperature for 20, 40 and 60 min. Before fermentation and at each proof time, the Width (W) and Height (H) of fermented dough were measured and the ratio (W/H) was calculated as an indication of dough spreading. At the end of each proof time the dough was baked for 190°C for 10 mins in an oven.

Specific volume: The prepared dough samples standard and composite millet flour incorporated pizza were baked in a microwave oven at the end of 20-, 40- and 60-min proofing. Diameter and thickness were measured in the baked pizza base.

Diameter: For the determination of the diameter, the pizza base was placed and the diameter was measured from one edge to another edge in millimeters using ruler.

Thickness: To determine the thickness, the pizza base was placed and the total height was measured in millimeters using ruler.

Image acquisition and analysis of composite millet flour incorporated pizza base

Images of the sliced pizza were captured using a flatbed scanner (HPscanjet G2410) with 600 dpi of resolution and analyzed in grey-level image (16 bits). Image analysis was performed using MATLAB (MATHWORKS.com). A threshold method was used for differentiating gas cells (pores) and non-cells,Form factors indicating gas cell to the total area ratio (proportion) were recorded.

Computation of nutrient composition for composite millet flour incorporated pizza base

The developed pizza base was estimated for proximate nutrients namely protein, iron and fiber using standard procedures**(Lowry's et al., 1951) (Raghuramalu,2003)(AOAC, 1998).**The other nutrients namely carbohydrate, fat, calcium and energy are computed from Nutritive Value of Indian Foods **(ICMR,2010)**.

Cost calculation for composite millet flour incorporated pizza base

The cost of the accepted variation V_2 of the developed pizza base was calculated taking into account of ingredients used, processing and other charges.

III. RESULTS AND DISCUSSION:

Physicochemical properties of the millet flour and composite millet flour

The selected millets were made into flour and their physicochemical properties were evaluated. Among the selected millet flour the moisture and swelling capacity was higher in foxtail millet (0.308 and 239.6), and water and oil absorption capacity in little millet (283.5 and 194.1), bulk density was higher in sorghum millet (176.1 and 173.3). From the results of the physicochemical properties the combination of millets for composite flour was decided and the flour that had higher bulk density, swelling capacity and water holding capacity were taken in higher proportion as a result sorghum, little millet and foxtail millet were taken in larger quantity of 30 parts each and the other two millet were taken 5 parts each. Physicochemical properties of the flour of the selected milletsand composite millet flour are presented in Table 2.

Table 2 Physicochemicalproperties of thewhole millet flour and composite millet flour

Physicochemical properties	Foxtail millet	Little millet	Sorghum	Finger millet	Kodo millet	Composite Flour
Moisture (%)	0.308	0.254	0.221	0.257	0.209	0.542
Water absorption	261.8	285.3	242.4	264.7	264.1	142.9

capacity (%)						
Oil absorption capacity (%)	184.6	194.1	183.5	153.6	181.8	83.2
Swelling capacity (%)	239.6	178.7	152.5	183.6	188.7	1.092
Bulk density(g/cc)	1.509	1.523	1.761	1.684	1.476	1.562

Table 3 Comparing the physicochemical properties of the composite millet flour and wheat flour

PHYSICOCHEMICAL PROPERTIES	COMPOSITE MILLET FLOUR	WHEAT FLOUR*
Moisture (%)	0.542	13.284
Water absorption capacity (%)	142.9	140
Oil absorption capacity (%)	83.2	146
Swelling capacity (%)	1.092	17.60
Bulk density (g/cc)	1.562	0.762

*(**Sunil et al., 2013)** values are taken as reference to compare with the developed composite Millet flour.

Water absorption capacity represent the ability of a product to associate with water under conditions where water is limited. The highest WAC(142.9%) of composite millet flour could be attributed to the presence of higher amount of carbohydrates (starch) and fibre in this flour. Water absorption capacity is a critical function in various food products like soups, dough and baked products. The moisture content was found to be 0.542% and bulk density of 1.562g/cc. Similar study conducted by **(Agu et al., 2010)**on incorporating bread fruit in wheat biscuit had moisture content ranged from 1.001 to 2.001% it is higher than the common cream biscuit and digestive crackers so it was concluded that the moisture content vary according to the type of ingredients used . Water and oil absorption index and swelling power was found to be 1.429, 0.832 and 1.092 respectively. The most important criteria of bread quality may be final bread volume. The best bread volumes were obtained with medium strength flour combinations **(Bruckner et al., 2001).**

Standardization of composite millet flour incorporated pizza

The evidences of time, temperature of baking, equipment's used and weight of the standard and composite millet flour incorporated pizza is presented in Table 4

Table 4 Standardization of composite millet flour incorporated pizza

Name of the Recipe	Raw Ingredients (g)	Preparation Involved	Equipment Used	Time Taken
Standard pizza	100	Baking	Electric oven	20 min
V_1	100	Baking	Electric oven	20 min

V_2	100	baking	Electric oven	20 min

Preparation methods involved, equipment used, cooking quality, time taken and temperature to prepare the pizza were recorded for standardization of the recipes. It is clear that the baking time was 20 minutes and it was uniform for all the variations including the standard. There was a minor change in the baked weight of the developed pizza this may be attributed to the different ingredients added for the development of the pizza.

Sensoryevaluation of the composite millet flour incorporated pizza

The results of the sensory evaluation of thecomposite millet flour incorporated pizza is presented in Table 5

Table 5 Sensory evaluationfor thestandard and composite millet flour incorporated pizza

Attributes	**Standard Pizza**	**Composite millet flour incorporated pizza**	
		V_1	**V_2**
Appearance	8.6	6.4	8.6
Colour	8	7.6	8.7
Flavor	8.4	8	8.4
Texture	8.6	6.8	8
Taste	6.8	8	8.6

It is clear from the table that the mean sensory score for the variation (V_2) of the composite millet flour incorporated pizza was higher than the standard and variation (V_1).The mean sensory score for V_1 of the composite millet flour incorporated pizza had an appetizing taste and flavor but it required improvement in colour, appearance and texture. Whereas colour and taste were found to have low scores for the standard pizza. Among the two, variation (V_2) had higher scores for all the attributes. Thus, from the sensory evaluation it is clear that the variation (V_2) prepared by replacing 24g of refined wheat flour with composite millet flour had an affirmative texture, flavor and taste.

Consumer acceptability of composite millet flour incorporated pizza

The developedpizza basewas served to 25 respondents who were also given a score card to evaluate the consumer acceptability. The findings of the scores are collected and reported in Table 6 and Figure 2 represents the consumer acceptable (V_2)Composite millet flour incorporated pizza**.**

Fig2 Consumer acceptable composite millet flour incorporated pizza

Table 6 Consumer acceptability of the composite millet flour incorporated pizza

Product	Consumer Acceptability Score
Standard	8.08
V_1	7.36
V_2	8.8

Table 6 above shows the findings of the consumer acceptability of the developed composite millet flour incorporated pizza and standard. The variation (V_2) had a high mean consumer acceptance score of 8.8 compared to standard and other variation.Thus, it is evident that consumers like experimenting with different pizza base, flavoursand textures and even willing to acceptany nutritious alternative similar with Junk food. Thus, variation (V_2) was chosen for further investigation based on the results obtained from table 5 and 6.

Physical properties of composite millet flour incorporated pizza

The following physical properties of standard and composite millet flour incorporated pizzabase were determined and the results of spread ratio and specific volume are tabulated.

Table 7 Spread Ratio of Standard and Composite millet flour incorporated pizza

Spread Ratio	Initial	After proofing
Standard	1.6	1.8
Composite millet flour incorporated pizza	1.6	1.89

The effects of flour source(millet) and starch, and proof time on the mean spread ratios of dough and microwave-baked pizza are presented. The spread ratios at the end of each proof time ranged from 1.6 to 0.89. Flour combinations and proof time significantly affect the spread ratio of the dough.

Table 8 Specific Volume of Standard and Composite millet flour incorporated pizza

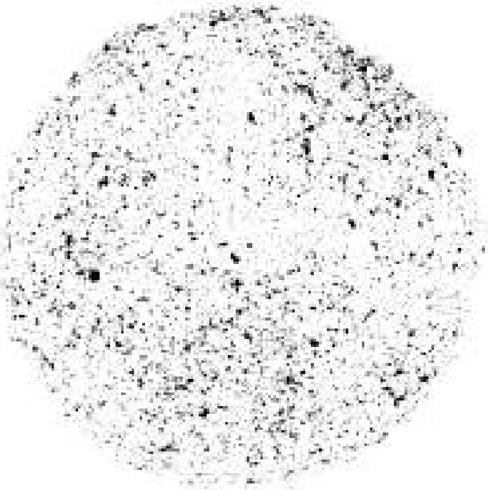
	Specific volume	
Time (mins)	**Standard Pizza(ml)**	**Composite millet flour incorporated pizza(ml)**
20	350	275
40	450	400
60	475	450

Dough samples were baked in a microwave at the end of 20-, 40- and 60-min proof time.The specific volume of composite millet flour incorporated pizzawas 275 ml for 20 min, 400 ml for 40 min and 450mL for 60 min of fermentation and pizza volumes significantlydiffered from each other and when compared with the specific volume of the standardpizza and a significant difference was observed. The standard pizza was 350ml for 20mins, 450ml for 40mins and 475ml for 60mins. Total fermentation time of standard pizza was approximately 60min. Therefore, the specific volumes of composite millet flour incorporated pizza after 60min of proof time were used for comparison with the standard pizza. Only flour source significantly affects the specific volumes of composite millet flour incorporated pizza. Studies carried out by **(Covino et al., 2023)** reported that the higher W/H ratio of dough indicates more spread as a result of viscous flow of fermenting dough. Starch is an interacting ingredient in flour water dough system; therefore, addition of starch, reducing gluten quality increased viscous-flow and gave higher dough spread and volume. The result of the present study also proves the same because the gluten content of composite millet flour incorporated pizza would have had lower gluten content than the standard.

Image acquisition and analysis of composite millet flour incorporated pizza

In the search for improved baked product formulations, image processing is a useful tool in Non-destructive way to investigate, approximate and predict many properties, such as texture **(P.Scheuer et al., 2015)**by assessing cell size, cell size distribution, number of cells per unit area, cell wall thickness, void fraction and shape factor. The gray image was processed using threshold technique and the results of the image analysis is presented in Figure 3 and Table 9

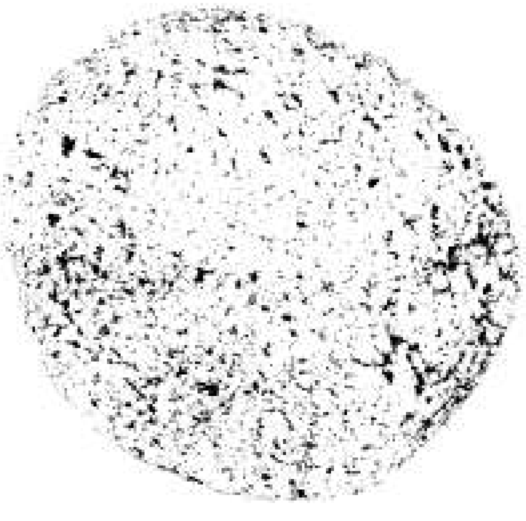
Fig 3 Image Analysis of the standard andcomposite millet flour incorporated pizza



Gray Image

Threshold Image

Composite millet flour incorporated pizza



Gray image

Threshold image

Table 9 Image analysis of the standard and composite millet flour incorporated pizza

Particulars	Proportion	Threshold Value
Standard pizza	0.1176710	165
Composite millet flour incorporated pizza	0.09373106	135

The composite millet flour incorporated pizza had lower proportion than the standard pizza and in the terms of crumbs, composite millet flour incorporated pizza had larger crumb pores because of millet flours having high fiber content than standard. This can be explained by the fact that fibers can dilute and interrupt the gluten–starch matrix, thus causing a restriction in gas retention, as reported in whole-oat bread by **(Scheuer et al., 2015)(Polaki et al., 2010)** It is also reported that presence of fiber hinders the formation of air bubbles in the viscoelastic gluten network and emphasized that the gas retention of the dough is impaired largely by water-insoluble fractions, thereby changing the texture and appearance of the baked product**(Polaki et al., 2010)** This is consistent with the results of the present study.

Nutritional Composition Analysis

The nutrients namely protein, iron, total ash and crude fiber were analyzed using standard procedures.The nutrients namely carbohydrate, protein, fat along with these nutrients' total ash, crude fiber were analyzed using standard procedures and energy was computed from the three major nutrients. The proximate nutrients namely carbohydrate, fats and calcium were computed from the raw ingredients with the use of Nutritive Value of Indian Foods, **(ICMR, 2010).** The result is presented in Table10

Table 10 Estimated and Computed Nutrient Content of the standard and Composite millet flour incorporated pizza

Nutrients /100gm	Standard Pizza	Composite millet flour incorporated pizza(V_2)
Ash (g)	0.823	0.974
Energy (kcal)*	517.1	496.41
Carbohydrate (g)*	99.66	101
Protein (g)	14.54	15.72
Fat (g)*	6.78	5.78

Crude Fiber (g)	0.37	7.04
Iron (mg)	3.3	18.3
Calcium (mg)*	17.35	43.85

*Computed nutrients

Based on the evidence from the table 10, it has been found that the composite millet flour incorporated pizzacontains 7.04g of crude fiber, 18.3mg of iron, and 43.85 mg of calcium. While a standard pizza has 0.37 g of crude fiber, 3.3 mg of iron, and 17.35 grams of calcium, respectively. The results show that composite millet flourincorporated pizza has a greater nutritious content than standard pizza in terms of crude fiber, iron and calcium. High fiber content was due to the presence of multigrain in the developed pizza. The energy content was found to be higher in standard than composite millet flour incorporated pizza with 21 kcals more from the other. The protein content of the developed pizza(15.72g) was found slightly higher than in the standard pizza (14.54g) was also due to the addition of millets.

Cost Calculation

Table 11 Cost Calculation for Standard and Composite millet flour incorporated pizza

Ingredients for standard pizza	Quantity (g)	Cost of Ingredients	Ingredients for Composite millet flour incorporated pizza	Quantity (g)	Cost of Ingredients
Millet flour	-	-	Millet flour	24	2.8
Maida	86.2	4.31	Maida	62.2	3.11
Oil	6.90	1	Oil	6.90	1
Sugar	3.45	1	Sugar	3.45	1
Yeast	3.45	2	Yeast	3.45	2
Total	-	8.31	Total	-	9.91

The cost of producing 100g of composite millet flour incorporated pizza base was found to be Rs10. The developed product is cheaper but slightly higher than the standard pizza base. The cost does not include the cost of packaging ,dressing and labeling.

Conclusion:

The development and acceptability of composite millet flourincorporated pizza base is a promising new approach for improving the nutritional value of a popular food. Millets are a nutritious group of cereals has become increasingly popular as a healthy and economic alternative to cereal-based food products. By incorporating millet flour into pizza base, a popular food that is enjoyed by people of all ages, we can help to increase millet consumption and improve nutritional intake among the community.The sensory evaluation showed that the composite millet flourincorporated pizza was well-accepted by consumers and rated highly for its taste, flavor, texture, and appearancebut also nutritionally dense with high fiber, calcium and iron content and low in calories and fat.The cost of the product was also reasonable. This suggests that composite millet flour can be used to develop nutritious and delicious food products that are acceptable to consumers.However, the development of composite millet flourincorporated pizza shows that millets can be used to develop a wide range of food products, including processed foods. This opens up new possibilities for the use of millets in the food industry.

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DEVELOPMENT AND SENSORY EVALUATION OF RAGI WHEAT COMPOSITE CAKE

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Abstract:

In India, ragi (Eleusine coracana) is the most common and important finger millet. Because of its high calcium content (380 mg), dietary fiber content (18 g), and phenolic compounds content (0.03–3 g) per 100 g, ragi is nutritionally superior to wheat and rice.The experiment was carried out to improve the procedure for creating more palatable ragi-wheat composite cakes. Children and women, especially during pregnancy and lactation, need a lot of calcium. The level of Rag flour and refined Wheat flour was optimized using an orthogonal array design. During the experimentation, four different grades of refined Wheat flour and Ragi flour were experimented.Astandard set of techniques was used for the product's chemical analysis.

Keywords: Sensory; Wheat-Ragi; cake; orthogonal array design

Introduction:

Ragi (Eleusine coracana), a plant belonging to the Gramineae family, is the name given to finger millet. People from the arid and semi-arid regions favor finger millet above other cereal crops as a main source of nutrition. However, millets satiate the desire of countless people, particularly those who reside in hot, humid climates.1 Millets are a staple crop in many underdeveloped nations where agricultural productivity is negatively impacted by unfavorable climatic conditions like insufficient rainfall. Ragi's grain resembles reddish mustered. It is typically collected between December and January. Only ragi makes up 25% of the whole production of cereal grains. India and South Africa are two of the biggest ragi-producing nations in the world. While Tamil Nadu (1630 MT), Maharashtra (161 MT), and Karnataka (161 MT) (1630 MT), Tamil Nadu and Maharashtra (161 MT) are leading state of Ragi.2

Low-income communities in a southern region of India consume ragi balls and unleavened bread/roti as part of their daily diet.2 Because of its high levels of calcium and iron and dietary fiber, finger millet is now more important than ever. Additionally, because of its high calcium content (380 mg), dietary fiber content (18 g), and phenolic compounds content (0.03–3 g) per 100 g, it is nutritionally superior to wheat and rice. The polyphenol and dietary fiber content of ragi is credited with providing health advantages. It has anti-diabetic, anti-tumorigenic, anti-atheroclerogenic, antioxidant, and other positive health benefits.3 Because ragi takes a long time to digest, giving the carbohydrate more time to be absorbed, it is the perfect food for diabetics and obese people.4,5 There are three variables that are detrimental to nutrition in theParaphrase without limits.
Namely, tannin, phytic acid, and trypsin inhibitor. As a result, ragi malt and fermented ragi drink are well-known traditional foods.6 Finger millet's digestibility, sensory quality, and nutritional value are all improved

by the malting process, which also reduces its anti-nutritional elements. In addition to unleavened bread and ragi balls, other popular items in the market include ragi idly, pasta, ragi malt, ragi dosa, etc.

Improved nutritional security is achieved through processing and value addition of finger millet.6 The cake is a product made by baking a batter that contains flour, sugar, shortening, egg, milk, or other liquids as well as leavening and flavoring ingredients.2 The cake is a significant and delectable food that is consumed worldwide for various occasions. Due to a shift in attitude, a change in lifestyle, urbanization, a busy lifestyle, greater employment of women, and higher per capita income, the globalization environment has raised demand for cakes. Malting has a number of advantages, including the development of vitamin C, enhanced phosphorus bioavailability, and the synthesis of lysine and tryptophan.6 Consequently, an effort was made to substitute Ragi flour for Wheat flour when making cake.

Resources and Procedures:

Raw substance:

Refined Wheat flour, Ragi flour, sugar, soybean hydrogenated vegetable oil, eggs, milk powder, vanilla essence, and baking powder are the main components of a ragi-wheat composite cake. The local market in Chiplun, District-Ratnagiri (Maharashtra, India), was where all of these ingredients were obtained. Different code numbers were assigned to each sample of cake made with 0, 10, 15, or 25% Ragi flour in refined Wheat flour. The flour that is creamy white and bran-free was chosen. The sweetener used was sugar. A local brand of hydrogenated soybean oil was employed as a leavener. As an emulsifier and tenderizer, shortening is employed. Eggs serve as an emulsifier, structure-builder, and tenderizer, while baking powder helps the product to be lighter and easier to digest.2

Statistical analysis and experimental planning:

In order to create a mixture of several ingredients, primarily a quantity of Ragi flour and a ratio of wheat flour, the Taguchi experimental design approach was used (Table). Taguchi design is a practical and effective approach for streamlining the product development process.7 Every aspect in the design has been assigned the same weight, allowing for independent analysis of each factor relative to the others. The functional features of a product can diverge from their target values due to a number of uncontrollable variables. These elements are referred to as noise elements (such as human errors).

Table-1: Composition of ragi flour

INGREDIENTS	CONTROLS

Refined wheat flour(g)	100
Ragiflour	0
Sugar (g)	100
Soybean hydrogenated vegetables oil(g)	30
Eggs(Nos)	02
Milk powder (g)	02
Baking powder (g)	01
Vanilla essence(g)	03

Treatment of Raw Materials Before Processing:

According to the experimental design, all the raw ingredients needed to make the ragi-wheat composite cake were weighed. depicts the manufacturing process for cakes.

the production process for ragi-wheat composite cakes.: Process flow diagram for producing ragi-wheat composite cakes Click here to see the graphSugar, milk powder, baking powder, refined wheat flour, and ragi flour were sieved. Initially, soybean hydrogenated vegetable oil (30g) and sugar (100g) were mixed together to obtain a creamy texture. Two whole eggs were beaten to get foamy consistency and then essence (3ml) was mixed with it. The mixture of egg and essence, vegetable oil and sugar, baking powder (1g), milk powder (2g), and flour were mixed at highest speed of blender as per experimental design so that homogeneous mix obtained. The mix was then poured into agreased pan (20×5 cm) and baked at 170ºC for 25 min in the baking oven. To ensure completion of baking, a sterilized toothpick was inserted into the centre of the cake. After commencing of baking, the cake allowed to cool for 15-20 min and then pack using PET tray and polyethene bag.

To begin, sugar (100g) and soybean hydrogenated vegetable oil (30g) were combined to create a creamy texture. After beating two whole eggs to a frothy consistency, 3ml of essence was added. According to the experimental plan, the mixture of egg and essence, vegetable oil and sugar, baking powder (1g), milk powder (2g), and flour was blended at the fastest speed possible to produce a homogeneous mix. The mixture was then placed into a prepared 20 by 5-inch baking pan and cooked for 25 minutes at 170 degrees Celsius. A sterile toothpick was pushed into the cake’s center to check if the baking was finished. Following the start of baking, the cake was given time to cool for 15-20 minutes before being packaged in PET trays and polyethene bag.

Near-term analysis:

With the aid of the factor 6.25 Nitrogen (%), the cake's protein, fats, ash, and moisture content were all analyzed.9 The carbohydrate content of various cake samples was calculated by deducting these values from the total weight using AOAC approved techniques.9

Sensory Evaluation of Developed Ragi-Wheat Composite Cake

A panel of 100 people evaluated the Wheat-Ragi composite cake's sensory attributes, including appearance, color, flavor (aroma), taste, texture, and overall acceptability, using a nine-point hedonic scale.10 Teachers, technical staff, and students from the S.P. College of Food Technology in Kharawate-Dahiwali, Maharashtra, were on the panel. The evaluation of the sensory attributes, including appearance, color, flavor, taste, texture, and general acceptability, was done by giving each attribute a maximum score of 9.

Results and Discussion:

The study was conducted to replace wheat flour by using Ragi flour at S. P. College of Food Technology, Kharawate-Dahiwali (Maharashtra). All experiments were performed using design given in Table 1. The data obtained through sensory evaluation of cake prepared using orthogonal array design is as shown in Table

Sensory evaluation of Wheat-Ragi composite cake:

The sensory characteristics of ragi cake such as appearance (colour), flavour (Aroma), taste, texture and overall acceptability were evaluated by a panel. Each product sample was evaluated on a nine-point hedonic scale where 9 represented like extremely and 1 represented dislike extremely as shown in Table

The Findings and Discussion:

A study was done at the S. P. College of Food Technology in Kharawate-Dahiwali, Maharashtra, to substitute wheat flour with ragi flour. All tests were conducted with the design detailed displays the information gleaned from the sensory assessment of a cake made with an orthogonal array pattern.

Sensory analysis of a cake made of wheat and ragi:

A panel assessed the sensory qualities of ragi cake, including appearance (color), flavor (aroma), taste, texture, and overall acceptability. As indicated in Table , each product sample was rated on a nine-point hedonic scale, with 9 denoting a strong preference and 1 a strong distaste mode

TABLE 2: SENSORY ANALYSIS

Colour:

Any baked good's acceptance depends greatly on its color. The findings demonstrated that cakes made with 90% wheat flour have superior color and score 7.8 on the hedonic scale compared toother combinations while controls had the maximum score of 8. The color of the cake shifts from light brown to dark brown as the percentage of Ragi flour rises, lowering its acceptance based on color. Both Sudha et al., 10, and Zubairuddin et al., 2, discovered results that were similar.

Flavour:

Any baked good's flavor has a significant effect in how people perceive it. The outcome demonstrated that adding ragi flour initially enhanced flavor as there was a rise in score up to 8 for ragi flour additions of 20%. However, the sensory score on a hedonic scale was afterwards reduced to 7.5 by the addition of ragi flour above 20%.

Taste:

Any food product's acceptability is mostly based on how it tastes. Cake's flavor is enhanced when ragi flour is added in place of wheat flour. The cake containing 20% Ragi flour received a higher rating, 8.1. However, adding extra Ragi flour makes baked goods taste slightly bitter, which caused the score to drop significantly to 7.4.Taste

Texture:

The Wheat-Ragi flour composite cake had the grainy texture as reported by panellists (up to 20 % of ragi flour). The cake prepared from 25% Wheat-Ragi composition had excessive grainy appearance which caused reduction in its texture acceptability. The lower scores of appearances may be due to decrease in sponginess of cake resulting from a decrease in gluten content.10, 11 The results obtained during the study were comparable with those found for Ragi based noodles.11Texture

Generally acceptable:

The S/N ratio for 20% inclusion of Ragi flour with 80% wheat flour exhibited better noise, or more acceptance, according to analysis utilizing Taguchi orthogonal array design. The lowest S/N ratio for that level was 17.30 for the 25% inclusion of ragi flour, while the highest S/N ratio for that level was 18.18. Although the nutritional content of the cake was boosted by the addition of Ragi flour, after a 25% addition, the cake's sensory appeal began to decline. As a result, it may be advised to add 20% Ragi flour to wheat flour when making cake.The general acceptance of the Ragi-wheat composite biscuit was primarily determined by its hardness, mouthfeel, and flavor.12

Near-term analysis:

The optimum Wheat-Ragi Composite cake with a 20% Ragi flour inclusion level in Wheat flour is proximally analyzed in Table . The composite cake had less moisture than the control. Results were comparable to those of other scientists.13 The outcomes of the proximate analysis were comparable to those assessed by Majumder6, except they contained more ash and less fat. High ash content data indicated the presence of the most minerals, which could be a varietal trait.

Table-3: composition of ragi wheat cake.

S.No	Component	Percentage
1	Moisture content	12.40
2	Protein	7.80
3	Fat	13.20
4	Ash	1.2

Conclusion:

Incorporating Ragi flour to replace Wheat improves the nutritional quality and palatability of the cake compared to the control sample, according to a study on the development and sensory evaluation of a Wheat-

Ragi Composite cake. Based on the study's findings, the sensory panel approved a 20% level of Ragi flour inclusion in Wheat flour for cake production. The created Wheat-Ragi composite cake will benefit growing children, teenagers, expectant mothers, nursing mothers, and anemic patients. More research will therefore be needed on the nutritional makeup of this food, particularly with regard to some crucial micronutrients as calcium, iron, vitamins B1, B2, B6, B9, and B12.

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EXPLORING THE NUTRITIONAL AND SENSORY ASPECTS OF BARNYARD MILLET BREAD: A Comprehensive Review

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ABSTRACT:

Barnyard millet is one the significant millet plant in Asia. The genus Echinochloa comprises of two major species, Echinochloaesculenta and Echinochloafrumentacea, which are most importantly cultivated for human consumption and forage. Barnyard millet grain is a good source of protein, carbohydrate, fiber, and, most notably contains more micronutrients (iron and zinc) than other major cereals.Ooda, oodalu, sawan, sanwa and sanwank these are the other name of barnyardmillet.It is an suitable food for patients who are intolerant to glutenthose with celiac disease. It can be potentially recommended for patients with cardiovascular disease and diabetes mellitus. Bread is the most staple for prehistoric periods. Baked products are integral to human health with plenty of major nutrients, antioxidants and vitamins. After thousands of year people consume bread regularly. The product of barnyard millet bread has been devoloped.The above product was analysed for nutritional composition. The product are subjeced to sensoryanalysis by 20 semi trained panels.

Keywords:*Gluten,Bread,,antioxidants,micronuteients,intolerence,Cardiovascular,oodalu,Semitrained panels.*

INTRODUCTION:

Bread is one of the oldest prepared foods in the world, with evidence of bread-making dating back over 30,000 years. The earliest breads were made from coarsely crushed grain mixed with water and baked on heated stones. The Industrial Revolution brought about many changes to bread-making. New machines were developed that could automate the process of kneading and baking bread.

This made it possible to produce bread on a larger scale and at a lower cost. Bread has played an important role in human history and culture for thousands of years. It is a staple food for many people around the world, and it is used to make a variety of delicious and nutritious dishes. Bread, a vital constituent of human food basket uses refined wheat flour (RWF) as a key ingredient.

Bread made from RWF provides carbohydrate, proteins and certain minerals (magnesium, iron, phosphorus). Addition of new ingredients to dough has been attempted to improve quality in terms of nutritional value of breads. Present times is witnessing a shift in consumer preference for food not only with rich nutritional attributes, but also with characteristics either promising reduced incidence of diseases or at least having the features of delaying the onset of disorders Globally, India is the biggest producer of barnyard millet, both in terms of area and production Barnyard millet bread is a type of bread made using barnyard millet flour as one of its main ingredients.

Barnyard millet is a nutritious and gluten-free grain that can be used in various recipes, including bread. Barnyard millet flour in combination with other gluten-free flours like rice flour or tapioca flour to make a gluten-free bread. There are many recipes available for making barnyard millet bread, which can be a healthy and tasty alternative for those with gluten sensitivities.

OBJECTIVES:

- Create a nutritious and healthy bread alternative by incorporating barnyard millet, which is rich in fiber, vitamins, and minerals, to meet the demands of health-conscious consumers.
- Develop a bread with an appealing taste and texture that is comparable to traditional wheat bread,

ensuring that consumers enjoy the product.

- Aim to make the product gluten-free and allergen-free to cater to individuals with dietary restrictions or allergies.
- Ensure that the bread has a reasonable shelf life and can maintain its quality over time, making it suitable for distribution and retail.

METHODOLOGY:

Selection of millet and other ingredients:

Choose high-quality barnyard millet grains. They should be clean, free from contaminants, and have a uniform size. Check the protein content of the millet. Higher protein content can contribute to better bread texture and structure. Barnyard millet is naturally gluten-free. If you need a gluten-free bread, this is a good choice. However, you might need to add binding agents like xanthan gum to improve texture.

Consider the mild, nutty flavor of barnyard millet. This can add a unique taste to your bread. Ensure it complements your desired bread flavor. Experiment with the millet flour in small batches to understand its baking properties. It may require adjustments in hydration levels, leavening agents, and baking time compared to traditional wheat flour.Itmight want to blend barnyard millet flour with other gluten-free flours like rice or sorghum for better texture and flavor balance. Depending on the millet's characteristics, you may need to experiment with yeast, baking powder, or other rising agents to achieve the desired bread volume and texture.

Formulation of bread:

- All purpose flour
- Warm water
- Dry yeast
- Sugar
- Vegetable oil and melted butter

These ingredients are mixed together and baking for certain time and temperature.

Formulation of gluten free barnyard millet bread

- Barnyard millet
- Dry yeast
- Warm water
- Salt
- Sugar
- Melted butter
- Sweet potato

In barnyard millet bread making process slightly differed from normal bread. In this millet bread adding millet flour is incorporated mixing the all these ingredients and baking for certain temperature and time.

INGREDIENTS	VARIATION 1	VARIATION 2
Barnyard millet flour	75g	80g
Sweet potato	25g	20g
Salt	2g	2g
Sugar	10g	10g
Dry yeast	2 tsp	2 tsp
Melted butter	10 ml	10 ml

- In a mixing bowl, combine the barnyard millet flour and whole wheat flour.
- Warm the water slightly (about 110°F or 43°C). Add a pinch of sugar and stir in the yeast. Let it sit for about 5-10 minutes until it becomes frothy.
- In a separate bowl, mix the yogurt, olive oil, and activated yeast mixture.
- Gradually add the wet mixture to the flour mixture and knead it into a dough. Add the salt and baking powder during this process.

- Knead the dough for about 5-7 minutes until it becomes smooth and elastic. If it's too sticky, you can add a bit more flour.
- Place the dough in a greased bowl, cover it with a damp cloth, and let it rise in a warm place for about 1-2 hours or until it doubles in size.
- Preheat your oven to 350°F (175°C).
- Punch down the risen dough and shape it into a loaf. You can use a bread pan or shape it by hand
- Cover the shaped loaf and let it rise for another 20-30 minutes.
- If desired, sprinkle some seeds or nuts on top of the loaf. Bake in the preheated oven for about 30-35 minutes or until the bread is golden brown and sounds hollow when tapped on the bottom.
- Remove the bread from the oven and let it cool on a wire rack for a while before slicing.

Food sensory evaluation is the scientific discipline of evaluating the sensory properties of food, such as appearance, aroma, taste, texture, and mouthfeel. It is a systematic and objective process that uses the human senses to assess the quality of food products.Sensory evaluation is conducted by trained panelists, who are able to accurately and consistently perceive and describe the sensory attributes of food. There are a variety of sensory evaluation methods that can be used, depending on the specific purpose of the evaluation. Apendix for the sensory analysis table as follows:

CRITERIA	**VARIATION 1**	**VARIATION 2**
TASTE		
COLOUR		
TEXTURE		
APPEARANCE		
FLAVOUR		
OVERALL ACCEPTABILITY		

1. Dislike extremely
2. Dislike very much
3 .Dislike moderately
4 .Dislike slightly
5.Neither like nor dislike
6 .Like slightly
7.Like moderately
8 .Like very much

9 .Like extremely

SCORE CARD FOR SENSORY EVALUATION:

CRITERIA	VARIATION 1	VARIATION 2
TASTE	9	8
COLOUR	8	7
TEXTURE	9	9
APPEARANCE	8	8
FLAVOUR	9	8
OVERALL ACCEPTABILITY	9	8

RESULT AND DISCUSSION:

The results of sensory evaluations can be used to make informed decisions about food product development, quality control, and marketing. For example, if a manufacturer finds that consumers prefer a new product with a sweeter taste, they can adjust the formulation accordingly.Sensory evaluation notes the human attires like taste, texture, flavour, appearance of the humans.

The formulation of barnyard millet bread with sweet potato can improve the taste and enhancing the nutritious value of the product. The above table shows the various aspects of the barnyard millet bread compared to Variations2the overall Acceptability of Variation 1 is higher.

CONCLUSION :

In conclusion, the barnyard millet are a delicious and nutritious snack that can be enjoyed by people of all ages. They are a good source of fiber, protein, and healthy fats, and they are also very low in calories. Barnyard millet bread is also easy to make and can be customized to your liking. You can experiment with other types of millet and other ingredients to create the perfect snack .

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DEVELOPMENT AND STANDARDISATION OF FOXTAIL MILLET INCORPORATED PANI PURI

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ABSTRACT

Foxtail Millet (*setaria italic.L)* is one of the earliest cultivates crops, extensively grown in the arid and semi-arid regions of Asia and Africa. Panipuri is a popular snack mainly produced from wheat flour. This study was aimed to develop and standardized the Foxtail Millet Panipuri and to evaluate the sensory attribute and analyse the nutritive value of Foxtail millet Panipuri. Wheat flour contains low levels of protein, minerals and lysine. Foxtail millet rich in dietary fibre, protein, minerals like calcium, magnesium, iron and phosphorus. The product is developed with Wheat flour, Foxtail millet flour and Sooji. The developed Foxtail millet Panipuri has done in 3 variations V1 (40g, 40g, 20g) V2 (60g, 20g, 20g) V3 (50g, 30g, 20). The nutrient composition of developed Foxtail Millet determined by nutritive calculator method and the sensory evaluation of Foxtail Millet Panipuri was done by semi trained panel members. Result revealed that the variation V2 is best and highly acceptable based on sensory evaluation. The nutrient composition of developed product contain Energy 24.96 Kcal, Protein 12.30g, Carbohydrate 60.9, Dietary fibre 14.0mg, Iron 3.6mg, Calcium 31mg, Fat 28g. It may concluded that the developed and standardised incorporated Foxtail millet Panipuri has high nutritive value and it can commercialized, this may help to regulate blood sugar level, good for cardiac health, reduce body weight, improve immunity and metabolism

KEYWORDS: Foxtail millet, Panipuri, Sooji, Cardiac health.

1. INTRODUCTION

Foxtail millet (FTM) *(Setaria italica)* is a drought-tolerant and salt-tolerant crop with little use of herbicides for crop growth. Though Bangladesh FTM production fluctuated substantially in recent years, it tended to increase through 1972–2021 period, ending at 9616.28 tonnes in 2021. Therefore, it is currently receiving national and international interest. FTM is a non-glutinous, non-acid-forming, and easy-to-digest food that is high in energy and protein and can be cultivated in a variety of agro-climatic conditions. Bangladesh is located in the largest deltaic land in the world, and a large portion of it remains uncultivable. Moreover, food security is threatened by rising sea levels, loss of fertile lands, frequent floods, and severe weather patterns. Therefore, growing FTM in abandoned or unproductive soil could be a major solution for such places. FTM adapts well to climate changes and can be grown in semiarid or arid regions where wheat or other crops cannot be cultivated. The nutritional profile of FTM is also superior to the staple cereals (rice and wheat), and possess comparable contents of protein (10–14%), calcium (20–30 mg/100 g), iron (5–7 mg/100 g), phosphorous (500–600 mg/100 g), and fibre (7–8%). It acts as a binding agent in the production of high-calorie foods. The use of FTM flour in combination with wheat flour may result in the production of food items that may enhance national food security.***(Mst. Meherunnahar et.al,2023).***

The nutrients found in foxtail millet might have special powers that can help ward off certain non-communicable diseases.

Panipuri are a convenient snack because of their ease of preparation, low cost, and relatively long shelf life. Changing food habits, increasing population, and urbanization have led to increasing consumption of noodles worldwide. It is mainly produced from wheat flour, which contains 10–12% protein. Wheat *(Triticum aestivum)* is the second major food in Bangladesh and is extensively used in bakery and confectionery products. However, the local climatic conditions in Bangladesh are not very conducive for wheat farming. In Bangladesh, the consumption rate of wheat is 7.1 million metric tons (mmt) per year, whereas production is only 1.15 mmt per year. Therefore, Bangladesh imports the deficit quantity to satisfy consumer demand every year, thereby posing an economic threat to the baking industry.

OBJECTIVES

- To develop and standardize Panipuri incorporated with Foxtailmillet.
- To perform sensory evaluation ofthe developed Foxtailmillet Panipuri.
- To evaluate the nutrient content present in Foxtailmillet Panipuri.

3.MATERIALS AND METHODS:

3.1 SELECTION AND COLLECTION OF INGREDIENTS:

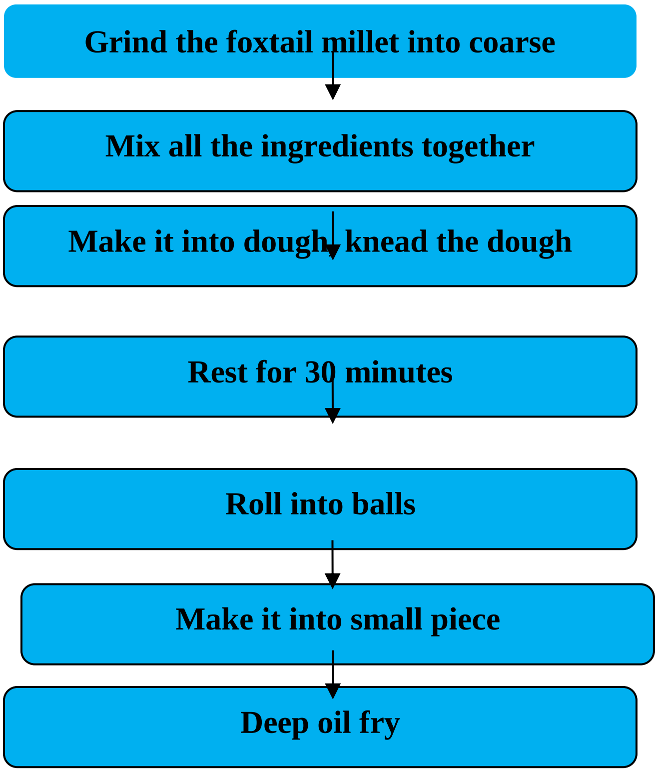
The major ingredients are Foxtail millet Wheat flour and Sooji is bought from the nearest store.

3.2 PRODUCTION OF FOXTAIL MILLET POWDER

The Foxtail millet was dry roasted and grinded into coarse powder and used for further Panipuri making process.

3.3 PREPERATION OF THE FOXTAIL MILLET INCORPORATED PANI PURI

3.3.2METHOD



3.4 STANDARDISATION OF THE PRODUCT

DEVELOPMENT OF FOXTAIL MILLET INCORPORATED PANI PURI

INGREDIENTS	V1	V2	V3
Wheat flour	40g	60g	50g
Foxtail millet flour	40g	20g	30g
Sooji	20g	20g	20g

4. RESULT AND DISCUSSION:

Sensory evaluation is the process of evaluation of the knowledge acquired to human senses like Sight, taste, touch and smell. The formulated variations (V1, V2 and V3) of Foxtail millet panipuri and the control were assessed for sensory evaluation using semi trained panel members. A five point hedonic scale was used for Sensory evaluation.

4.1 SENSORY ANALYSIS OF FOXTAIL MILLET PANI PURI

The Developed product was evaluated by 25 semi trained panel members and the results shows that the variation 2 is highly acceptable when compared with other two variations.

4.2 NUTRIENT ANALYSIS OF FOXTAIL MILLET PANI PURI

This variation was standardised the nutritive value the highly acceptable Variation2 iscalculated by nutritive calculator method and the values areEnergy 24.95Kcal, Carbohydrate 0.978 Protein 0.38g, Calcium 44.04mg, Phosphorous, Iron 1.035mg.

5. CONCLUSION

It may be concluded from the study that developed Foxtail millet flour incorporated panipuri have high nutrient like carbohydrates, iron, calcium, phosphorous.

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REVIEW ON THE TREATMENTS TO DIMINISH ANTINUTRITIONAL FACTORS PRESENT IN SORGHUM BICOLOR MOENCH

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ABSTRACT
(Sorghum bicolor Moench) is the fifth most produced cereal worldwide. However, some varieties of this cereal contain antinutritional factors, such as tannins and phytate that may form stable complexes with proteins and minerals which decreases digestibility and nutritional value.The present study sought to diminish antinutritional tannins and phytate present in sorghum grains. Three different treatments were studied for that purpose, using enzymes tannase (945 U/Kg sorghum), phytase (2640 U/Kg sorghum) and Paecilomyces variotii (1.6 X 107 spores/mL); A) Tannase, phytase and Paecilomyces variotii, during 5 and 10 days; B) An innovative blend made of tanase and phytase for 5 days followed by a Pv increase for 5 more days; C) a third treatment where the reversed order of B was used starting with Pv for 5 days and then the blend of tannase and phytase for 5 more days.Phytase increased the amount of available inorganic phosphorous, on the average by 78.3 %. The most promising results concerning tannins and phytate decreases were obtained by the enzymes combination of tannase and phytase. The three treatments have shown effective on diminishing tannin and phytate contents in sorghum flour which leads us to affirm that the proposed treatments can be used to increase the nutritive value of sorghum grains destined for either animal feeds or human nutrition.
KEY WORDS: *Sorghum, enzymes, tannase, phytase*

1. INTRODUCTION

Sorghum (Sorghum bicolor (L.) Moench) is one of the most important cereal crops widely grown for food, feed, fodder, forage and fuel in the semi-arid tropics of Asia, Africa, the Americas and Australia. In spite of rapid decreases in the area of sorghum in Asia, the production level has been maintained owing to the adoption of high yielding hybrids. Tannins belong to a group of phenolic compounds present in the secondary metabolism of plants. These compounds are mostly soluble in water (except those with high molecular weights), and are capable of forming stable complexes with proteins and other polymers such as cellulose, hemi-cellulose, pectin and with minerals (14). Phytate (myo-inositol hexakis phosphate,IP6) is the major inhibitor of mineral absorption from plant foods, and decreasing the content of phytic acid in meals of plant origin greatly improves the absorption of minerals (16).Several simple processing methods, such as decortication, soaking, cooking, germination, enzymes and fermentation, have been used to reduce the amounts of tannins phenols and phyates.

Tannin acyl hydrolases, commonly referred to as tannases (E.C. 3.1.1.20), are inducible enzymes produced by fungi, yeast and bacteria. Tannases have mostly been characterized by their activity upon polyphenolic complexes.

Phytases (EC: 3.1.3.8 or 3.1.3.26) are enzymes that hydrolyze phytate (myo-inositol hexakisphosphate), releasing phosphoric acid, free inositol and/or intermediate compounds such as esters of mono-, bi-, tri-, tetrakis, and pentakisphosphateinositol (IP1-IP5), depending on the degree of dephosphorylation and the release of minerals that may be chelated.Phytic acid is the main storage form of phosphorus In grains, legumes, oilseeds and pollens.

Life cycle for bicolor moench

Based on detailed studies of grain sorghum hybrids of different maturities, the following ten stages of development have been defined and illustrated: emergence, three-leaf, five-leaf, growing-point differentiation, final leaf visible in whorl, boot, half-bloom, soft dough, hard dough, and physiological maturity.

TREATMENT TO DIMINISH ANTINUTRITIONAL FACTORS PRESENT INSORGHUM BICOLOR MOENCH

2.1 Physiological mechanisms of drought tolerance

Amelework et al., (2015)reviewed that drought resistance as mechanisms of drought avoidance, recovery, survival and tolerance. These drought tolerance mechanisms are associated with plant survival and production. Drought avoidance is defined as the ability of plants to conserve water at the whole plant level through decreasing water loss from the shoots or by more efficiently extracting water from the soil. However, drought tolerance is defined as the ability of plants to withstand water deficit while maintaining appropriate physiological activities to stabilize and protect cellular and metabolic integrity at tissue and cellular level.The rolling of leaves usually occurs following the reduction in leaf water potential. However, the degree of leaf rolling depends on the ability of the plant to adjust osmotically at low leaf water potential (Amelework et al., 2015).However, the degree of leaf rolling rest on the ability of the plant to amend osmotically at low leaf water potential. Plants with high osmotic adjustment develop less leaf rolling, and hence, reduced leaf rolling is considered as an pointer of a greater degree of desiccation avoidance, through a deep root system (Morka, 2015). Drought tolerant genotypes exhibit lower stomatal conductance associated with increased leaf temperature, which gives rise to high transpiration efficiency and lower carbon isotope discrimination. Enlarged leaf temperature and transpiration percentage are due to a controlled transpiration cooling system brought by stomatal closure. Osmotic adjustment had a significant role in maintaining stomatal conductance and accumulation of solutes that extend time for CO2 assimilation and increase the net assimilation rate under drought condition(Morka, 2015). Decrease in stomatal conductance, reduction of intercellular carbon dioxide, decreased chlorophyll content, ultra-structural changes in chloroplast, alteration in electron transport, decreased activity of Rubisco and sucrose accumulation. At the plant level, drought stresses will result in reduction in growth and affect photosynthesis by reducing leaf area, enhancing stomatal closure, decreasing water status in the leaf tissues, and reducing the rate of CO2 assimilation. Ultrastructural changes in chloroplast will also affect photosynthesis electron transport and CO2 assimilation and hence impairment of adenosine triphosphate (ATP) synthesis and Ribulose-1,5- bisphosphate (RuBP) generation (Mutava, 2009). The significance of using these traits as physiological indicators of plant drought adaptive mechanisms depends on the crop species and the environment. Under conditions where there are no sophisticated instruments to measure transpiration efficiency and stomatal conductance, leaf rolling is good indicator of drought tolerance(Assefa, 2012).

2.2 Sorghum tannins as to be used as to change the rheological properties of dough

In comparison to other cereals, grain sorghum includes tannins with a high molecular weight and a high degree of polymerization; these tannins are the most studied polyphenols in sorghum (Kumari et al., 2021). In sorghum grains, tannin levels range from 10.0 to 68.0 mg/g dry weight. The tannin content in sorghum cultivars varies greatly in proportion to their color. Red and brown grain sorghums, for instance, have more bioactive chemicals, such as tannins, which are considered good for human health and are frequently utilized in the beer and food industries (Eastin and Lee 2020). Tannins may be separated into two groups: condensed tannins and proanthocyanidins (PA) made up of polymerized flavanols; and hydrolyzable tannins made up of gallic acid esterified to glucose (Smeriglio et al., 2017).

2.3 Life cycle for bicolor moench

Based on detailed studies of grain sorghum hybrids of different maturities, the following ten stages of development have been defined and illustrated: emergence, three-leaf, five-leaf, growing-point differentiation, final leaf visible in whorl, boot, half-bloom, soft dough, hard dough, and physiological maturity.

2.4. Antinutritional factors

Determination of condensed tannins content

The condensed tannins content was determined according to the method described by Maxson and Rooney (1972). About 1.000g of the sample was weighed and mixed with 10 ml of 1% HCl solution in methanol in a screw cap test tube. Then, the tube was shaken for 24 hr at room temperature on a mechanical shaker (Hy-2©, Shanghai, China). The solution was centrifuged (sigma 2-16KC, UK) at 1,000 rpm for 5 min. One ml of supernatant was transferred to another test tube and mixed with 5 ml of vanillin–HCl reagent (prepared by combining equal volume of 8% concentrated HCl in methanol and 4% vanillin in methanol). The D (+)-catechin was used as a standard for condensed tannins content determination. A 40 mg of D (+)-catechin was weighed and dissolved in 1,000 ml of 1% HCl solution in methanol, which was used as stock solution from which a series of standard solutions (0, 12, 24, 36, 48, and 60 μg /ml) were prepared by mixing with 5 ml 1% HCl in methanol. The absorbance of samples and the standard solutions were measured at 500nm using UV-VIS Spectrophotometer (JASCO V-630, Shimadzu Corporation, Tokyo, Japan) after 20 min. The condensed tannins content was determined from standard curve of catechin, and result was expressed as mg/100g.

Determination of phytate content

Phytate content was determined by the method described by Vaintraub and Lapteva (1988). About 0.100 g of sample was extracted with 10 ml of 2.4% HCl in a mechanical shaker (Hy-2©, Shanghai, China) for 1 hr at a room temperature. The extract was centrifuged (Sigma 2-16KC, UK) at 3,000 rpm for 30 min. The clear supernatant was used for phytate estimation. One ml of wade reagent (containing 0.03% solution of $FeCl_3.6H_2O$ and 0.3% of sulfosalicylic acid in water) was added to 3 ml of the sample solution (supernatant), and the mixture was mixed on a vortex mixer for 5 s. The absorbance of the sample solutions was measured at 500 nm using UV-VIS spectrophotometer (JASCO V-630, Shimadzu Corporation, Tokyo, Japan).). A series of standard solutions from sodium salt of phytic acid were prepared to contain 0.0, 4.5, 9.0, 18.0, 27.0, and 36.0 μg/ml of phytic acid (analytical grade sodium phytate) in 0.2N HCl. One ml of the wade reagent was added to each test tube, and the solution was mixed on a Vortex mixer for 5 s. The mixture was centrifuged for 10 min, and the absorbance of the sample and standard was measured at 500 nm by using deionized water as a blank. The phytate content was determined from standard curve of sodium salt of phytic acid, and result was reported in mg /100g.

2.5 Statistical analysis

The analysis of variance (ANOVA) was performed on the three copies of the data. SAS version 9.3 was used for all statistical analyses, and a difference was judged significant at p .05. To find significant differences between means (p .05), mean comparison tests were performed using Fisher's least significant difference (LSD). Mean and standard deviation were used to express the results.

3. RESULT AND DISCUSSION

3.1 Effect of the Treatments upon Phenolic Content

When compared to the untreated sorghum flour, the amount of total assayable phenols (TP) has been demonstrated to be lower (p 0.1) after treatments A, B, and C (for 5 days). It was discovered that 5-day treatments reduced TP more effectively than 10-day treatments. Given that the Follin-Ciocaulteau reagent is sensitive to any substance capable of decreasing it, including proteins, the delayed increase in TP concentration could be attributed to the presence of foreign compounds generated over the extra period. As a result, it is not possible to say with assurance that the TP concentration that was confirmed on the tenth day could be attributed to phenolic chemicals alone. The lowest TP concentration was seen in Experiments 1, 3, and 5, where decreases of 48, 48.5, and 66 were observed.

3.2 Phosphorus content after treatment

Treatment Untreated sorghum presents a phosphorus content of 125 mg/100g of sorghum, which has shown to increase after the application of almost all treatments 1, 2, 3, 4 and 6. The increases were of 70, 113, 82, 108 and 19 %, respectively (Fig. 3). Experiments 2 and 4 showed the largest Pi content although they did not statistically differ from one another ($p <0.1$). The increases in Pi are likely to be assigned to the action of the added phytase enzyme. Sorghum flour treated with P. variotii (Experiment 5) resulted reduction of inorganic phosphorus in the medium, which was of 76 % . That could be ascribed to the fact that the fungus might have used for its growth both the innate Pi and the Pi released from phytate. Some studies have claimed that a lactic acid bacteria can break down phytate when it is the only phosphorus source in the medium (19). Bergqvist et al., (6) verified that a decreased level of soluble minerals may be attributed to their being involved in various functions in the lactic acid bacteria themselves. Kayodé et al., (16) attribute the reduction in phytate to lactic acid bacteria and yeasts, which can produce phytase and thus degrade phytate into its lower form, IP5 (inositol-pentakisphophate), IP4, etc., and inorganic phosphorus (Pi) and which is used then for its growth.

CONCLUSION

There are a number of effective treatments that can be used to diminish ANFs in sorghum. The best treatment to use depends on the specific ANF being targeted and the resources available.In general, traditional methods such as soaking, germination, and fermentation are simple and cost-effective, but they may not be as effective as modern methods such as thermal processing and enzymatic treatment. However, modechoose a treatment method that preserves the nutritional value of the grain. If the sorghum is to be used for animal feed, the nutritional value is less important, and a treatment method that is more cost-effective may be preferred.

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RAGI SUPERFOOD BITES: A NUTRIENT-RICH SNACKING INNOVATION

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ABSTRACT

The pursuit of healthier snack options has led to the emergence of innovative food products that combine convenience with nutrition. This abstract introduces the concept of "Ragi Superfood Bites," a novel snacking solution crafted from Ragi, a whole grain rich in essential nutrients. Ragi, also known as finger millet, is renowned for its exceptional nutritional profile, containing high levels of dietary fiber, protein, vitamins, and minerals.The proposed Ragi Superfood Bites are designed to cater to the growing demand for wholesome, on-the-go snacks that align with health-conscious lifestyles. These bites are envisioned as bite-sized morsels, carefully formulated by blending Ragi flour with a diverse array of nutrient-dense ingredients such as nuts, seeds, dried fruits, and natural sweeteners. The synergy of these components is intended to deliver a well-rounded nutritional package, combining carbohydrates, healthy fats, proteins, and antioxidants.Key advantages of Ragi Superfood Bites include their potential to offer sustained energy release, support digestive health, and contribute to overall well-being. The abstract explores the appeal of this product among individuals seeking alternatives to conventional snacks laden with refined sugars and unhealthy additives. Moreover, Ragi Superfood Bites align with the trend of incorporating superfoods into everyday diets to optimize nutrition and health outcomes. This abstract paves the way for further exploration of Ragi Superfood Bites as an innovative snacking solution that encapsulates the nutritional potency of Ragi within a convenient, delectable format. The product's potential impact on promoting healthier dietary choices and its role in catering to the evolving preferences of health-conscious consumers are topics ripe for investigation and product development.

KEY WORDS :*Ragi , Superfood bites , Key advantages , Conventional snack , Synergy, Innovating snack , Potential .*

INTRODUCTION :

In a world that constantly seeks healthier and more sustainable food options, I proudly present my Ragi Superfood Bites, a delicious and nourishing snack that's here to revolutionize our snacking experience. Ragi, also known as finger millet, has been cherished for centuries for its exceptional nutritional value. Packed with essential vitamins, minerals, and dietary fiber, Ragi is a true superfood. We've harnessed the power of this ancient grain to create a snack that not only tantalizes your taste buds but also fuels your body with goodness. Our Ragi Superfood Bites are more than just a snack; they're a commitment to your well-being. Each bite is a symphony of flavours and nutrition, carefully crafted to provide you with a guilt-free snacking option that aligns with your health goals. Whether you're a fitness enthusiast looking for an energy boost, a parent in search of a wholesome treat for your family, or simply someone who appreciates the finer things in life, our Ragi Superfood Bites are designed with you in mind. We've taken the best nature has to offer and combined it with culinary expertise to bring you a snack that's as delectable as it is nutritious. Join us on a journey to snack smarter, one bite at a time. Explore the world of Ragi Superfood Bites, where taste meets nutrition, and where every bite is a step towards a healthier you. Indulge in the goodness of Ragi, savour the flavours, and nourish your body.

METHODOLOGY :

MATERIALS :

Ragi (finger millet) flour**,** mixed nuts (e.g., almonds, cashews, walnuts) , desiccated coconut , honey or maple syrup for sweetness butter (e.g., almond or peanut butter) vanilla extract, Saltdried fruits (e.g., raisins, chopped dates, cranberries) , seeds (e.g., chia seeds, flax seeds) , cinnamon or cocoa powder for flavor

PREPARATION :

HEALTH BENEFITS:

- ✓ Rich in Nutrients
- ✓ High in Dietary Fibre
- ✓ Gluten free
- ✓ Balances blood sugar level
- ✓ Supports bone health
- ✓ Rich in antioxidants
- ✓ Heart health
- ✓ Aids in weight management
- ✓ Improves digestion
- ✓ Helps in anaemia prevention

RICH IN NUTRIENTS :

Ragi is primarily composed of carbohydrates, making it an excellent source of energy. Ragi is rich in dietary fiber, both soluble and insoluble. This fiber aids in digestion, helps prevent constipation, and promotes a feeling of fullness. Ragi contains a moderate amount of protein, and it is considered a valuable source of plant-based protein. It provides essential amino acids, making it a suitable option for vegetarians and vegans. Ragi is one of the best plant-based sources of calcium. Calcium is crucial for maintaining strong bones and teeth. Ragi is a good source of iron, an essential mineral for preventing and managing anaemia. The iron in Ragi is more readily absorbed when consumed with vitamin C-rich foods. Potassium is essential for maintaining proper heart and muscle function, and Ragi contains a decent amount of this mineral. Ragi is rich in magnesium, which plays a role in various bodily functions, including muscle and nerve function, blood glucose control, and bone health. Phosphorus is essential for bone health, and Ragi contains a significant amount of this mineral. Ragi contains various vitamins, including: B-Vitamins: Ragi is a good source of B-vitamins like thiamine (B1), riboflavin (B2), niacin (B3), and B6. These vitamins are essential for energy metabolism, nerve function, and overall health. Vitamin K: Ragi contains vitamin K, which is important for blood clotting and bone Folate (Vitamin B9): Folate is vital for cell division and is particularly important during pregnancy. Ragi contains antioxidants like phenolic compounds and flavonoids,which help protect cells from oxidative damage and reduce the risk of chronic diseases. Ragi contains zinc, an essential mineral that supports immune function and wound healing. Copper is necessary for various metabolic processes, and Ragi provides a small amount of this mineral. Manganese plays a role in bone formation and blood clotting, and ragi contains trace amounts of it.Ragi is low in saturated fats, which are considered less healthy for the heart. Ragi contains various phytochemicals, such as tannins and polyphenols, which may have health benefits, including antioxidant and anti-inflammatory properties.

HIGH IN DIETARY FIBRE :

Ragi, or finger millet, is naturally rich in dietary fiber, which is a type of carbohydrate that the body cannot digest. This fiber content sets ragi apart as a highly nutritious grain. Ragi contains both soluble and insoluble fiber. Soluble fiber dissolves in water and forms a gel-like substance in the digestive tract, while insoluble fiber adds bulk to stool and aids in regular bowel movements. The fiber in Ragi is beneficial for digestive health. It promotes regular bowel movements, prevents constipation, and can alleviate digestive issues. Foods high in fiber, like Ragi, provide a sense of fullness and satisfaction after consumption. This can help in managing appetite and reducing the tendency to overeat, supporting weight management goals.

GLUTEN FREE :

Ragi, also known as finger millet, is naturally gluten-free, making it a safe grain for those with gluten sensitivities or celiac diseases . It provides a gluten-free alternative to wheat and other gluten-containing grains, allowing individuals with gluten-related disorders to enjoy a wide range of dishes. Ragi can be included in gluten-free diets, offering essential nutrients like fiber, iron, and calcium without the gluten-related health risksRagi flour and products made from ragi, such as ragi roti or Ragi Superfood Bites, are commonly used to create gluten-free recipes and snacks.Ragi's gluten-free nature allows for the creation of diverse gluten-free dishes, including bread, porridge, pancakes, and baked goods. Ragi-based snacks are a great choice for those seeking gluten-free snack options that are both nutritious and delicious.

BALANCES BLOOD SUGAR LEVEL

Ragi has a low glycaemic index, which means it releases glucose into the bloodstream gradually. Foods with a low GI are known to help stabilize blood sugar levels, preventing rapid spikes and crashes. Ragi is rich in dietary fiber, both soluble and insoluble. Fiber slows down the absorption of sugars from the digestive tract, preventing sudden increases in blood sugar levels after meals. It also promotes a feeling of fullness, reducing the urge to consume more carbohydrates. Ragi primarily contains complex carbohydrates, which take longer to digest than simple carbohydrates. This slow digestion contributes to sustained energy release and helps prevent rapid blood sugar fluctuations.

SUPPORTS BONE HEALTH

Ragi, also known as finger millet, plays a significant role in supporting bone health. This remarkable grain is a rich source of essential nutrients like calcium, magnesium, and phosphorus, all of which are pivotal for maintaining strong and healthy bones. Calcium, in particular, is a cornerstone of bone health, and ragi provides a substantial amount of this mineral, making it an excellent dietary choice to prevent conditions like osteoporosis. Additionally, magnesium aids in the absorption of calcium, ensuring that the body can effectively utilize this vital nutrient. The combination of these minerals, along with the presence of other bone-friendly nutrients in ragi, makes it an invaluable addition to one's diet for promoting lifelong bone strength and resilience. Whether consumed as a porridge, roti, or in the form of Ragi Superfood Bites, ragi's contribution to bone health cannot be overstated, offering a natural and nutritious way to fortify one's skeletal system.

RICH IN ANTIOXIDANTS

Ragi, commonly known as finger millet, boasts a surprising and often underestimated quality—it's rich in antioxidants. These powerful compounds, including phenolic compounds and flavonoids, play a crucial role in protecting our cells from oxidative stress and damage caused by harmful free radicals. By consuming ragi regularly, we introduce a natural defense mechanism into our diets. These antioxidants help shield our bodies from various chronic diseases, including heart disease, cancer, and neurodegenerative disorders. Ragi's antioxidant properties not only contribute to better health but also underscore its status as a versatile and wholesome grain, offering a delightful and nutritious way to fortify our bodies against the challenges of modern living. Whether enjoyed as a warm porridge, baked into wholesome bread, or incorporated into Ragi Superfood Bites, ragi's antioxidant-rich nature adds a valuable dimension to our dietary choices, promoting long-term well-being from within.

HEART HEALTH

One of its standout qualities is its ability to help manage cholesterol levels. Ragi is low in saturated fats, the kind of fats that can contribute to heart disease, making it a heart-friendly choice. Additionally, its high dietary fiber content aids in reducing bad cholesterol (LDL) levels by binding to cholesterol molecules and eliminating them from the body.Furthermore, the presence of antioxidants in ragi, such as phenolic compounds and flavonoids, helps combat oxidative stress and inflammation, which are linked to heart disease. These antioxidants help protect the blood vessels and reduce the risk of atherosclerosis, a condition characterized by the buildup of plaque in arteries.Ragi is also a source of magnesium and potassium, minerals that play a crucial role in regulating blood pressure and maintaining proper heart function. Adequate magnesium intake is associated with a lower risk of heart disease.Lastly, its low glycemic index (GI) ensures that ragi releases glucose into the bloodstream slowly, preventing rapid spikes in blood sugar levels. This steady energy release is beneficial for overall cardiovascular health, as it reduces stress on the heart and helps maintain stable blood pressure.

AIDS IN WEIGHT MANAGEMENT

Ragi, also known as finger millet, stands out as a valuable ally in weight management. One of its key attributes is its high dietary fiber content, both soluble and insoluble, which plays a pivotal role in helping individuals maintain a healthy weight. This fiber not only promotes a feeling of fullness and satiety but also regulates the digestive process, preventing sudden hunger pangs and excessive snacking. By curbing overeating and reducing overall calorie intake, ragi contributes to better portion control and aids in weight loss or weight maintenance.Moreover, ragi's low glycemic index (GI) ensures that it releases glucose into the bloodstream gradually, providing a steady and sustained source of energy. This helps prevent rapid spikes and crashes in blood sugar levels, reducing cravings for high-sugar, high-calorie foods that can sabotage weight management efforts.Additionally, ragi is a nutrient-dense grain, offering essential vitamins, minerals, and even some protein without excessive calories. It provides the necessary nutrients for overall health while supporting weight loss goals. Incorporating ragi into the diet through options like ragi porridge, roti, or innovative snacks such as Ragi Superfood Bites is a delicious and nutritious way to harness its benefits for effective weight management.

RAGI HELPS IN DIGESTION

Ragi, commonly known as finger millet, is renowned for its remarkable ability to promote and improve digestion. At the heart of this digestive benefit is its rich dietary fiber content, consisting of both soluble and insoluble fiber. Soluble fiber forms a gel-like substance when it interacts with water in the digestive tract, slowing down the digestion and absorption of food. This gentle pace helps prevent sudden spikes in blood sugar levels and promotes a more stable digestive proces.Furthermore, the insoluble fiber in ragi adds bulk to stool and aids in regular bowel movements. This not only prevents constipation but also helps in the efficient elimination of waste from the body. Ragi'sfiber content acts as a natural laxative, softening stool and making bowel movements more comfortable and regular.Ragi also contains natural compounds that soothe the digestive system, making it particularly helpful for individuals with sensitive stomachs or digestive issues. It can alleviate common discomforts like acidity and indigestion.Incorporatingragi into your diet, whether as a warm and comforting ragi porridge or as a part of wholesome roti, is an effective way to harness its digestive benefits. It provides the body with the essential nutrients it needs while supporting a healthy and well-functioning digestive system. Ragi's reputation as a digestive aid makes it a valuable addition to any balanced diet, promoting not just digestion but overall gastrointestinal comfort and well-being.

HELPS IN ANAEMIA PREVENTION

Ragi, also known as finger millet, plays a significant role in the prevention and management of anemia, a condition characterized by a deficiency of red blood cells or hemoglobin. At the core of ragi's contribution to combating anemia is its impressive iron content. Iron is a crucial mineral required for the production of hemoglobin, the protein responsible for carrying oxygen throughout the body.Ragi provides a substantial amount of easily absorbable iron, making it a valuable dietary choice for individuals with or at risk of anaemia. Regular consumption of ragi can help increase hemoglobin levels and improve the oxygen-carrying capacity of the blood. This is particularly beneficial for individuals who may have low iron intake in their diets.Moreover, ragi contains other essential nutrients like vitamin C, which enhances the absorption of iron from plant-based sources. Including ragi alongside vitamin C-rich foods or drinks can further optimize iron absorption. AS a nutrient-dense grain, ragi not only aids in preventing anaemia but also supports overall health. It offers a wide range of vitamins and minerals, making it an excellent dietary choice to fortify the body against nutritional deficiencies. Incorporating ragi into one's diet through dishes like ragi porridge, roti, or innovative snacks like Ragi Superfood Bites can be a flavorful and nutritious strategy for anemia prevention and overall well-being.

CONCLUSION

Ragi Superfood Bites are not just a snack; they are a testament to the harmonious fusion of taste and nutrition. These bites have taken the extraordinary qualities of ragi, the ancient super grain, and transformed them into a delightful and nourishing treat. With each bite, you embark on a journey that celebrates health without compromising on flavor. Ragi's rich nutrient profile, combined with culinary ingenuity, makes these bites a symbol of wholesome indulgence. Whether you're seeking a burst of energy, supporting digestive health, or simply savoring the goodness of nature, Ragi Superfood Bites are the answer. They exemplify the ideal snack, where taste meets nutrition, and where every bite is a step towards a healthier and more satisfying snacking experience. So, embrace the goodness, relish the flavors, and make Ragi Superfood Bites your daily companion on the path to a more nourished and enjoyable life. Your snacking journey has just become extraordinary.

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CRUNCHY DELIGHTS: EXPLORING THE WORLD OF PEARL MILLET POPCORN

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ABSTRACT:

Pearl millet Pennisetumglaucum is grown under both arid and semi-arid conditions .It's likewise known as dukn, cumbu, gero, sanio, kambu, babala, or bulrush millet .India is the largest producer of millets in the world, harvesting about 11 million tons per year, nearly 36% of the world's output.The study was aimed at making the pearl millet available in ready-to-eat form to people with some enhanced nutritional and storage propertiesPoped grains is the special kind of maize that was selected by Indians in early western civilizations.popped millets are crunchy in taste and high aroma and are highly appreciated for lightness.Bajra contains vitamin B6,thiamine,magnesium,zinc,phosphorous,it is a good source of protein and also calories Bajra is high beneficial plant chemicals like antioxidants, polyphenols, and phytochemicals, all of which are known for contributing to optimal human health in many ways.may help prevent chronic conditions like diabetes, heart disease, and certain cancers.It helps to weight lose because it has low density of calories.

Keywords:*Arid condition,Cumbhu,ready to eat,crunchy,lightness,polyphenols,weight lose.*

INTRODUCTION

Pearl millet (Pennisetumglaucum is a cereal crop that is believed to have originated in tropical West Africa over 5,000 years ago. It is the most widely grown millet species in the world, and is cultivated in over 100 countries, primarily in Africa and Asia. Pearl millet is particularly well-adapted to semi-arid and arid conditions, and is an important food crop for millions of people in developing countries.Pearl millet is a tall, annual grass that can grow up to 3 meters in height. The stems are strong and erect, and the leaves are long and narrow. The inflorescence is a dense, cylindrical spike that can be up to 30 centimeters long. The seeds are small, round, and pearl-like in appearance, hence the name pearl millet.Ithighly adaptable crop and can be grown in a wide range of climates and soil conditions. It is particularly well-suited to dry and hot conditions, and can tolerate drought and high temperatures better than most other cereal crops. Pearl millet is also relatively resistant to pests and diseases. Pearl millet is a good source of nutrition, providing carbohydrates, protein, fiber, and essential vitamins and minerals. It is particularly high in iron and zinc, which are important nutrients for people in developing countries. Drought tolerance: Pearl millet is one of the most drought-tolerant cereal crops in the world. It can withstand long periods of drought without significant yield loss.

Heat tolerance: Pearl millet is also very heat tolerant. It can thrive in temperatures above 40 degees Celsius.

FIGURE 1.1PEARL MILLET

Salt tolerance: Pearl millet is relatively salt tolerant, making it suitable for cultivation in saline soils.Poor soil tolerance: Pearl millet can grow in a wide range of soil conditions, including poor soils.Pest and disease resistance: Pearl millet is relatively resistant to pests and diseases.Nutritional value: Pearl millet is a good source of carbohydrates, protein, fiber, and essential vitamins and minerals.Pearl millet is the sixth most important cereal crop in the world, after wheat, rice, maize, sorghum, and barley.Pearl millet is grown in over 100 countries, but the majority of production is in Africa and Asia.India is the world's largest producer of pearl millet, followed by Niger, Nigeria, Mali, and Chad.Pearl millet is used to make a variety of food products, including bread, porridge, beer, and couscous.Pearl millet is also used as a livestock feed and for the production of biofuels. Pearl millet is a promising crop for the future. It is well-suited to the changing climate, and its drought tolerance and heat tolerance make it an important crop for food security in developing countries. Pearl millet is also a versatile crop that can be used to make a variety of food and non-food products. Research is ongoing to develop new varieties of pearl millet with improved yields.

NUTRITIONAL PARAMETER

Calories: Pearl millet is a relatively low-calorie food, making it a good choice for people who are trying to lose weight or maintain a healthy weight.

Protein: Pearl millet is a good source of protein, which is essential for building and repairing muscle tissue.

Fat: Pearl millet is a low-fat food, making it a good choice for people who are trying to reduce their intake of saturated and unhealthy fats.

Fiber: Pearl millet is a good source of fiber, which can help to improve digestion and lower cholesterol levels

Carbohydrates: Pearl millet is a good source of complex carbohydrates, which provide the body with sustained energy.

Iron: Pearl millet is a good source of iron, which is essential for transporting oxygen throughout the body.

Zinc: Pearl millet is a good source of zinc, which is essential for immune function, wound healing, and cell growth.

Calcium: Pearl millet is a good source of calcium, which is essential for strong bones and teeth.

Magnesium: Pearl millet is a good source of magnesium, which is essential for muscle function, nerve function, and blood.

Nutritional parameters of pearl millet (per 100 grams):

- Calories: 360
- Protein: 12 grams
- Fat: 5 grams
- Fiber: 11 grams
- Carbohydrates: 67 grams
- Iron: 8 milligrams
- Zinc: 5.5 milligrams
- Calcium: 42 milligrams
- Magnesium: 242 milligrams
- Potassium: 407 milligrams
- Vitamin B1 (thiamin): 0.4 milligrams
- Vitamin B2 (riboflavin): 0.2 milligrams
- Vitamin B3 (niacin): 3 milligrams
- Vitamin B6 (pyridoxine): 0.3 milligrams

- Vitamin B9 (folate): 58 micrograms

EXTRUCTED PRODUCT FROM PEARL MILLET

POPCORN:

Pearl millet popcorn is made in a similar way to regular popcorn, but there are a few key differences. First, pearl millet kernels are smaller and harder than regular popcorn kernels, so they require more heat and pressure to pop. Second, pearl millet kernels have a higher moisture content than regular popcorn kernels, so they need to be dried before popping.

METHOD AND MATERIAL

MATERIALS

Pearl popcorn kernels were popped in an air popper according to the manufacturer's instructions. A single layer of kernels was added to the air popper, which was then preheated and turned on. The popcorn was popped until the popping stopped. The popcorn was then seasoned with salt to taste.

- Pearl popcorn kernels
- Popcorn popper (air popper or stovetop popper)
- Cooking oil (for stovetop popper only)
- Salt (optional

METHODS:

AIRPOPPER:

- Preheat the air popper according to the manufacturer's instructions.
- Add a single layer of pearl popcorn kernels to the air popper.
- Cover the air popper and turn it on.
- Pop the popcorn until the popping stops.
- Season the popcorn with salt to taste (optional).

STOVETOPPOPPER:

- Add a small amount of cooking oil to the bottom of the stovetop popper.
- Add a single layer of pearl popcorn kernels to the stovetop popper.
- Cover the stovetop popper and heat over medium heat.
- Shake the popper occasionally until the popping stops.
- Remove the popper from the heat and pour the popcorn into a bowl.
- Season the popcorn with salt to taste (optional).

- **Dry the pearl millet kernels.** This can be done by spreading the kernels in a single layer on a baking sheet and baking them in a preheated oven at 150 degrees Celsius for 30-60 minutes, or until the kernels are completely dry.
- **Heat the oil.** If you are using a stovetop popper, add a small amount of cooking oil to the bottom of the popper. If you are using an air popper, there is no need to add oil.
- **Add the pearl millet kernels to the popper.** Be sure to add a single layer of kernels to the popper to prevent overcrowding.
- **Cover the popper and heat over medium heat.** If you are using a stovetop popper, shake the popper occasionally to prevent the popcorn from burning.
- Once the popping slows to a stop, remove the popper from the heat and pour the popcorn into a bowl.
- Season the popcorn with salt to taste (optional).

EFFECT OF DURING PROCESSING PEARL MILLET

PHYSICAL EFFECTS:

- The kernels expand and pop due to the pressure of the steam inside the kernels.
- The endosperm of the kernels turns into a fluffy, white foam.

CHEMICAL EFFECTS :

- The water in the kernels turns to steam and creates pressure inside the kernels.
- The starch in the kernels breaks down into glucose.
- The glucose caramelizes and gives the popcorn its characteristic flavor and color.

FOOD TO BE RECOMMENDED:

Pearl millet popcorn is a healthy snack that is nutritious and low in calories and fat. It is a good source of fiber, protein, and vitamins and minerals. Pearl millet popcorn is also a good source of antioxidants, which can help to protect the body from damage caused by free radicals.

Diabetes: Pearl millet popcorn is a low-glycemic index food, which means that it does not cause a rapid spike in blood sugar levels. This makes it a good snack for people with diabetes.

Heart disease: Pearl millet popcorn is a good source of fiber, which can help to lower cholesterol levels. This can help to reduce the risk of heart disease.

Digestive problems: Pearl millet popcorn is a good source of fiber, which can help to improve digestion. It is also a good source of magnesium, which can help to relieve constipation.

Weight loss: Pearl millet popcorn is a low-calorie and low-fat snack that is high in fiber. This makes it a good snack for people who are trying to lose weight or maintain a healthy weight.

CONCLUSION

Pearl millet is a climate-resilient and nutritious cereal crop that has the potential to play a major role in addressing global food security challenges. It is particularly well-suited for cultivation in arid and semi-arid regions, where other crops often fail. Pearl millet is also a good source of protein, fiber, and other essential nutrients, making it a healthy choice for consumers. However, there is a growing movement to promote the cultivation and consumption of pearl millet. Governments, international organizations, and the private sector are investing in research and development, extension, and market development initiatives. As a result, pearl millet is becoming increasingly popular among consumers and farmers alike.Overall, pearl millet is a promising crop with the potential to make a significant contribution to global food security and nutrition. It is important to continue to invest in research and development, extension, and market development initiatives to promote the cultivation and consumption of pearl millet.

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EFFECTIVENESS OF NUTRI SHOTS ON WEIGHT GAIN PATTERN AMONG CHILDREN AGED 4-5 YEARS AT SELECTED SCHOOLS IN THIRUVARUR DISTRICT

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ABSTRACT

Aim and Objectives: To assess and compare the effectiveness of Nutri Shots on weight gain pattern among children aged 4-5 years. **Methodology:** Quantitative approach, Quasi experimental research design was adopted to assess the effectiveness of Nutri Shots on weight gain pattern among 40 underweight children aged 4-5 years. The 40 underweight children were selected by purposive sampling method at selected schools in Thiruvarur district who fulfilled the inclusion and exclusion criteria. Pre test weight gain pattern was assessed and supplementation of Nutri Shots for selected 40 underweight children aged 4-5 years was administered for a period of 30 days and post test level of weight gain pattern was explored. **Results:** The study findings revealed that the post test mean weight gain pattern score was 14.81 with S.D of 2.01. The calculated unpaired ‘t’ value (t = 8.561) of pre and post test level of weight gain pattern indicates there was high statistical significance at $p<0.0001$ among underweight children aged 4-5 years. **Conclusion:** The results revealed that the Nutri Shots was effective in increasing the weight pattern among underweight children aged 4-5 years and can be further utilized as a preventive measure in percluding malnutrition.

INTRODUCTION

Childhood is a sensitive period, particularly in human development, that can impact later educational and career opportunities. The starting five years of life is very important for children growth and development. The infants and pre-school children are most vulnerable to vicious cycle of malnutrition especially under-nutrition.

Malnutrition refers to a lack or excess of nutrient intake, an imbalance of essential nutrients, or improper use of nutrients. Under-Nutrition in children can be prevented and treated by providing them with the sufficient amount of energy, including essential macro and micronutrients, to support normal growth, strengthen immunity, and support normal physical, mental, and metabolic development.

The adequate level of nutrition is very important to child growth and health development. Nutritional supplements are considered to be the most appropriate method to improve children's growth and physical health.

MATERIALS AND METHODS

A quasi experimental research design was adopted in order to assess the effectiveness of Nutri Shots increasing the level of weight gain pattern among underweight children aged 4-5 years. The sample size consisted of 40 underweight children (who fulfilled the inclusion and exclusion criteria) selected by purposive sampling method. The study sample include underweight children in the age group of 4-5 years. The independent variable of the study is Nutri Shots. The dependent variable is weight gain pattern. The study was conducted in, The Merit Higher Secondary School and Gandhi Kamaraj Matriculation School at Thiruvarur district.

The study includes the underweight children aged 4-5 years who are willing to participate the study, and the study excluded those who have normal range of BMI (above 15).

The tool consisted of two points that is data collection tool and intervention tool. The data collection tool used in this study was self-structured questionnaire. After completion of pre test, the assessment of weight gain pattern were administered with Nutri Shots. The intervention tool Nutri Shots was prepared by the investigator. The ingredients areragi, green gram, roasted groundnut, moringa leaves, jaggery, ghee were used in the formulation of Nutri Shots. The intervention was given for a period of 30 days.

After the intervention, the investigator did the post test assessment on Weight pattern among underweight children aged 4-5 years. The data collected was analysed and compared to identify the effectiveness of Nutri Shots in weight gain pattern among underweight children aged 4-5 years.

The study findings revealed that the intervention was administered for 30 days and states that there was a significant difference in pre and post test weight gain pattern among selected underweight children aged 4-5 years.

RESULT AND DISCUSSION

The finding of the study revealed that administration of Nutri Shots for 30 days in increasing the weight pattern, state that there was a significant difference in pre and post test weight gain pattern among underweight children aged 4-5 years.

The post test analyses on the weight gain pattern among underweight children aged 4-5 years revealed that the mean difference was 14.81 with paired 't' value $t = 8.561$ and p value 0.0001 which shows the weight gain pattern in post test was found statistically significant. Thus, the supplementation of Nutri Shots was more effective in increasing the weight pattern among underweight children aged 4-5 years.

UTILISING PEARL MILLET TO DEVELOP NOVEL MARSHMALLOW PRODUCTS

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ABSTRACT :

Marshmallows are a widely popular confectionery item enjoyed by people of all ages. However, traditional marshmallows are typically derived from ingredients such as gelatin and corn syrup, which do not provide significant nutritional value. This paper aims to explore the potential of incorporating pearl millet, a nutritious and drought-resistant cereal grain, as an alternative ingredient in marshmallow production.

Pearl millet (Pennisetum glaucum) is a staple crop in many regions of Africa and Asia, known for its rich nutritional profile and resilience in harsh environmental conditions. Thus, its incorporation into marshmallow production could not only enhance the nutritional value of the final product but also contribute to the utilization of an underutilized crop. The research methodology involves the formulation and optimization of pearl millet-based marshmallow recipes. Firstly, pearl millet flour will be incorporated as a partial or complete replacement of traditional ingredients. The rheological properties of the marshmallow mixture, such as viscosity and elasticity, will be evaluated to ensure its consistency and texture are comparable to conventional marshmallows.

Next, sensory analysis will be conducted to assess the consumer acceptance of the pearl millet marshmallows in terms of taste, texture, and overall preference. This analysis will involve a panel of trained taste-testers, who will compare the pearl millet marshmallows with commercially available marshmallows.

Furthermore, the nutritional analysis will be conducted to determine the potential health benefits of pearl millet marshmallows. It will include assessing the levels of macronutrients and micronutrients, such as proteins, fiber, vitamins, and minerals, which directly impact the nutritional value of the product.

The outcomes of this study will provide insights into the feasibility of incorporating pearl millet into marshmallow production, expanding the range of applications for this versatile cereal grain. If successful,

these findings may encourage the development of innovative and nutritious marshmallow products, catering to consumer demands for healthier food options. Additionally, the increased utilization of pearl millet could contribute to enhancing the sustainability and food security in regions where it is predominantly cultivated.
In conclusion, the utilization of pearl millet as an alternative ingredient in marshmallow production holds potential for creating novel and nutritious marshmallow products. This paper will pave the way for further research and development in the field of functional food production, showcasing the versatility and potential nutritional benefits of underutilized crops like pearl millet.

KEYWORD : *Pearl millet, Marshmallow, Nutritious snack, Gelatin, Corn syrup, Underutilized crop.*

1.INTRODUCTION :

Marshmallows are a popular confectionery product made with sugar, gelatin, and water. They are typically white and fluffy, with a slightly chewy texture and a sweet flavor. Marshmallows can be eaten plain, roasted over a campfire, or used in a variety of desserts.

Pearl millet is a type of cereal grain that is native to Africa and India. It is a good source of protein, fiber, and minerals, and it is gluten-free. Pearl millet has a slightly nutty flavor and a chewy texture.

In recent years, there has been a growing interest in developing new and innovative food
products using pearl millet. One such product is a pearl millet marshmallow. Pearl millet marshmallows can be made using the same basic ingredients as traditional marshmallows, but with the addition of pearl millet flour. Pearl millet flour gives the marshmallows a slightly nutty flavor and a more chewy texture.

Pearl millet marshmallows have a number of potential benefits over traditional marshmallows. First, they are more nutritious. Pearl millet is a good source of protein, fiber, and minerals, while traditional marshmallows are mostly made of sugar and corn syrup. Second, pearl millet marshmallows are gluten-free, making them a good option for people with celiac disease or gluten intolerance.

Third, pearl millet marshmallows are more sustainable. Pearl millet is a drought-tolerant crop that can be grown in marginal areas. This makes it a more sustainable alternative to corn, which is the primary ingredient in traditional marshmallows.

There are a number of ways to develop novel marshmallow products utilizing pearl millet. One approach is to simply add pearl millet flour to the traditional marshmallow recipe.

This will give the marshmallows a slightly nutty flavor and a more chewy texture.

Another approach to developing novel marshmallow products utilizing pearl millet is to experiment with different flavors and ingredients. For example, pearl millet marshmallows could be made with different types of chocolate, nuts, or dried fruit. Pearl millet marshmallows could also be used to make new and innovative desserts, such as pearl millet marshmallow ice cream or pearl millet marshmallow cake.

Overall, pearl millet is a versatile and nutritious ingredient that can be used to develop a variety of novel marshmallow products. Pearl millet marshmallows have the potential to be more nutritious, gluten-free, and sustainable than traditional marshmallows.

2. NUTRITIONAL IMPORTANCE OF PEARL MILLET:

Pearl millet Originated in Central tropical Africa and is widely distributed in the drier tropics and India. The most prevalent millet kind is pearl millet. Considering that the beginning of time, it has been grown throughout Africa and the Indian subcontinent. In different pearl millet genotypes the starch content of the grain varied about 62.8 to 70.5%, soluble sugar 1.2 to 2.6%. In high protein varieties of pearl millet protein content ranges from 14.4 to 27.1%.

3. METHODOLOGY:

3.1SELECTION OF MILLET:

Pearl millet is a highly nutritious cereal grain, rich in protein, fiber, minerals, and vitamins. It is also a good source of antioxidants. When selecting pearl millet for product development, it is important to consider the nutritional profile of the specific variety and how it will contribute to the overall nutritional value of the product.

Pearl millet has a number of functional properties that can be beneficial in food product development. For example, pearl millet flour is gluten-free and has a high water absorption capacity. It can also be used to improve the texture and flavor of food products.

Pearl millet is a relatively hardy crop that can be grown in a variety of climates. It is also a relatively high-yielding crop, making it a good choice for product development.

3.2 PREPARATION OF TRADITIONAL MARSHMALLOW:

Select good quality ingredients.

↓

Weigh according to ratios

↓

Dissolve sugar in boiling water

↓

Soak gelatin in water

↓

Add sugar syrup in gelatin and beat for 15mins until foamy texture

↓

Coat a plastic container with corn flour and powdered sugar and pour the mixture into it.

Let it set for 4-6hrs in refrigerator.

3.3 FORMULATING PEARL MILLET:

Select a variety of pearl millet.

(Pearl millet flour is recommended, as it will give the marshmallows a smoother texture.)

Roast and Grind the pearl millet flour to a fine powder.

(This can be done using a food processor or blender.)

INGREDIENTS	RATIO 35%	RATIO 50%
SUGAR	200g	200g
WATER	6tbspn	6tbspn
GELATIN	13g	13g
WATER	6tbspn	6tbspn
LEMON JUICE	10-12 drops	10-12 drops
PEARL MILLET POWDER	35g	50g

Combine the pearl millet flour with the other ingredients in the marshmallow recipe.

(This may include sugar, corn syrup, water, gelatin, and flavoring.)

Whip the mixture until it is light and fluffy.

(This may take several minutes.)

Pour the marshmallow mixture into a prepared pan and let it cool and set.

Once the marshmallows have set, cut them into desired shapes and sizes.

“THE FORMULATION OF PEARL MILLET POWDER INTO TRADITIONAL MARSHMALLOW PRODUCT HAS DONE IN TWO RATIOS”

3.4 SENSORY EVALUATION:

Sensory evaluation where done for the product made from both the ratios of ingredients. The chosen panels are tasted the pearl millet marshmallow and approximately 40 responses were collected. From which the pearl millet marshmallow made with ratio one has better taste and texture than the ratio two.Overall acceptance of the product is good among the panels.

CONCLUSION :

Pearl millet marshmallows have the potential to be a popular new food product. They are nutritious, sustainable, and have a unique flavor and texture. Food manufacturers who are interested in developing a novel pearl millet marshmallow product should experiment with different recipes and conduct sensory evaluation tests to ensure that the product is appealing to consumers.Pearl millet is a highly nutritious and sustainable grain that has the potential to be used in a variety of food products. One way to utilize pearl millet is to develop a novel marshmallow product. Pearl millet marshmallows have a number of potential advantages over traditional marshmallows. First, they are more nutritious. Pearl millet is a good source of protein, fiber, and essential minerals. Second, they are more sustainable. Pearl millet is a drought-tolerant crop that can be grown in marginal lands. Third, they have a unique flavor and texture. Pearl millet marshmallows are slightly denser and chewier than traditional marshmallows. To conclude pearl millet marshmallow product is developed to make a empty calorie food product into nutritious one.

EDIBLE CUPS- ANARCHETYPETO ENDORSE NUTRITION AND WASTE MANAGEMENT

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ABSTRACT

Our community today is going through multiple challenges, in the arena of nutrition and the environment. The use of plastic or paper containers to pack foods is on a huge rise proportional to the increase in the purchase of outside foods. In terms of environment, the concern is with the substantial and desperate use of single-use plastics,the improper disposal of which destroys volumes of species, causes pollution in land and water, elevates greenhouse gas emissions and contaminates the food chain, On the other hand, in health perspective, there is a rise in the pervasiveness of various non-communicable diseases because of several carcinogenic, toxic, and hazardous chemicals present in foods we consume packed in those containers.As an alternative initiative, this study aims to formulate nutritive edible cups utilizing wheat flour as the major ingredient, and the by-products of the food industry namely rice bran, dehulled chickpea flour, groundnut cake, pomaceof beetroot, apple, and molasses in different proportions, thereby providing a solution to disposal of waste products from food industry also. These nutritive edible cupswere found to be palatable and can be utilized to serve solid and semi-solid foods and can be consumed along with the served food. The edible cups provide sufficient energy, carbohydrates, fat, protein, fiber, polyphenols, flavonoids, and phytochemicals.This study will also serve as a means to achieve SDGs namely “Good health and wellbeing, Decent work and economic growth, Industry, innovation, and infrastructure, Responsible consumption and production”.

Keywords: Edible cups, Food groups, Flavonoids,Polyphenols

FORMULATION AND SENSORY EVALUATION OF VALUE ADDED SORGHUM KULFI

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ABSTRACT

Sorghum (Sorghum bicolor) has a nutritional profile similar to rice, Maize, and wheat.Sorghum is the fifth most produced cereal in the world and is a source of nutrients and bioactive compounds for the human diet. Sorghum development in Indonesia, as well as Sorghum-based products and by-products, must be supported by researchers. Sorghum grain is a rich source of nutrients and health-beneficial phenolic compounds Studies have shown that sorghum phenolic compounds have potent antioxidant activity in vitro, and consumption of sorghum whole grain may improve gut health and reduce the risks of chronic diseases .the effects of whole sorghum and its fractions on human health need to be evaluated which multiple benefits on human health such as, ant proliferative properties associated with the prevention of certain cancers, antioxidant activities related to the prevention of associated diseases to oxidative stress, antimicrobial and anti-inflammatory effects, it also improves glucose metabolism.. Recently, sorghum grain has been used to develop functional foods and beverages, and as an ingredient incorporated into other foods sorghum benefit the gut microbiota and parameters related to obesity, oxidative stress, inflammation, diabetes, dyslipidaemia, cancer, and hypertension. Kulfi is a traditional frozen dairy dessert from the Indian subcontinent. It is often described as “traditional Indian ice cream” and is part of the national cuisines of India, Pakistan, and Trinidad and Tobago. It is also popular in Bangladesh, Myanmar, Nepal, Sri Lanka, and the Middle East. Kulfi is denser and creamier than regular ice cream, with a rich, intense flavor.

Key words: *sorghum, traditional dessert, antioxidantactivities, glucose metabolism*

1. INTRODUCTION

Sorghum (Sorghum bicolour) is the fifth most important Cereal crop grown in the world. India is the second largest country occupying 13.6% of the sorghum cultivated area after Nigeria (14.16%) sorghum, (Sorghum bicolour), also called great millet, Indian millet, milo, durra, orshallu, cereal grain plant of the grass family

(Poaceae) and its edible starchy seeds.Sorghum grain is used mainly for Human consumption in Asia and Africa while it is used as Animal feed in the Americas, China and Australia. In India, the rainy season sorghum grain is used mostly for Animal/poultry feed while the post rainy season sorghum Grain is used primarily for human consumption.

Kulfi is a traditional frozen dairy dessert from the Indian subcontinent. It is often described as “traditional Indian ice cream” and is part of the national cuisines of India, Pakistan, and Trinidad and Tobago. It is also popular in Bangladesh, Myanmar, Nepal, Sri Lanka, and the Middle East. Kulfi is denser and creamier than regular ice cream, with a rich, intense flavour. It is made by slowly simmering milk until it has thickened and reduced by about half. Sugar and flavourings are then added, and the mixture is frozen in molds. Kulfi can be made in a variety of flavours, but some of the most popular include malai (cream), rose, mango, cardamom, saffron (kesar), andpistachio. It is a good source of protein and calcium, but it is also high in calories and Kulfi is also a good source of other nutrients, including phosphorus, vitamin B1, and vitamin B2.

2. METHODOLOGY

2.1 selection of sorghum millet:

Buy from a reputable vendor. This will help you to ensure that you are getting high-quality sorghum. Store sorghum in a cool, dry place. This will help to keep it fresh and prevent spoilage .Ask the vendor about the variety and origin of the sorghum. This information can help you to determine if the sorghum is well-suited to your needs.

2.2 Formulation of Sorghum Milk Kulfi:

Substituting cow’s milk for kulfi with sorghum milk at different proportions 50% and 75%.

2.2.1 ingredients:

Cow milk	50ml
Sorghum milk	150ml
Sugar	100g
Cashew nut	20g
Badam	10g
Pistachio	10g
Cardamom powder	2g

2.2.2 Procedure:

Soak the sorghum grains overnight and grind the grains

↓

Now extract the milk by using the muslin cloth.

↓

After extraction keep milk aside

↓

ion, keep the milk Blend the milk powder, Sugar, com four, citric acid,Cardamom powder, and all dry fruits and the mix.

↓

Take 25 g of the above mix, add sorghum milk and regular Milk and make a thick consistency by cooking.

↓

After cooling, fill the kulfi molds and keep freezing Overnight Serve as a healthy,Delicious dessert.

2. COMPOSITION OF FORMULATION SORGHUM KULFI:

Sorghum grain composition varies significantly, owing to genetic and environmental influences, and is similar to that of maize Starch (75–79%) is the major component, followed by protein (9.0–14.1%) and oil (2.1–5.0%). The protein content (N × 6.25) of sorghum is more variable and usually 1–2% higher than maize. Sorghum starch is composed of 70–80% amylopectin and 20–30% amylose. Waxy sorghums contain starch with 100% amylopectin.

INGREDIENTS	STANDARD	INCORPORATE SORGHUM MILK	
		Variation 50%	Variation 75%
Cow milk	200 ml	100ml 50ml	
Sorghum milk	---	100ml150ml	
Sugar	100g	100g 125g	
Cashew nut	20g	20g20g	
Badam	10g	10g10g	
Pistachio	10g	10g10g	
Cardamom powder	2g	2g2g	

4. SENSORY EVALUATION:

Food sensory evaluation is the scientific discipline used to evoke, measure, analyze, and interpret human reactions to the properties of foods and materials, as perceived by the six senses: taste, smell, touch, flavour and apperance.Sensory evaluation is an important tool for the food industry, and it plays a vital role in ensuring that food products are of high quality and meet consumer preferences.

1-Dislike extremely

2-Dislike very much

3-Dislike moderately

4 -Dislike slightly

5-neither like nor dislike

6 -Like slightly

7 -Like moderately

8 -Like very much

9 -Like extremely

Score card for sensory evaluation:

	Variation 1	Variation 2
Taste		
Colour		
Appearance		
Flavour		
Texture		
OverallAcceptablity		

3. COST CALCULATION :

Cost calculation

The cost of market products can vary widely depending on a number of factors, including the type of product, the materials used, the manufacturing process, and the brand. The first step is to identify all of the costs associated with the product .Once all of the costs have been identified, they need to be added up to get the total cost of the product.

1.1 Cost calculation for standard kulfi:

1.2

INGREDIENTS	AMOUNT(g)	COST(Rs)
Cow milk	200ml	10
Sugar	100g	8
Cashew nut	20g	10
Badam	10g	15
Pistachio	10g	20
Cardamom powder	2g	5
Total cost		68

1.3 Cost calculation for formulation sorghum kulfi:

1.4

INGREDIENTS	AMOUNT(g)	COST(Rs)
Cow milk	50ml	5
Sorghum	150g	15
Sugar	125g	20
Cashew nut	20g	10
Badam	10g	15
Pistachio	10g	20
Cardamom powder	2g	5
Total cost		90

6. **RESULTS AND DISCUSSION**:

Sensory evaluation results are the data collected from sensory tests. These tests are used to measure the human response to a product's sensory attributes, such as its appearance, , texture, taste,colour,flavor and overall acceptability.

	Variation 1	Variation 2
Taste	8	9
Colour	7	7
Appearance	8	8
Flavour	8	9
Texture	9	9
Overall Acceptability	8	9

The above table shows the overall acceptability of the formulated product sorghum milk kulfi. The variation 2 has the highest acceptability when compared to Variation 1.

CONCLUSION:

It is concluded that above findings that 75% sorghum milk formulation kulfi was found to be highly acceptable. The nutrient content of the formulation sorghum milk kulfi was found to be higher than standard kulfi.sorghum milk is lactose-free, so sorghum kulfi is a good choice for people with lactose intolerance. Sorghum milk is a good source of vitamins andminerals, including calcium, iron, and vitaminD.

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COMBINED EFFECT OF MUNTINGIA *CALABURA* L FRUIT POWDER WITH FOXTAIL MILLET ADDITION ON ANTIOXIDANT CAPACITY OF BAKED DOUGHNUTS

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The present research work examined *Muntingia calabura L* fruit powder (MFP) with foxtail millet addition as a potential functional food ingredient in baked doughnuts. The composite flour was developed using wheat flour, refined wheat flour, and foxtail millet flour to prepare doughnuts. MFP blends of 0% was termed as 'control', 5%, 10%, 15%, 20% and 25% (w/w) were prepared by replacing equivalent amount of composite flour were analyzed for proximate compounds such as ash, carbohydrate, protein, crude fat, crude fibre, total Phenols, vitamin-C, vitamin-E, and tocopherol and antioxidant activity in DPPH form. Results showed that different MFP substitution in doughnuts showed a significant increase in ash, protein, crude fiber, and a decrease in carbohydrate and crude fat content. As the percentage of MFP substitution increased, a significant ($p<0.05$) increase in total Phenols, vitamin-C, vitamin-E, and tocopherol and antioxidant activity was observed. Therefore, MFP could be utilized as an active component to develop high-quality composite flour-based baked doughnuts with health-promoting properties to the consumers.

DEVELOPMENT AND EVALUTION OF VALUE ADDED LITTLE MILLET *(Panicum sumatrance)* SESAME STICKS

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ABSTRACT

Little millet is one of the oldest crops domesticated in India and is important minor millet grown in dry lands. However, its utilization is restricted to only certain cultural occasions in certain parts of the country. In Karnataka Little millet is grown in different regions, in view ofthis a study was conducted to document the physic-chemical properties and also to know if there are variations in nutritional and physical parameters in the little millet grain grown in different regions. The grains had a protein content of 7 per cent, fat 4.26 per cent, carbohydratesaround 78 per cent, energy 370 Kcal and ash around 5 per cent. Little millet grains took 13- 16minutes to cook and the volume of the grains increased by two and half folds. Little millet grains had different hull colours, however, the other physical, cooking and nutritional characters did not vary among the grains when classified based on hull colour. Also, variationsin physical, cooking and nutritional qualities were not evident in the grains cultivated in different zones. In corporation of sesame seeds we have got a good taste.

Keywords: *Little millet, nutritional quality, cooking quality, agro-climatic zones, Sesame*

INTRODUCTION

Little millet belongs to the family Poaceae, Sub-family Panicoideae and the tribe Paniceae (Rachie, 1975). Little millet (Panicumsumatrense L.) is grown in India under various agro ecological situations and commonly known as Samai, Samo, Moraio, Vari, kutki. Little millet

is a hardy crop which can withstand drought better than most of other cereal crops and water logging to a certain degree, also. Hence, it can provide us with food security in unfavourable climatic conditions. Little millet is rich in vitamin B, minerals like potassium, phosphorus, iron,Zinc and magnesium. Therefore it can address nutritional sensitive agriculture, which aims at nutritional enhancement to combat the present scenario of micronutrient malnutrition (Arunachalam et al., 2005, Kundgol et al., 2014 and Selvi et al., 2015). In India, little millet growing states are Karnataka, Tamil Nadu, Odisha, Madhya Pradesh, Chattisgarh, Jharkhand, Andhra Pradesh, Uttarakhand, Maharashtra and Gujarat.

Little millet sesame sticks:

Little millet sesame sticks were most commonly found in India.Little millet sesame sticks are a healthy and delicious snack that offer a variety of health benefits.Overall, little millet sesamesticks are a healthy and nutritious snack that can offer a variety of health benefits. They are a good source of protein, fiber, vitamins, minerals, and antioxidants. They may also help to improve heart health, support gut health, boost the immune system, and support weight loss and weight management.It is important to note that little millet sesame sticks are a high-caloriesnack.

1.METHODOLOGY

Selection of millet

Little millet shares quite an illustrious history with Indian cuisine. The grains have been cultivated in the country for centuries and are traditionally grown as a catch crop in particularlyhilly regions of central India. Ours is sourced from Madhya Pradesh and adds a mellow crunchto this dish where we have used some widely available Indian Pennywort (thankuni) and Eucalyptus honey.

Formulation of little millet in sesame sticks

Formulation of normal chocolate sticks

Normal chocolate sticks are typically made with a combination of the following ingredients:

* Sugar
* Cocoa butter
* Milk powder
* Soy lecithin
* Natural vanilla extract
* Chocolate liquor

The ingredients are melted together and then poured into molds to cool and harden.

Formulation of little millet sesame sticks

Little millet sesame sticks are typically made with a combination of the following ingredients.

* Little millet flour

* Sesame seeds
* Jaggery
* Coconut oil
* Salt

The ingredients are mixed together to form a dough, which is then rolled into sticks and baked.

Adding of little millet flour and sesame seeds in exchange of Chocolate and milk powder inthe variation of 50% and 70%

INGREDIENTS	**STANDARD (***Chocolat eSticks***)**	**FORMULATION O FLITTLE MILLET FLOUR (***Little Millet sesame sticks* **)**	
		VARIATIO N 1(50%)	**VARIATIO N 2(70%)**
Chocolate	75g	—	
		75g	100g

Little millet flour	—	
Milk powder	100g	— —
Sugar	50g	25g 50g
Soy lecithin	2ml	— —
Sesame seeds	—	10g 20g
Vannila extract	2ml	— —
Egg	2ml	5ml 10ml

2.PROCEDURE

•In a bowl, add little millet flour, sesame,sugar, baking powder, salt, oil and mix well.

• Add the eggs and mix into a dough. Divide the dough into small balls.

• Now roll the dough into rectangular (stick) shape.

• Fry them in medium heated oil.

• Remove them onto a tissue paper and serve the sticks with sesame on the sticks.

3.SENSORY EVALUATION

Food sensory evaluation is the scientific discipline of evaluating the sensory properties of food, such as appearance, aroma, taste, texture, and mouthfeel. It is a systematic and objective process that uses the human senses to assess the quality of food products.Sensory evaluation isconducted by trained panelists, who are able to accurately and consistently perceive and describe the sensory attributes of food. There are a variety of sensory evaluation methods thatcan be used, depending on the specific purpose of the evaluation.

1 Dislike extremely 2 Dislike very much

3 -Dislike moderately

4 -Dislike slightly

5-Neither like nor dislike

6 -Like slightly

7-Like moderately8 .Like very much9 .Like extremely

Score Card for sensory evaluation:

CRITERIA	VARIATION 1	VARIATION 2
Taste		
Colour		
Appearance		
Flavour		
Texture		

4.RESULT AND DISCUSSION

The results of sensory evaluations can be used to make informed decisions about food productdevelopment, quality control, and marketing. For example, if a manufacturer finds thatconsumers prefer a new product with a sweeter taste, they can adjust the formulation accordingly.Sensory evaluation notes the human attires like taste, texture, flavour, appearanceof the humans.

The formulation of Little Millet flour and sesame seeds in exchange of Chocolate and milk powder can improve the taste and nutritious value of the product.Thus the product can improvethe formulation of various types of millets in snack .

CRITERIA	**VARIATION 1**(*Chocolate sticks)*	**VARIATION 2((***Little Millet sesame sticks)*
Taste	8	8
Colour	7	9
Appearance	8	9
Flavour	8	9
Texture	9	8
Over-all Acceptablity	8	9

The above table shows the various aspects of the little millet sesame sticks.When compared toVariation

1(Chocolate sticks) the overall Acceptablity of Variation 2 (Little Millet sesame sticks) is higher.

5. CONCLUSION

In conclusion, little millet sesame sticks are a delicious and nutritious snack that can be enjoyedby people of all ages. They are a good source of fiber, protein, and healthy fats, and they are also low in calories. Little millet sesame sticks are also easy to make and can be customized toyour liking. You can experiment with different types of millet, sesame seeds, and other ingredients to create the perfect snack for you.

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STANDARDIZATION OF PROTEIN FORTIFIED NOODLE FROM DEFATTED GROUNDNUTMEAL

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Abstract

Groundnut is classified as both legume and oil crop due to its high oil content. After the extraction of oil, groundnut meal is left over as a byproduct, which has a high protein content (45-60%). The objective of this study is to isolate the protein from the groundnut meal, develop protein rich snack recipes and to standardize them. The groundnut defatted meal is collected from oil refineries and oil press units and subjected to the alkaline protein extraction method. The chemicals used are NaOH, KOH, NaCl, NaHCO3 & H2SO4. The isolated protein will be recovered using centrifuge method and dried with the help of a desiccators. The isolated and dried protein is incorporated in noodle and cookie. The standardizedproducts are qualitatively analyzed for organoleptic and nutrient profile.

Keywords : *Groundnut meal, Isolation of protein concentrate, Incorporation and standardization.*

IMPORTANCE OF MILLETS IN NUTRITION AND HEALTH BENEFITS

ABSTRACT

Millets is a good source of protein,fibre, vitamins and minerals. The nutritional valueof millets are 3.51gofprotein,23.7g of carbohydrate,1.3g of dietaryfibre,44milligrams(mg)of magnesium,0.61mg of copper,100mgof phosphorus,0.272mg of manganese.In the era of 21st century, rapid urbanisation, climate change, increased population, scarcity of water and increaseddry land are the factors responsible for the worldwide agriculturaland nutritional challenges. As awidely cultivated popular grain in arid and semiarid regions across the globe, Millets can act as amultifaceted solution to the above global challenges because of their rich vitamins, minerals, phytochemicals and anti-oxidant content. In addition to vitamins, Millets are the rich source of flavanoids such as apigenin, catechin, daisein, orientin, isoorientin, lutolin, quercetin, vitexin, isovitexin, myricetin sponarin, violanthin, lucenin-1, and tricin. Further, the presence of essential amino acids enriches the nutritive potential of Millets. The rich anti-oxidant content in Millets reduces oxidative stress in human and animal models by significantly minimizing Reactive Oxygen Species (ROS) generation. Several bioactive principles in Millets are known to decrease cardiovascular risk, diabetes, ageing and even cancer. However, nutritive and therapeutic potentials of bioactive compounds found in Millets are underexplored and a systematic review encompassing available data in literature is grossly missing. The potential health benefits of milletinclude protecting cardiovascular health, preventing the onset of diabetes, helping people achieveand maintain a healthy weight ,and managing inflammation in the gut . Millet is an adaptable grain

.Millet contains fiber, which contributes to digestive health and helps to regulate bowel movements.Millet also has prebiotics, which stimulate the growth of probiotics within the microbiome. This is important for gut health and the immune system in general.The aim of this review is to compile the recent advances that have been carried out covering nutritional properties,processing technologies and their effects in reducing anti-nutritional factors enhancing nutrient bioavailability along with the potential health benefits of millets.

Keywords: Bioavailability of Minerals, Health Benefits, Micronutrient deficiency, Millets , Nutritional value.

IMPORTANCE IN MILLETS IN NUTRITION AND HEALTH BENEFITS

ABSTRACT

Millets are nutritionally comparable to major cereals and serve as good source of protein, micronutrients and phytochemicals. Processing methods like soaking,malting, decortications and cooking affect the anti-oxidant content and activity. While sorghum and most of the millets contains about 10%protein,3.5%lipids,finger millet contains 12-16%protein and 2- 5%lipids.Sorghum and millets are very good sources of micronutrients such as vitamins and minerals. Millet is a group of small-seeded grasses that have been cultivated for thousands of years, and they hold significant importance in nutrition and offer various health benefits. Millets are packed with essential nutrients, including carbohydrates, dietary fiber, protein, vitamins (such as niacin, B6, and folic acid), and minerals (like magnesium, phosphorus, and iron). Most millet varieties are naturally gluten-free, making them an excellent choice for individuals with celiac disease or gluten sensitivity. Millets have a low glycemic index, which means they release glucose into the bloodstream slowly. This can help regulate blood sugar levels and reduce the risk of diabetes. The high dietary fiber content in millets aids in digestion, promotes a feeling of fullness, and helps maintain healthy cholesterol levels. Some millet varieties, like finger millet (ragi), are rich in antioxidants like polyphenols and phytosterols, which have potential health benefits, including reducing oxidative stress. The magnesium and potassium content in millets can contribute to cardiovascular health by helping to regulate blood pressure and reduce the risk of heart disease. Millets can be part of a balanced diet for weight management due to their fiber content and ability to keep you feeling full for longer. Millets contain essential minerals like phosphorus and calcium, contributing to bone health and preventing conditions like osteoporosis.The dietary fiber in millets supports a healthy digestive system by preventing constipation and promoting regular bowel movements. Millets can be used in various culinary applications, including as a substitute for rice, in baking, and in the preparation of porridges, soups, and side dishes. Millets are drought-resistant and require less water and resources compared to some other major cereal grains like rice and wheat. This makes them an environmentally sustainable crop choice. In Addition to that, creation of awareness to stress on the importance of these Millets for human health is highly encouraged.

Key words: *Millets, importance, benefits, nutrients, constipation ,culinary applications*

FINGER MILLET IN GASTRO INTESTINAL TRACT: A REVIEW

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Abstract

Finger millet belongs to the family *poaceae* and is more commonly known as ragi or madua in India, Ropoko in south Africa and dagusa in Ethiopia. Specifically, it is the richest source of calcium among cereals. It is also rich in iron and fiber, making this crop more nutritive as compared to other most commonly used cereals. Finger millet is also rich in a mixture of soluble and insoluble dietary fibers or roughage that are resistant to breakdown during digestion and help to prevent gastro-intestinal disorders, colon cancer, coronary heart disease and diabetes. In Gastro Intestinal tract contain gut microbes are lactobacillus, Bifidobacterium, roseburia, Ruminococcus. These microbes help digestion of finger millet This Microbes helps to reduce microbial toxins in gut health. Due to its high cellulose content, the insoluble fiber of finger millet helps to bulk the stool, acts as laxative to stimulate bowl mobility and prevents constipation by retaining water. The soluble fibers, on the other hand assist lubrication and soothing of an inflamed digestive tract. Consumption of food products derived from its grain can increase the satiety index, reduce excessive calorie intake and thus can promote weight loss.

Keywords: finger millet, soluble fiber, insoluble fiber, gastro-intestine.

REVIEW ON PROBIOTIC RICH MILLET

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ABSTRACT:

Millets are cereal crops and small seed grasses, which are widely used in African and Asian countries. Since ages, these small crops were used for human consumption as well as a fodder for animals.Probiotics are a combination of live beneficial bacteria and/or yeasts that naturally live in your body. Bacteria is usually viewed in a negative light as something that makes you sick. However, you have two kinds of bacteria constantly in and on your body — good bacteria and bad bacteria. Probiotics are made up of good bacteria that helps keep your body healthy and working well. This good bacteria helps you in many ways, including fighting off bad bacteria when you have too much of it, helping you feel better.The main job of probiotics, or good bacteria, is to maintain a healthy balance in our body.Think it of as keeping your body in neutral.Germinated food mixture usually contains a significantly higher amount of thiamine, lysine and niacin contents. The combination of cereals with other methods results in better nutrient profile and an enhanced amino acid pattern. Fermentation is said to be the most crucial and popular process which considerably lowers the anti-nutrients present in coarse cereals such as trypsin inhibitor, phytic acid and tannins and hence, enhance the overall nutritive value of coarse cereals and other food grains. Also, germinated cereal-based food products have higher cell count and better growth of beneficial bacteria, thus, germination of cereals facilitates the probiotic fermentation of cereals.Probiotic rich millet are foxtail and pearl.

KEYWORDS:*Millets, Probiotics, Fermentation, Germination, Anti-nutrients, Beneficial bacteria.*

1. INTRODUCTION:

Probiotics are live microorganisms promoted with claims that they provide health benefits when consumed, generally by improving or restoring the gut microbiota. Probiotics are considered generally safe to consume, but may cause bacteria-host interactions and unwanted side effects in rare cases. There is some evidence that probiotics are beneficial for some conditions, but there is little evidence for many of the health benefits claimed for them.The first discovered probiotic was a certain strain of bacillus in Bulgarian yoghurt, called Lactobacillus bulgaricus. The discovery was made in 1905 by Bulgarian physician and microbiologist Stamen Grigorov. The modern-day theory is generally attributed to Russian Nobel laureate Élie Metchnikoff, who postulated around 1907 that yoghurt-consuming Bulgarian peasants lived longer.

A growing probiotics market has led to the need for stricter requirements for scientific substantiation of putative benefits conferred by microorganisms claimed to be probiotic. Although numerous claimed benefits are marketed towards using consumer probiotic products, such as reducing gastrointestinal discomfort, improving immune health, relieving constipation, or avoiding the common cold, such claims are not supported by scientific evidence and are prohibited as deceptive advertising in the United States by the Federal Trade Commission. As of 2019, numerous applications for approval of health claims by European manufacturers of probiotic dietary supplements have been rejected by the European Food Safety Authority for insufficient evidence of beneficial mechanism or efficacy.

2. MILLETS:

The grasses known collectively as millets are a set of highly variable, small-seeded plant species indigenous to many areas of the world. They are well adapted to grow under low soil fertility, low moisture, and hot environmental conditions. Millets are of value especially in semiarid regions because of their short growing season and higher productivity under heat and drought conditions. Often millets are produced in areas where maize and sorghum crops may fail. Some millets, such as teff or fonio, are prized for their taste and functionality in nondrought years and can bring higher prices per bushel than the more common millets. The grain and forage are valuable as food and feed resources in Africa, Russia, India, and China. Pearl millet is the most widely grown millet and is a very important crop in India and parts of Africa. There are more than 15,000 pearl millet lines in the World Germplasm Collection located in India. Finger millet is popular in East Africa and India. Foxtail and proso millets are cultivated primarily in the Near East and China. Proso millet is also widely cultivated in the Russian Federation. Fonio (acha) and teff are grown in West Africa and Ethiopia, respectively. Millets are important cereals in the diet of many people in Africa and India, where millets and sorghum are used interchangeably in the same traditional food systems.

2.1 FOXTAIL MILLET:

The annual grass foxtail millet, scientifically known as Setaria italica (also known as Panicum italicum L.), is cultivated for human consumption. It is Asia's most popular millet species and the second most extensively planted millet species overall. The earliest indication of foxtail millet cultivation was discovered in Cishan, China, along the historic Yellow River route, and it was carbon-dated to be from roughly 8,000 years ago. Since ancient times, foxtail millet has also been grown in India.

2.2PEARL MILLET:

The millet variety that is most frequently grown is called pearl millet (Cenchrus americanus, sometimes known by its synonym Pennisetum glaucum). Since the beginning of time, it has been grown in Africa and the Indian subcontinent. The Sahel region of West Africa is where the crop is most diverse and is thought to have undergone domestication. Recent archaeobotanical studies have demonstrated that domesticated pearl millet was present in northern Mali's Sahel region between 2500 and 2000 BC. The United Nations General Assembly proclaimed 2023 the International Year of Millets in 2021.

3. PROBIOTIC:

The term "probiotic" was first used in 1965, by Lilly and Stillwell, to describe substances secreted by one organism which stimulate the growth of another. The use of antibiotics, immunosuppressive therapy and irradiation, amongst other means of treatment, may cause alterations in the composition and have an effect on the GIT flora. Therefore, the introduction of beneficial bacterial species to GI tract may be a very attractive option to re-establish the microbial equilibrium and prevent disease. Prebiotic is a non-digestible food ingredient that confers benefits on the host by selectively stimulating one bacterium or a group of bacteria in the colon with probiotic properties.

Probiotics are live nonpathogenic microorganisms administered to improve microbial balance, particularly in the gastrointestinal tract. They consist of Saccharomyces boulardii yeast or lactic acid bacteria, such as Lactobacillus and Bifidobacterium species, and are regulated as dietary supplements and foods. Probiotics exert their beneficial effects through various mechanisms, including lowering intestinal pH, decreasing colonization and invasion by pathogenic organisms, and modifying the host immune response. Probiotic benefits associated with one species or strain do not necessarily hold true for others. The strongest evidence for the clinical effectiveness of probiotics has been in the treatment of acute diarrhea, most commonly due to rotavirus, and pouchitis. More research is needed to clarify the role of probiotics for preventing antibiotic-associated diarrhea, Clostridium difficile infection, travelers' diarrhea, irritable bowel syndrome, ulcerative colitis, Crohn's disease, and vulvovaginal candidiasis. There is no consensus about the minimum number of microorganisms that must be ingested to obtain a beneficial effect; however, a probiotic should typically contain several billion microorganisms to increase the chance that adequate gut colonization will occur. Probiotics are generally considered safe and well tolerated, with bloating and flatulence occurring most frequently. They should be used cautiously in patients who are critically ill or severely immunocompromised or those with central venous catheters since systemic infections may rarely occur. Bacteria-derived probiotics should be separated from antibiotics by at least two hours.

4. PROBIOTIC BACTERIA IN FERMENTATED FOODS:

Probiotic bacteria are sold mainly in fermented foods, and dairy products play a predominant role as carriers of probiotics. These foods are well suited to promoting the positive health image of probiotics for several reasons: 1) fermented foods, and dairy products in particular, already have a positive health image; 2) consumers are familiar with the fact that fermented foods contain living microorganisms (bacteria); and 3) probiotics used as starter organisms combine the positive images of fermentation and probiotic cultures. When probiotics are added to fermented foods, several factors must be considered that may influence the ability of the probiotics to survive in the product and become active when entering the consumer’s gastrointestinal tract. These factors include 1) the physiologic state of the probiotic organisms added (whether the cells are from the logarithmic or the stationary growth phase), 2) the physical conditions of product storage (eg, temperature), 3) the chemical composition of the product to which the probiotics are added (eg, acidity, available carbohydrate content, nitrogen sources, mineral content, water activity, and oxygen content), and 4) possible interactions of the probiotics with the starter cultures (eg, bacteriocin production, antagonism, and synergism). The interactions of probiotics with either the food matrix or the starter culture may be even more intensive when probiotics are used as a component of the starter culture. Some of these aspects are discussed in this article, with an emphasis on dairy products such as milk, yogurt, and cheese.

5. MILLET BASED PROBIOTIC:

Fermentation of cereals such as millet, is culturally significant. The aim of this study was to investigate the fermentation capability of millet when one gram of the Fiti sachet consortium was added. An increase of 1.8 and 1.4 log CFU/mL was observed for S. thermophilus C106 and L. rhamnosus GR-1 when grown in 8% millet in water. Single cultures of L. rhamnosus GR-1 showed the highest μmax when grown in the presence of dextrose, galactose and fructose. Single cultures of S. thermophilus C106 showed the highest μmax when grown in the presence of sucrose and lactose. All tested recipes reached viable counts of the probiotic bacteria, with counts greater than 106 colony-forming units (CFU)/mL. Notably, a number of organic acids were quantified, in particular phytic acid, which was shown to decrease when fermentation time increased, thereby improving the bioavailability of specific micronutrients. Millet fermented in milk proved to be the most favorable, according to a sensory evaluation. In conclusion, this study has shown that sachets being provided to African communities to produce fermented milk, can also be used to produce fermented millet. This provides an option for when milk supplies are short, or if communities wish to utilize the nutrient-rich qualities of locally-grown millet

6. EFFECTS OF PROBIOTICS ON BODY:

A systematic review and meta-analysis of randomized controlled trials was conducted to examine the effects of probiotic supplementation on body weight, body mass index (BMI), fat mass and fat percentage in subjects with overweight (BMI 25–29.9 kg m−2) or obesity (BMI ≥30 kg m−2). MEDLINE, EMBASE and the Cochrane Central Register of Controlled Trials were searched for studies published between 1946 and September 2016. A meta-analysis, using a random effects model, was performed to calculate the weighted mean difference between the intervention and control groups. Of 800 studies identified through the literature search, 15 were finally included. The studies comprised a total of 957 subjects (63% women), with the mean BMI being 27.6 kg m−2 and the duration of the interventions ranging from 3 to 12 weeks. Administration of probiotics resulted in a significantly larger reduction in body weight (weighted mean difference [95% confidence interval]; −0.60 [−1.19, −0.01] kg, I2 = 49%), BMI (−0.27 [−0.45, −0.08] kg m−2, I2 = 57%) and fat percentage (−0.60 [−1.20, −0.01] %, I2 = 19%), compared with placebo; however, the effect sizes were small. The effect of probiotics on fat mass was non-significant (−0.42 [−1.08, 0.23] kg, I2 = 84%).

Objective: To assess the efficacy of probiotic therapies on body weight and BMI using a meta-analysis of randomized, controlled trials.

Methods: Twenty studies with 25 trials (1931 participants with age over 18 years) were included. The pooled WMD was calculated by random effects model.

Results: Probiotic consumption significantly reduced body weight by 0.59 kg (95% CI, 0.30–0.87) and BMI by 0.49 kg/m2 (95% CI, 0.24–0.74). A greater reduction in BMI was found with multiple species of probiotics. Subgroup analysis of trials with intervention duration ≥8 weeks found a more significant reduction in BMI. Limiting analysis to trials with a baseline BMI ≥25 kg/m2 showed a greater reduction in BMI.

7. CONCLUSION:

Probiotic bacteria have many beneficial health effects, and one of them is their ability to bind aflatoxin. Evidences from in vitro, animal and human clinical studies have supported the potential ability of probiotic bacteria as adsorbent of aflatoxin.

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REVIEW ON FUNCTIONAL PROPERTY OF MILLET

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ABSTRACT:

Millets or nutri-cereals are high-energy foods; that were domesticated and cultivated as early as 10,000 years ago. The millets cultivation is taken up usually in degraded and marginal lands that receive very less rainfall and are poor in soil nutrient content. Reactive oxygen species play a significant role in accelerating the complications of diabetes mellitus, and antioxidants alleviate these effects. Hence, the beneficial role of a millet-based diet in protecting against oxidative stress and maintaining glucose levels . millet contains an abundance of bioactive compounds with antioxidant activity. The intake of antioxidants through the diet is essential for improving human health. This review aimed to evaluate the antioxidant compounds in millet, as well as the factors that influence antioxidant activity. Millets being anti-inflammatory also promote nerve and blood vessel health. They are great for muscle contraction without which we can experience stiffness, soreness, and reduced mobility. Millets are also rich in ferulic acid which plays a huge role in reducing inflammation. Polyphenols are the most important phytochemicals of the millet because of their nutraceutical potentials such as antioxidant activity, anti-inflammatory, anti- carcinogenic, antimicrobial, antidiarrhoeal, antiulcer, and anti-cardiovascular properties. Millet is a soft-textured whole grain that's perfect for casseroles and one-pots. And now, research shows that whole grains can help lower your risk for colorectal cancer. millet is often used to feed pets, livestock, and birds, but it is growing in consumer popularity. This is because it is gluten free and a good source of protein, fiber, micronutrients. It also provides multiple benefits to physical and mental health, requires few inputs to grow, and is resistant to drought. white bread, cookies, and cake,snack foods, such as candies and chips,sodas and other sweetened drinksSupporting the cardiovascular system. Millet contains magnesium, which helps to regulate heart rhythm. Consuming millet may also levels of the protein

adiponectin, which can protect cardiovascular tissues. Millet also contains vitamin B3 or niacin. This vitamin helps reduce certain factors of heart disease, such as high levels of cholesterol and triglycerides, and is effective in lowering oxidative stress. Promotes anti-aging.How your body metabolizes sugars is a major factor in how you age. Millets are full of tannins, phytates, and phenols that help protect your cells against damage and potential diseases like high blood pressure, diabetes, and high cholesterol. They may have numerous health benefits, such as helping lower your blood sugar and cholesterol levels. Plus, they're gluten-free, making them an excellent choice for people who have celiac disease or follow a gluten-free di

Keywords: functions of millets, anti-carcinogenic property, anti-stress property, anti-aging, anti-cardio protective property of millets.

Introduction:

Millets or nutri-cereals are high-energy foods; that were domesticated and cultivated as early as 10,000 years ago. The millets cultivation is taken up usually in degraded and marginal lands that receive very less rainfall and are poor in soil nutrient content. The only way to fight back is through the introduction of nutritionally rich millets in our daily diets. The timing of the introduction of millet and the horse in northern Greece coincide; the possibility therefore that they are both introduced through contacts with horse breeding cultures cultivating millet in the north and/or northeast is raised. as well as in discussions on modern global food security and sustainable agriculture. It can be considered a special crop in Europe, different from the Neolithic ‘founder crops’ in that it was domesticated in the Far East, namely China, and arrived in Europe ‘late’–not before the full establishment of metallurgy, in the Bronze Age, when trade and exchange and production levels also peaked. Its distinctive biological, nutritional and ecological traits made this species particularly attractive to farmers in recent and modern communities and, together with its ‘special’pathway of spread from its region of origin, likely contributed to its widespread and relatively quick adoption by communities in the past.

Millets uses in antioxidant property:

Millet is a major drought-resistant crop that serves as a nutrient rich food staple in Africa and Asia. In addition, millet contains an abundance of bioactive compounds with antioxidant activity. The intake of antioxidants through the diet is essential for improving human health. This review aimed to evaluate the antioxidant compounds in millet, as well as the factors that influence antioxidant activity. The Millet contained several natural occurring phenolic compounds which include phenolic acids, flavonoids and tannins, in addition to xylo-oligosaccharides (XOs), insoluble fibers and peptides. Certain lipophilic antioxidants, including vitamin E and carotenoids, were extensively distributed among varieties. Furthermore, the bioactivity of the antioxidants can be affected by food processing. Germination and fermentation could enhance the antioxidant properties, due to increased antioxidants content (phenolic compounds). In summary, it is possible to use millet as a nutraceutical and antioxidant food resource to reduce disease risks and maintain health. Antioxidant activities of phenolic extracts of kodo and pearl millet whole grains, dehulled grains, and hulls were examined by monitoring inhibition of radical-induced DNA scission, human low-density lipoprotein (LDL) cholesterol, and phospholipid liposome oxidation. The millet is also reported to possess hypolipidemic, low-glycemic index, and antioxidant characteristics. This review concludes that, like most millet varieties, foxtail millet remains under-utilized as a food source. It is however receiving increased research and commercial attention, especially because its cultivation is not too demanding from point of view of agricultural inputs and it can grow in difficult terrains. It would be reasonable to surmise that foxtail millet has a promising role to play in enhancing nutritional and food security.

Anti-inflammatory property:

The prevalence of inflammatory-mediated and oxidative stress-associated diseases is increasing worldwide, creating an increasing demand for novel sources of anti-inflammatory agents and antioxidants. The findings revealed the potential of using these finger millet extracts as natural sources of anti-inflammatory drug candidates. Additionally, the findings indicated that Ravi, Rawana, and Oshadha varieties are good sources of antioxidants. Therefore, consumption of these finger millet varieties on a regular basis may play an important role in the prevention and dietary management of oxidative stress-associated diseases. This review describes many nutritional characteristics of millet seeds and their derivatives that are important to human health: antioxidant, antihypertensive, immunomodulatory or anti-inflammatory, antibacterial or antimicrobial, hypocholesterolemic, hypoglycemic, and anti-carcinogenic potential, and their role as modulators of gut health. There are several varieties, but the main focus of this review is on pearl millet (Cenchrusamericanus [synonym Pennisetumglaucum]), one of the most widely eaten millet crops grown in India, though other millet types are also covered.Millets are suggested as good candidates for use in future nutritional interventions for improved human health. anti-inflammatory peptides derived from the in vitro gastrointestinal digestion of germinated and heated (microwave and boiling) foxtail millet. The protein digest fraction containing low-molecular-weight peptides (<3 kDa) and the most hydrophobic subfraction (F4) abundant in random coil structure were responsible for the bioactivity.

Anti-Carcinogenic property:

Millet is consumed as a staple food, particularly in developing countries, is part of the traditional diet in a number of relatively affluent countries, and is gaining popularity throughout the world. It is a valuable dietary energy source. In addition to high caloric value, several health-promoting attributes have been reported for millet seeds. This review describes many nutritional characteristics of millet seeds and their derivatives that are important to human health: antioxidant, antihypertensive, immunomodulatory or anti-inflammatory, antibacterial or antimicrobial, hypocholesterolemic, hypoglycemic, and anti-carcinogenic potential, and their role as modulators of gut health. Although many of these health benefits have been demonstrated using animal models in vitro studies, human intervention-feeding trials are required to confirm several of the potential health benefits of millet seeds. Based on the nutritional and health-promoting attributes known for pearl millet (discussed in this review), finger millet and foxtail millet are suggested as good candidates for use in future nutritional interventions for improved human health. Millet is an important cereal food and exhibits multiple biological activities, including immunodulatory, antioxidant, antifungal and anti-hyperglycemia effects. Herein, we describe a novel 35 kDa protein with anti-cancer properties, named FMBP, which was extracted and purified from foxtail millet bran by cell-based screening. FMBP is highly homologous to peroxidase as revealed by mass spectrometry and gene sequencing analysis. Cereals and millets have been known as poor man's crops for a long time, and have good potential in the mercenary system of food and in research and development but these coarse grains have been leftover and underutilised since a long time. In addition to nutritional properties, various elements of cereal grains contain phenolic compounds as well as various anti-nutritional factors. To improve the nutritional quality and availability of these grains, they are processed in several ways.

Anti-cardio protective property:

Cardioplegic arrest is a common procedure for many types of cardiac surgery, and different formulations have been proposed to enhance its cardio-protective effect. Hydrogen sulfide is an important signaling molecule that has cardio-protective properties. We therefore studied the cardio-protective effect of hydrogen sulfide in cardiac cell culture and its potential therapeutic use in combination with cardioplegia formulations. Millets are one of the underutilized groups of cereal grains. In spite of the presence of high nutritional and nutraceuticals components, these are still considered as food of poor people. Millets are considered as rich source of energy, carbohydrate, and protein and are comparable to other cereals but have more fat, calcium, iron, dietary fiber, and Vitamin E. Millets are an important food crop at a global level with a significant economic impact on developing countries. Millets have advantageous characteristics as they are drought and pest-resistance grains. Millets are considered as high-energy yielding nourishing foods which help in addressing malnutrition. Millet-based foods are considered as potential prebiotic and probiotics with prospective health benefits. Grains of these millet species are widely consumed as a source of traditional medicines and important food to preserve health and with Anti-Cardio protective property.

Anti-stress:

With the increasing population and changing climatic scenario, there is a dire need to increase the productivity of millets which is greatly affected by various abiotic stresses like drought, salinity, heat and cold stress. Heat and drought stresses have become a major threat to the millets.Kodo millet is rich in B vitamins especially niacin, pyridoxin and folic acid as well as the minerals such as calcium, iron, potassium, magnesium and zinc. It contains a high amount of lecithin and is an excellent for strengthening the nervous system. Eating millet daily will provide you with several health benefits. It helps women to fight off heart ailments post-menopause. It could also control high blood pressure and cholesterol level in the body. Those suffering from gallstones should also benefit from it since it contains fiber.

Anti-aging:

Aging is a multifaceted process that is associated with progressive, lethal, and unalterable changes like damage to different molecules (DNA, proteins, and lipids), cells, tissues, and organs. It is an inevitable process but can be delayed by both genetic and dietary interventions. Besides aging, premature death and age-associated diseases can be dealt with diet regulation and the use of compounds that inhibit the stress responsiveness or promote the damage repair signaling pathways. Natural compounds offer a repertoire of highly diverse structural scaffolds that can offer hopeful candidate chemical entities with antiaging potential. One such source of natural compounds is millets, which are minor cereals with an abundance of high fiber, methionine, calcium, iron, polyphenols, and secondary metabolites, responsible for numerous potential health benefits. Cereal grains are the most important source of the world's food and have a significant role in the human diet throughout the world.

Conclusion:

They may have numerous health benefits, such as helping lower your blood sugar and cholesterol levels. Plus, they're gluten-free, making them an excellent choice for people who have celiac disease or follow a gluten-free dietmillet is often used to feed pets, livestock, and birds, but it is growing in consumer popularity. This is because it is gluten free and a good source of protein, fiber, micronutrients. It also provides multiple benefits to physical and mental health, requires few inputs to grow, and is resistant to drought. millet contains an abundance of bioactive compounds with antioxidant activity. The intake of antioxidants through the diet is essential for improving human health. This review aimed to evaluate the antioxidant compounds in millet, as well as the factors that influence antioxidant activity.

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REVIEW ON NUTRITIONAL PROPERTIES OF RAGI

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ABSTRACT:

Ragi or finger millet (Eleusine coracana) is a variety of small millet packed with nutrients and low in calories. It is cultivated extensively in the southern states of India. It is also known as nachni in the northern parts of the country. Karnataka is the primary producer of ragi. According to a study by Rajiv et al (2011) published in the Journal of Texture Studies, replacing wheat flour with finger millet flour in bakery products enhances their nutritive value without affecting the quality, texture, or taste. Ragi flour is known for its high nutritional value and multiple health benefits in skincare, diabetes management, obesity, pregnancy, and skeletal health. Ragi is a mineral-rich whole grain that has a very low natural fat content and nutritionists usually suggest ragi for weight loss. Tryptophan, an amino acid present in ragi, helps to check weight gain by lowering the appetite. Eating ragi during pregnancy aids in milk production prevents gestational diabetes, relieves anxiety and stress, and prevents insomnia. Finger millet's phytochemicals help in slowing digestion process. This helps in controlling blood sugar level in condition of diabetes. This is due to presence of factors in finger millet flour which lower digestibility and absorption of starch. Finger millet is a very good source of natural Iron and its consumption helps in recovery of Anemia. Finger millet consumption helps in relaxing body naturally. It is beneficial in conditions of anxiety, depression and insomnia. Green ragi (finger millet) is recommended for conditions of blood pressure, liver disorders, asthma and heart weakness. If consumed regularly, finger millet could help in keeping malnutrition, degenerative diseases and premature aging at bay. Despite finger millet's rich nutrient profile, recent studies indicate lower consumption of millets in general by urban Indians. Finger millet is processed by milling, malting, fer-mentation, popping, and decortication. However, appropriate intervention or randomized clinical trials are lacking on these health effects. Glycemic index (GI) studies on finger millet preparations indicate low to high values, but most of the studies were conducted with outdated methodology. Hence, appropriate GI testing of finger millet preparations and short-

and long-term human intervention trials may be helpful to establish evidence-based health benefits.

Keywords :*Ragi Millets ,Use of Ragi millet ,Health Benefits and Green ragi.*

INTRODUCTION:

Ragi Millets are a group of small seeded species of cereal grains widely grown around the world and India is the world's leading producer of millet. It is a staple grain for much of the population and has been cultivated for thousands of years as early as 2700 BC in China. Millet runs as the sixth most important grain in the world and is a significant part of the dieting India, Africa, China, Japan and Egypt. Millet is also used as cattle feed in many of the developed countries. Sometimes millets are referred as a "Poor man's Cereal" because of relative low cost, cultivation environment as well as people when given a choice prefer other cereals such as rice and wheat. Probably, the strength of millets has not been well understood and its potential has been untapped. Millet is a superior food source in terms of dietary fibre,minerals, phytochemicals, B-vitamin series and the starch properties, as non glutinous cereal and for its physiological action. Millets are important crops in semiarid and tropical regions of the world due to their resistance to pests and diseases, short growing season and productivity under heat and drought conditions when major cereals cannot be relied upon to provide sustainable yields. Most of the millets of the world is grown in Asia, Africa and the USSR where it is largely consumed as food (Anderson and Martin, 1949).The nutrient composition is comparable to other cereals, both in major and minor nutrients. Rather millets are rich in minerals. The most common and important small grains of millet species cultivated are of six types and the details are given in Amongst these, finger millet possesses high calcium, potassium, sodium and good amount of iron. Finger millet is also having relatively high quantity of dietary fiber to the tune of 19%1 which stands next to Kodo millet. Besides, finger millet consumption regularly protects against the risk of cardiac problems, diabetes, gastrointestinal cancers (McKeown, 2002) and advisable as a substitute cereal for celiac disease patients (Chandrashekara and Shahidi,2010). But millets lost its importance over the 1000 years, later started as a minor cereal. To-day, millets are being considered as strengthful cereal and it has gained its place because of its functional characteristics. In this book, finger millet is dealt in detail with reference to varieties, properties, processing, products and their benefits.

NUTRITIONAL PROPERTIES:

ANTI-OBESITY:

All cereals are a rich source of dietary carbohydrates, but finger millet has a relatively higher proportion of dietary fiber as compared to other cereals. Fiber rich foods improve digestion and provide bulk to the food, making you feel full for a longer period of time. Ragi can thus be highly beneficial if one is looking to shed a few extra kilos. Observational studies show that with increased intake of calcium, there is more chance of weight loss and overcoming obesity. According to this study, high calcium intake can help lose weight by reducing the number of fat cells in the body.Also, Ragi contains an amino acid called Tryptophan (191 mg/g of protein – as per the Food and Agriculture Organization (FAO) .1970a). This compound reduces appetite and helps to control diet.

MILK PRODUCTION DURING LACTATION:

Lactating women must consume more green Ragi as it increases hemoglobin levels thus increasing the production of mothers milk among women. This also called increased levels of lactation. A lactating mother must add Green Ragi to her daily diet and it will increase amino acids and breast milk, calcium and iron which is very important for the mother and the child. EatingRagi during pregnancy aids in milk production prevents gestational diabetes, relieves anxiety and stress, and prevents insomnia.

PREVENT GESTATIONAL DIABETES:

Ragi has a low glycemic index, which means it causes a slower and more gradual rise in blood sugar levels. This property can be beneficial for managing gestational diabetes and preventing spikes in blood sugar levels. Ragi belongs to the millet family, and millets are considered good for diabetes. Ragi for diabetes patients is a better grain option compared to wheat and white rice. The high fiber content present in ragi for diabetes patients reduces and manages their blood sugar by delaying the absorption of carbs.Eating ragi for diabetes patients resulted in lower glycemic response.Eating foods prepared with ragi or nachni flour can help manage blood sugar levels. Fiber present in the bran of finger millet reduces the rate of digestion and the absorption of carbohydrates and causes slower gastric emptying. This helps to prevent a spike in blood sugar levels.

ANAEMIA:

Ragi is a natural source of iron. Regular consumption of ragi can thus be very beneficial for people suffering from iron deficiency or anemia. A clinical study done on 60 young girls suggests that regular consumption of ragi can increase hemoglobin levels in the blood. Ragi is a rich source of iron and is recommended for those suffering from anemia to boost the levels of hemoglobin. Ragi upon sprouting increases the vitamin C content aiding in the easy absorption of iron in the bloodstream. Iron deficiency anaemia is a common problem in India. It results in excessive fatigue and low productivity levels. But not with ragi! Its high iron content is one of the most important ragi or finger millet benefits.It helps combat Iron deficiency anaemia. Regular ragi dosa or roti consumption can help increase haemoglobin and overall energy levels.

MALNUTRITION:

Ragi flour has high protein content and is a good source of protein for vegetarians who lack methionine in their staple diet. The essential amino acids present in the finger millet are valine, methionine, isoleucine, threonine, and tryptophan. The nutrient-rich Finger millet can help overcome issues of malnutrition, anaemia, and osteoporosis, when consumed regularly. It is an essential cereal that can help kids grow adequately and develop a strong immune system and body. Ragi is also recommended to women in post-pregnancy recovery, to increase lactation, and to people suffering from asthma, liver disorders, weak hearts, etc.

DEGENERATIVE DISEASE:

Ragi blast disease the major limiting factor for finger millet production in the cultivated areas is the occurrence of ragi blast. Blast of finger millet was first reported in the Tanjore area of Tamil Nadu almost a century ago. The disease is reported to cause complete harvest loss if it occurs prior to grain formation. The average loss due to blast is reported to be around 28 to 36 percent.Blast is a fungal disease caused by Magnaporthe grisea. The same pathogen causes the devastating blast disease of rice.Magnaporthe grisea is an ascomycete fungus that is a biotroph and is highly diverse in nature. Even though the pathogen has a broad range of hosts among grasses and sedges, a particular strain has only a limited number of hosts. The symptoms appear as circular lesions that are pointed towards either ends. The center of the spots appear greyish and the borders become brownish. In susceptible genotypes, several of such spindle shaped spots coalesce together, leading to drying of the entire leaf. Resistant genotypes develop specks on the leaves and necks.When the fungus infects the neck region, a few inches of neck just below the finger turns brownish black ultimately leading to breakage of the peduncle.Maximum damage is caused by neck blast as it prevents grain formation or shriveling of grains.

CONCLUSION:

Ragi is a very advantageous cereal crop, that can be taken by people of all ages. It is indeed a super-food, abounding in all the essential nutrients, including dietary fibers, proteins, iron, calcium, antioxidants and vitamins, besides being gluten-free and hence safe for those with specific cereal and gluten allergies.Nevertheless, like all other foods, ragi must also be eaten only in moderation, to avoid any adverse effects from cropping up in the body. When consumed in carefully measured proportions, finger millet or ragi could help in averting instances of malnutrition and degenerative diseases such as osteoporosis, arthritis and Alzheimer's. Incorporate this nourishing food crop, as sprouted seeds or in the form of ragi flour, to effortlessly prepare standard Indian recipes like roti's, dosa and halwas, to obtain the wonderful benefits it provides for both, physical and mental health. Millets, a small seeded species of cereal grains is superior as a food source in terms of minerals, phytochemicals, dietary fiber, B vitamins and starch properties. Amongst 6 commonly used millets, finger millet called Ragi in India is most promising with high Calcium, potassium, sodium and good amount of iron. Relatively high fiber and slowly digestible starch in finger millet are the positive strength for health benefits. Finger millet consumption regularly protects against the risk of cardiac problems, diabetes, gastrointestinal cancer and advisable as a substitute cereal for celiac disease patients.

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TITLE- FOOD PROCESSING, A BOON TO PRODUCT DEVELOPMENT

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In the era of 21st century rapid urbanization, climate change, increased population, scarcity of water and increased dry land or the factors responsible for the worldwide agricultural and nutritional challenges. Now-a-days people are very conscious about their healthy living practices to overcome metabolic disorders and lifestyle disease solution to the global challenges because of the their rich vitamins, minerals,phytochemicals and antioxidants content.Researchers are proving that millets has a better option to other cereals. In addition to vitamins, millets are rich source of flavinoids such as apigenin, cathechin, orientin, vitexin, iso orient, lutolin, querutin, isovetexin, myriatin, & tricin . Value added product of millets are possible to solve negative effect of agriculture and food security. Further the presence of essential amino acids and enriches the nutritive potential of millets . Several bioactive principles in millets are known to reduce cardiovascular disease, diabetes, aging and even cancer. The processing of millets are there in traditional ways. An extensive literature review articles related to processing techniques of millets such as fermentation, germination, dehulling, extrusion,cooking, puffing, popping, milling etc.. In the millets germination and fermentation showed a positive improvement in the overall nutritional characteristics of millets whereas excessive dehulling, polishing and milling resulted in reduction of the dietary fibre and micronutrients understanding the changes happening in the nutrient value of millets due to processing can help the food industry, researchers and customers select a suitable processing techniques to optimize the nutritive value increase the bio available of nutrients and help combat food and nutrition security.

CONTEMPORARY PROCESSING OF MILLETS IN INDIA: EXPLORING ALTERATIONS IN NUTRITIONAL CHARACTERISTICS

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ABSTRACT
Globally, there's a pressing issue of food insecurity and malnutrition affecting billions of people, and the UN aims to end hunger by 2030, but we're falling short due to factors like climate change, population growth, and economic challenges. Many countries struggle with both under nutrition and over nutrition. To tackle this, we need to transform the food system, and one key approach is making healthy, nutritious food affordable for all. Millets, a group of nutritious grains, can play a crucial role in this effort. They are rich in essential nutrients like carbs, protein, fiber, and various phytochemicals. However, how we process millets greatly affects their nutritional value. Research has shown that techniques like germination and fermentation enhance millets' nutrition, while excessive dehulling, polishing, and milling can strip away dietary fiber and micronutrients. Understanding these changes in millet nutrition during processing can help the food industry, researchers, and consumers choose the right methods to maximize nutrient value, improve nutrient absorption, and contribute to the fight against food and nutrition insecurity.
Key Words: Malnutrition, Phytochemicals, Fiber, Affordable, Micronutrients, Millet, Processing

VALUE-ADDITION AND NEW PRODUCT DEVELOPMENT USING MILLET

Abstract

Millets are tasty grains that have a mildly sweet, nut-like flavour. Millets are rich sources of protein, dietary fiber, energy and minerals when compared to rice. The gluten-free nature of protein, bioactive compounds with medicinal value, and high micronutrient density makes them an ideal candidate for developing several functional and value-added food products. Several value-added products of millets like biscuits, cakes, pasta, and infant foods are available in the market and gaining the attention of economically rich and health concerned masses of the society.Millet contains a high concentration of phenolic compounds, particularly ferulic acid and catechins. These molecules act as antioxidants, shielding your body from the damaging effects of oxidative stress.Millet is high in fiber and non-starchy polysaccharides, two types of indigestible carbohydrates that aid in blood sugar control.Millet contains soluble fibre, which creates a viscous substance in your digestive tract. As a result, fats are trapped and cholesterol levels are reduced.Millet cakes have been prepared at IIMR using 100% pearl millet, finger millet or foxtail millet flour and adding superior quality fat, sugar, eggs and chocolate/vanilla essence; and also adding all the millets together with varied proportions. Of all the cakes made finger millet cake was highly acceptable.The incorporation of millet into value-added products represents a promising avenue for enhancing both nutritional value and sustainability in the food industry.

Key words: Value Addition, Nutrients, Millets, Bioactive Compounds, Phenolic Compounds

FORMULATION OF HERBAL DIABETIC SUPPLEMENT USING *SENNA AURICULATA* (TANNER'S CASSIA)

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Abstract

Formation of herbal diabetic supplement using *Senna Auriculata* (Tanner's Cassia) incorporate with cashew nut powder and palm sugar. It aims to induced the insulin production and maintain the glucose level (blood sugar level) in the body. It is suitable for Type 2 diabetes. Tanner's cassia contains anti-diabetic agent and cashew nut having the capability of boosting the insulin production of the body and palm sugar is a promising ingredient for Type 2 diabetes in managing their blood sugar level in the body by containing very low amount of glycemic index, glucose and regulates blood sugar level.

INTRODUCTION

Diabetes is a disorder that occurs when the blood glucose, also called blood sugar, is too high. Blood glucose is the main source of energy and comes from the food we eat. Insulin, a hormone secreted by the pancreas, helps glucose digested and assimilated from food get into their cells to release energy. Sometimes the body doesn't make enough or any insulin or doesn't use insulin well. Glucose then stays in the blood and doesn't reach their cells. Over time, having too much glucose in the blood can cause health problems. Although diabetes has no cure, steps could be taken to manage diabetes and stay healthy. (Alina Petre *et al.*, 2020)

Sometimes people call diabetes "a touch of sugar" or "borderline diabetes." These terms suggest that someone doesn't really have diabetes or has a less serious case, but every case of diabetes is serious

All carbohydrate foods are broken down into glucose in the blood. Insulin helps glucose get into the cells. Not being able to produce insulin or use it effectively leads to raised glucose levels in the blood (known as *hyperglycaemia*). Over the long-term high glucose levels are associated with damage to the body and failure of various organs and tissues. *(Catherine et al., 2009)*

Carbohydrates (carbs) are what cause blood sugar to rise. When we eat carbohydrates, they are broken down into simple sugars. Those sugars then enter the bloodstream. As blood sugar levels rise, pancreas releases a hormone called insulin, which prompts the cells to absorb sugar from the blood. (Shaun Dmello Johanna *et al.,* 2019)

Type 1 diabetes can also be known as insulin-dependent diabetes, or juvenile-onset diabetes, as this form starts in childhood. It is an autoimmune condition and occurs when a person's body attacks his or her pancreas with antibodies. It leads to organ damage and thus, insulin production stops. Type 1 diabetes can be a genetic disorder. This can also occur due to problems in pancreatic cells that make insulin

Type 1 diabetes, once known as juvenile diabetes or insulin-dependent diabetes, is a chronic condition in which the pancreas produces little or no insulin. Insulin is a hormone needed to allow sugar (glucose) to enter cells to produce energy. It is a condition in the immune system destroys insulin-making cells in the pancreas. These are called beta cells. The condition is usually diagnosed in children and young people, so it is also called as juvenile diabetes. (Dan Brennan et al., 2020)

A condition called secondary diabetes is like type 1, but the beta cells are wiped out by something else, like a disorder or an injury to the pancreas, rather than by the immune system. (Phablecare et al., 2021) Different factors, including genetics and some viruses, may contribute to type 1 diabetes. Although type 1 diabetes usually appears during childhood or adolescence, it can develop in adults.

Other names of type 2 diabetes are non-insulin-dependent or adult-onset diabetes. It is a long-term (chronic) condition results in too much sugar circulating in the bloodstream Around 90% of diabetics belong to this type. In this condition, the pancreas generally produces some insulin, either it's not sufficient or it's not utilized by the body as it should. Insulin resistance occurs here meaning the body cells stop responding to insulin. This condition typically occurs in liver, fat, and muscle cells. This type of diabetes is often milder than the first type. Still, it can lead to major health complications, particularly in the small blood vessels of nerves, kidneys, or eyes. This type also increases the risk of heart ailments. Treatment involves eating a balanced portion of the meal, keeping a healthy weight, and exercising. Also, sometimes anti-diabetic medicines are prescribed. (Preetu Nair et al., 2017)

Gestational diabetes develops in some women when they are pregnant. Most of the time, this type of diabetes subsides away after the baby is born. However, if they have gestational diabetes, they have a greater chance of developing type 2 diabetes later in life. Sometimes diabetes diagnosed during pregnancy is actually type 2 diabetes. (Riddhi Parmar et al., 2021). It is diabetes diagnosed for the first time during pregnancy (gestation). (Saurabh V et al., 2020).

Tanner's Cassia is one of the medicinal hubs used for many health benefits. The plant is easily found in India and the surrounding countries. The yellow flowers of this plant are used for many types of health problems. Cassia tea comes first in herbal tea names. (Dietitian Julia Samuel et al., 2018)
The study conducted to compile the nutritional composition of Cassia flower powder, determined using in the extract of Cassia flower using standard methods, showed the total antioxidant content of cassia flower was found to be high i.e. 546.3µg/100g and the total phenols and flavonoids content of cassia flower powder was 249.13 mg of GAE/100gm and 304 mg of QE/100gm and the high amount of antinutrient such as tannin (1.82 mg/100g), oxalates (54.55 mg/100g) and phytates (23.90 mg/100g) also present. It is also rich in Physio-chemical properties such as moisture (11.73%), protein (9.54%), ash (5.51%), and fat (2.98%) fiber (1.89%), iron (189.95mg/kg) and zinc (17.53mg/kg). (Tenderich et al., 2020) Palm sugar is a better source of vitamins and minerals than comparable sweeteners. However, many people consume too much sugar, which can cause health issues like heart disease, diabetes, and obesity. Palm sugar contains less glucose and a lower glycemic index than table sugar or honey. (Dan Brennan et al., 2020)

As it is unrefined, it contains numerous health benefits and has a good source of copper, zinc, iron, manganese, and potassium. One tablespoon of palm sugar contains 54 calories, 0 grams protein, 0 grams fat, 15 grams carbohydrates, 0 grams fiber. According to (*John; Geissler, Catherine 2009)* the Palm sugar is produced by boiling collected sap until it thickens. The boiled sap can be sold as palm syrup. It is sold in bottles or tins and tends to thicken and crystalize over time. The boiled sap can also be solidified and sold in the form of bricks or cakes. (Shaun Dmello Johanna et al., 2019)
According to Cashews are low in sugar and rich in fiber, heart-healthy fats, and plant protein. They are also a good source of copper, magnesium, and manganese — nutrients important for energy production, brain health, immunity, and bone health. While they contain natural sugars, they are unlikely to cause a spike in blood sugar levels. Cashews help regulate blood sugar levels due to their high amounts of magnesium, which helps

to boost insulin sensitivity.

- Diabetes is a condition when the body fails to produce enough insulin or is unable to use the insulin it produces effectively. When this happens, glucose levels in the blood rise, leading to potential damage to other organs. (Dan Brennan et al., 2020)

Hence, it is crucial to monitor blood sugar levels if you are at risk of developing diabetes. Cashew nuts are a nutrient-dense superfood that can help to keep blood sugar levels balanced, as they are high in fibre, making you feel fuller for longer and reducing your overall calorie intake

MATERILS AND METHODS

Research is the discovery of some hidden facts and laws. Research is a careful and exhaustive investigative phenomenon with the objective of advancing knowledge. It is a systematic and objective attempt to study a problem for the purpose of deriving general principles. Research and its techniques are helpful in finding further knowledge about the study

S. No	Ingredients	Quantity of Supplement A	Quantity of Supplement B	Quantity of Supplement C
1	Boiled Milk	100ml	100ml	100ml
2	Roasted Cashew nut Powder	3g	3g	3g
3	Palm Sugar Power	4g	7g	6g
4	Tanner's cassia Powder	5g	5g	5g

Work Plan

Online survey using a Diabetic questionnaire to preparation of supplement

Collection of Ingredients

Selection of Ingredients

Selection of Cassia Flower

Cleaning

Drying

Grinding

Sieving

Selection of Cashew nut

Roasting

Grinding

Sieving

Fine Powder

Fine Powder

Weighing 5g of powder

Weighing 3g of powder

Mixing the Ingredients Together

Adding 4g of Powdered Palm sugar/jaggery/brown sugar

Sensory test done for the best variation

Packaging and stored

RESULT AND DISCUSSION

Sensory Evaluation:

All the three variations (A, B and C- Palm sugar, jaggery and brown sugar respectively) were tried and sensory test were done for all the three variation in terms of color, texture, aroma, taste and overall acceptability

Comparison of supplements A,B and C

Type of products	**Texture**	**Color**	**Aroma**	**Taste**	**Total**	**Overall Acceptability in (%)**
Palm sugar (A)	8	9	8	9	34	85
Jaggery (B)	6	8	9	7	30	75
Brown sugar (C)	7	9	7	8	31	77.5

Shelf life estimation

The Diabetic supplement powder stored in a air tight container at a room temperature of 35◦C. The product was checked once in 15 days, for the flavor and consistency it was not changed and it was good up to 6 months (Jan-June 2022).

Result

Nutritional composition of the diabetic supplement A with palm sugar contains 32.3 kcal of energy, 0.75g of protein, 3.9g of carbohydrate, 1.76g of fat, 4.85mg of iron, 10.14mg of magnesium, 7.24mg of flavonoids, 0.92mg of phytates, 0.04mg of tannins, 1.37mg of oxalates and 13g of antioxidant properties

Conclusion

The present study entitled "Formation of Herbal Diabetic Supplement using ***Senna auriculata*** (Tanner's Cassia)". ***Senna auriculata*** (Tanner's cassia) was under taken to develop the herbal diabetic supplement and organoleptic evaluation was carried out and shelf life was also tested. The overall acceptability of the product was good. Herbal supplementation to enhance human physical performance has had little scientific study, but it represents a large field for future study. ***Senna auriculata***, commonly known as "Tanner's cassia," is widely used in Indian folk medicine for the treatment of diabetes mellitus.

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FORMULATION OF HONEY CANDY WITH PEARL MILLET (BAJRA)

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ABSTRACT:

Millets are one of the minor cereals besides the major wheat, rice and maize. Millets are the major food sources for millions of people, especially those who live in hot, dry areas of the world. They are grown mostly in marginal areas under agricultural conditions in which major cereals fail to give substantial yield. There is an emerging need for the world to feed its growing population, therefore it is important to explore plants such as millets that are grown locally and consumed by low-income households in places like India. Millets are unique among the cereals because of their richness in calcium, dietary fiber, polyphenols, and protein. Millets generally contain significant amounts of essential amino acids, particularly the Sulphur containing amino acids such as methionine, cystine. They are moderate in fat content when compared to maize, riceand sorghum. In the present study, a product is developed that is Honey candy with Bajra, a millet that is cost efficient, easily available and a nutritious one. Honey candy (Thaen mittai) is one of the best sweet of childhood days which is prepared using rice, urad dhal and sugar. Here the Bajrais replaced with rice as it is nutritionally better than the rice. The increase of protein, calcium andfiber was observed in the product, which are useful for health and useful in preventing certain diseases like celiac diseases often irritated by the gluten content of wheat and other more commoncereal grains. Millets improve glycemic responses and regulate plasma levels and can be served asa healthy snack for pregnant women, growing children, and adolescents with sugar cravings.

INTRODUCTION:

Millets are known as storehouses of nutrition because millets are rich in almost all nutrientswhen compared to the rice and wheat. Millets are rich in mineral content than that of rice and wheat. Some millets are having fiber fifty times richer than rice. Finger millet is having calcium thirty times richer than rice and wheat. Each millet is having double quantities of calciumrice. Foxtail millet and little millet are rich in iron when compared to rice and wheat. Millets are rich in micronutrients like β-carotene, hence each and every millet is rich in nutrients when compared to rice and wheat. Therefore, millet consumption in daily life is a good remedy for malnutrition, which is a very big problem in India.

Millets can grow on low fertility soils. Some millets are grown on acidic soils and some onsaline soils. Pearl millet is mostly grown on sandy soils and places like Rajasthan. Finger millet grows well in saline soils. Barnyard millet is grown on poor soils in which rice fails to grow. In allmost all lands, millets grow very effectively in India.

Millets are most commonly available in the form of pearled and hulled kind. Millets are tasty grains that have a mildly sweet, nut-like flavor. Millets are rich sources of protein, dietary fiber, and minerals when compared to rice.

Now a day, the minor millets are used as food for poor people and also used as fodder foranimals. In some countries like Europe and America, millets are used as bird feed. The increase insoil flotation frequency showing the significant increase in flotation record of charred millet seeds.

People of all age are fond of different bakery products, because of their taste, color, and easily digestible nature. Celebrating any moment of happiness is incomplete without bakery products. Bakery products are becoming prominent day by day. Now a days, individuals have no time to invest much in making breakfast whether it is the bread, biscuits or cookies, which had occurred instead of other sorts of foodstuff. The good supplies of snacks, therefore, are broadly available. Millets were incorporated in different variations because the millets contain different nutritional health benefits.

Pearl Millet (Pennisetumglaucum) also known as Bajra is one of the oldest millet used byour ancestors and is one of the most important cereal grow in tropical semi-arid regions of the world primarily Asia and Africa. It is known to have a very high fiber. In India, it is used as regularmeal in states like Rajasthan and Gujarat. Previous studies have found that pearl millets are excellent source of micronutrients like iron and zinc. It also has certain antinutrient factors and inhibitors like phytic acid, polyphenols due to which the bio accessibility of iron and zinc is very low in pearl millet. Due to its potential health benefits, it has now gained popularity, nutritionists and dieticians recommends it for the better health options. Bajra is very cheap millet known as

"Poor People's food". It has enormous health benefits that it is being recommended to the patientsof celiac disease, constipation and several noncommunicable diseases.

Black Gram (URAD DAL) (Vigna mungo), very nutritive and use in ayurvedic medicine.Good source of containing dietary fiber which help in digestion and can easily digest. It's having many health benefits such as boost energy, improves skin health and hair. Good for heart patient and improves of bone mineral density.

Honey candy (Thaen mittai) is one of the best sweet of childhood days which is prepared using rice, urad dhal and sugar. Here the Bajra is replaced with rice as it is nutritionally better thanthe rice.

FIGURE – 1 BAJRA (PEARL MILLET) **FIGURE – 2 URAD DAL (BLACK GRAM)**

OBJECTIVES:

- Select the ingredients required for the formulation.
- Formulation of the selected ingredients.
- Preparation of the product (Honey candy)
- Sensory evaluation of the product.
- Interpretation of the evaluation.

LIMITATIONS:

Though the product has the enormous nutritive value, Nutrient analysis cannot be done dueto lack of time span. Further this review will be taken into research.

METHODOLOGY:

Step – I: Selection of the ingredients:

The ingredients were bought from the locally available market in Elampillai, Salem districtwhich are easily available throughout the year. The ingredients were checked for dust and rodent free product.

TABLE – I INGREDIENTS & QUANTITY

S.NO.	INGREDIENT	QUANTITY REQUIRED
1	Bajra flour	50 g
2	Urad dhal	20 g
3	Country sugar	100 g
4	Sunflower oil	250 ml
5	Water	200 ml

Step – II: Preparation of the product:

Urad dhal was soaked for about 3 hours. Then it was made into a thick batter. Bajra was soaked for about half an hour. Excess water was drained and kept for drying. Then the dried bajrawas grinded and made into fine powder. Now the powdered bajra was mixed with urad dhal batter.A pinch of baking soda was added to the mixture. Then the mixture was made into small balls andfried using sunflower oil. Sugar syrup was prepared and then the fried balls and soaked in the prepared sugar syrup.

Step – III: Sensory evaluation:

Appearance, Colour, Texture, flavor, Taste, After taste, over acceptability were evaluatedusing nine hedonic scales.

TABLE – II SCORE CARD FOR SENSORY EVALUATION

	Control	Variation I	Variation II
Appearance			
Colour			
Flavour			
Texture			
Taste			
After taste			
Overall acceptability			

9 – Like extremely 8 – Like very much 7 – Like moderately6 – Like slightly

5 – Neither like nor dislike4 – Dislike slightly

3 – Dislike moderately2 - Dislike very much 1 – Dislike extremely

Step – IV: Interpretation of the evaluation:

The data obtained from the sensory evaluation were interpreted for overall acceptability ofthe product. The interpretation was done using statistical methods, graphs and charts.

RESULTS AND DISCUSSION:

SENSORY EVELUATION OF BAJRA HONEY CANDY			
	Control	**Sample 1**	**Sample 2**

Appearance	8	8	9
Colour	7	8	8
Flavour	8	9	8
Texture	8	8	8
Taste	9	9	9
After taste	9	8	9
Overall acceptability	8	8	9

The product prepared ie., Honey candy using bajra was formulated, evaluated andinterpreted. The product was extremely good, nutritious and accepted by overall qualities.

TABLE – III OVERALL SCORE OF SENSORY EVALUATION

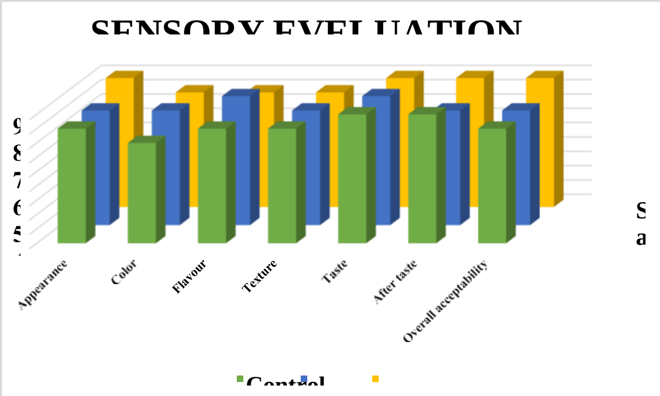

FIGURE – 3 OVERALL SCORE FOR SENSORY EVALUATION

The above figure shows the overall acceptability of the formulated product Bajra Honey candy.The Sample 2 has the highest acceptability when compared to Sample 1.

CONCLUSION:

Millets are known as storehouses of nutrition because millets are rich in almost all nutrientswhen compared to the rice and wheat. Bajra is very cheap millet known as “Poor People’s food”.It has enormous health benefits that it is being recommended to the patients of celiac disease, constipation and several noncommunicable diseases. Black Gram (URAD DAL) (Vigna mungo),very nutritive and use in ayurvedic medicine. Good source of containing dietary fiber which helpin digestion and can easily digest. It’s having many health benefits such as boost energy, improvesskin health and hair. Good for heart patient and improves of bone mineral density. A traditional snack (Sweet) from this millet (Bajra) has replaced the rice used in the preparation. This sweet serves as a health one for the kids, adolescents as well as for the pregnancy cravings.

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