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PROCEEDINGS OF
INTERNATIONAL CONFERENCE

"FRONTIERS OF BIOSCIENCES IN SUSTAINABLE DEVELOPMENT"

15th & 16th FEBRUARY 2023

HYBRID MODE

FBSD 2023

Organized
by

Post Graduate & Research Department of Zoology

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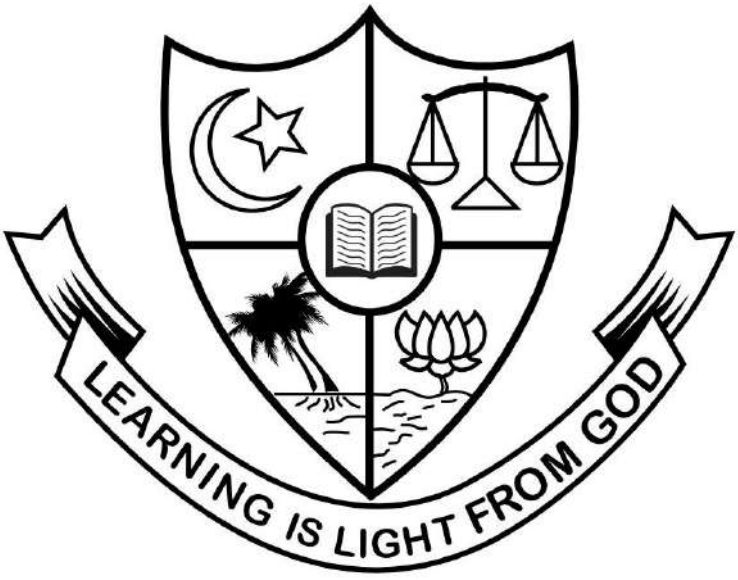

Organizing Secretary

Dr. D. MUBEEN SULTANA, M.Sc., M.Phil., Ph.D.

Assistant Professor in Zoology

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PREFACE

The International Conference on "Frontiers of Biosciences in Sustainable Development" FBSD 2023 focusses on the recent developments and applications of Biosciences in various fields promoting sustainability. In spite of bioscience research professionals are able to detect and provide solutions for the various problems existing in all the fields, it is vital for every Government to promote bioscience research in its jurisdiction because it has a mandate to protect its people. Research in bioscience have revolutionized our lives and improved our living standards, which have led to inventions and discoveries. These have opened doors for better career opportunities. Modern molecular techniques are used to develop vaccines for diseases which are incurable and this has shown light at the end of the tunnel, due to these advancements almost all fields related to bio-sciences like Agriculture, Health sector, Bio-technology, Genetics, Molecular biology have shown tremendous growth and improvement, which has led to all round development in all spheres.

This conference would witness a wide array of confluence of intellectuals, experts, budding scientists and academicians will enrich the proceedings with their expertise. The budding researchers will be exposed to the scientific advancements and research taking place in almost all the inter related disciplines of biosciences from every nook and corner of the world. It would serve as a platform to bridge the gap between the industry and academia, and serve as a fruitful and enriching experience. I hope that these two days International conference would be of great benefit to all those having passion towards science and help in instilling research in whatever small way possible towards the scientific progress and advancement of our country globally. The resources, manpower and the enormous amount of potential that is available abundantly can be tapped effectively and put to use in a more precise way so that the day is not far off when India would emerge as a super power in almost all fields of bio-sciences and this international conference would serve as a forerunner for emerging newer trends of research which will showcase the capabilities of our Nation to evolve as a potential power.

(**Dr. D. Mubeen Sultana)**

Organizing Secretary

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FOREWORD

I am delighted to acknowledge that the Postgraduate and Research Department of Zoology is organizing the International Conference on "**Frontiers of Biosciences in Sustainable Development**" **FBSD 2023** on 15th and 16th February 2023.

The theme chosen is commendable as it encompasses diverse fields of subjects and its study emphasizing on the applications for sustainable development. Biosciences and its related fields have always contributed significantly to the productivity of knowledge, being the driving factor for innovations, catering to the functioning of democracies and providing the impetus for our country to compete in the global arena.

In the present scenario, India's population is witnessing the development of modern agricultural technology, upscale of the communication system through Nano Science and Nano Technology,a surge in the pharma industry and the rise of indigenous Defense systems.Science and Technology with its innovations is ever evolving, but the need is to realize that it should focus on sustenance. The research aspects of such technology should reflect the essence of sustainability and be able to solve the problems and challenges faced due to natural disasters, climate changes, availability of safe and healthy food, water,disease outbreaks, etc.

I convey my sincere appreciation to the faculty and team of the Postgraduate and Research Department of Zoology and I congratulate the Organizing Secretary, Dr. D. Mubeen Sultana for her coordination and unstinted efforts to bring out the proceedings of this International Conference on "**Frontiers of Biosciences in Sustainable Development**" **FBSD 2023** which I am sure will benefit the Department, the College, Society and Mankind.

(Dr. AMTHUL AZEEZ)

PRINCIPAL

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CONTENT

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PROGRAMME SCHEDULE

DAY 1 – 15th February 2023

Inauguration : 9.00 am – 10.30 am

09.00 am – 09.05 am	**Prayer**	
09.05 am – 09.15 am	**Welcome Address**	**Dr. Amthul Azeez** HoD & Principal J.B.A.S. College for Women, Chennai
09.15 am – 09.25 am	**Dynamics of the Conference**	**Dr. D. Mubeen Sultana** Organizing Secretary, J.B.A.S. College for Women, Chennai
09.25 am – 09.35 am	**Presidential Address**	**Mrs. Faizur Rahman Sayeed** Secretary S.I.E. Trust & Correspondent J.B.A.S. College for Women, Chennai
09.35 am – 10.00 am	**Inaugural Address**	**Mr. TAGA Masayuki** Consul General, Japan Consulate
10.00 am – 10.25 am	**Keynote address**	**Dr. Sultan Ahmed Ismail** Member, State Planning Commission, Govt. of Tamil Nadu
10.25 am – 10.30 am	**Vote of Thanks**	**Dr. Kaneez Fathima** Assistant HoD J.B.A.S. College for Women
10.30 am	**National Anthem**	

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Panel Discussion : 11.00 am – 12.30 pm

Moderator: *Dr. Sultan Ahmed Ismail*

Member, State Planning Commission, Govt. of Tamil Nadu

Panel Members: *Dr. Mujeera Fathima*

Principal, Govt Arts & Science College, T.C. Koot Road, Vanur,

Villupuram, Tamil Nadu

Dr. Deepak Samuel. V

Scientist E, National Centre for Sustainable Coastal Management

Ministry of Environment, Forest and Climate Change

Dr. Aneesh Nair

Principal Scientist & Head, Centre for Genomic Medicine

NIMS Medicity Hospital, Trivandrum, Kerala

Dr. Krishna Prema

Associate Professor & Head Dean of Research

Ethiraj College for Women (Autonomous)

Chennai, Tamil Nadu

Dr. S. Sellamuthu

Chief Scientist in NiSCELL, Nichi – Asia Life Science Sdn. Bhd.,

Department of Regenerative Medicine, Malaysia

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Plenary Lecture - I

Dr. G. DHINAKAR RAJ

Professor and Head, Dept. of Animal Biotechnology, MVC, TANUVAS

Time	:	(2.00 pm – 3.00 pm)
Mode	:	Offline
Venue	:	Auditorium

TOPIC: NEW GENERATION VACCINE PLATFORMS WITH SPECIAL

Paper Presentations – Session I

Time	:	(3.00 pm – 4.00 pm)
Mode	:	Offline
Venue	:	Main - Auditorium

Chair : **Dr. Ananthi Rachel Livingstone,**
Assistant Professor, P.G. & Research Department of Zoology
Madras Christian College, Tambaram, Chennai.

Co – Chair : **Dr. Raja**
Assistant Professor, P.G. & Research Department of Zoology
Loyola College, Chennai.

Rapporteur : **Dr. Jasmine Shahina,**
P.G Department of Applied Microbiology
J.B.A.S. College for Women, Chennai.

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Plenary Lecture II

Dr. PARASURAMAN PADMANABHAN

Deputy Director (Translational Neuroscience), Head of Operation, Centre for Neuroimaging Research at NTU, Lee Kong Chian School of Medicine, Cognitive Neuro imaging Centre, Singapore

TOPIC: NANO-TECHNOLOGICAL APPROACH FOR NEURODEGENERATIVE DISEASES: SPECIAL REFERENCE TO ALZHEIMER'S

Time	:	04.00 pm – 05.00 pm
Mode	:	Online
Venue	:	Cisco Webex

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DAY 2 – 16th February 2023

Plenary Lecture III

Dr. RAJESH LAKSHMANAN

Biocompatibility Specialist, COOK Ireland Limited, National Technology Park, Limerick, Ireland.

TOPIC: TISSUE ENGINEERING STRATEGIES FOR CARDIAC AND BONE REGENERATION

Time	:	09.00 am – 10.00 am
Mode	:	Online
Venue	:	Cisco Webex

Paper Presentations – Session II

Time	:	(10.00 am – 11.00 am)
Mode	:	Offline
Venue	:	Main – Auditorium

Chair : **Dr. Bavani Govindarajulu**
Assistant Professor, Department of Zoology
Queen Mary's College

Co – Chair : **Dr. Thirunavukarasu,**
Assistant Professor, Department of Zoology
Dr. Ambedkar Govt. Arts College

Rapporteur : **Dr. Aruna,**
Assistant Professor, Department of Biochemistry
J.B.A.S. College for Women

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Paper Presentations – Session II (PARALLEL)

Time : 10.00 am – 11.00 am

Mode : Offline

Venue : Library Convention Hall

Chair : **Dr. Logamanya Tilak,**
Assistant Professor, P.G. & Research Department of Zoology
Madras, Christian College, Tambaram

Co-chair : **Dr. Jamal Mohammed,**
Assistant Professor, P.G. & Research Department of Zoology
The New college.

Rapporteur : **Dr. Lakshmi**
Department of Applied Microbiology
J.B.A.S. College for Women

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Plenary Lecture IV

Prof. BALASUBRAMANIAN SENTHILKUMARAN

Department of Animal Biology, School of Bioscience, Central University of Hyderabad, Hyderabad

TOPIC: OSMOTIC PUMP MEDIATED CONTROLLED DELIVERY OF HCG INDUCE OFF-SEASON BREEDING IN CATFISH: DEVELOPING NEW STRATEGIES TO UNRAVEL REGULATORY INFLUENCE OF BRAIN-PITUITARY AXIS

Time : 11.15 am – 12.15 pm

Mode : Offline

Venue : Auditorium

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Paper Presentations – Session III

Time : 12.15 pm – 1.15 pm

Mode : Offline

Venue : Main – Auditorium

Chair : **Dr. P. K. Kaleena,**
Associate Professor, P.G. & Research Department of Zoology,
Presidency College

Co – Chair : **Dr. Santhosh,**
Assistant Professor, Department of Zoology
Government Arts College, Nandanam

Rapporteur : **Dr. Anjum,**
Assistant Professor, Dept. of Biochemistry
J.B.A.S. College for Women

S. N	Title	P. N
1	**Inventory of Nucleotides of Indian snakes in the National Centre for Biotechnology Information** ***J. Jaithun Bi[1],*** *S.R. Ganesh[2] and R. Lucky[1]* [1]P.G. &Research Department of Zoology, J.B.A.S College for Women, Chennai – 18. [2]Director, Chennai Snake Park, Raj Bhavan Post, Chennai – 22.	44
2	**In Silico Analysis of the Genomes of SARS – Cov – 2 Variants of Concern (VOC) reported in India, with respect to the reference genome at nucleotide level** ***Hiba. M [1]****and Asifa Ahmmed [2*]* P.G. and Research Department of Zoology, J.B.A.S. College for Women, Chennai-18.	45
3	**Metagenomic analysis on the gut microbiome of dipteran blowfly maggot reared in solid fish waste** ***Nivedha.S[1],*** *Nikitha Vasu[2], J. Sweetlin Jebamary[2], Niren Andrew[3] and Anulin Chirstudhas[1]* [1]Department of Zoology, Madras Christian College, Chennai. [2]Department of Microbiology, Madras Christian College, Chennai.	46
4	**Extraction, Isolation and Characterization of bioactive compound with anti-MRSA Activity** ***V. Jeyanthi[1],*** *A. Chitra[1] and P. Velusamy[2]* [1]Department of Biotechnology, SRM Arts and science college, Kattankulathur-603 203 [2]Department of Biotechnology, School of Bioengineering, SRM Institute of Science and technology, Kattankulathur-603 203	47
5	**Estimation of total phenol, alkaloid and flavonoid contents in *Anisomeles indica (l.)* Whole plant extract and screening of their *in vitro* anti - inflammatory efficacy using the albumin denaturation technique**. ***Narayani Nivedhitha K. R*** *and Dr. Anita RJ Singh* Department of Biotechnology, Women's Christian College, Chennai	48

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Paper Presentations – Session III (PARALLEL)

Time : 12.15 pm – 1.15 pm

Mode : Offline

Venue : Library Convention Hall

Chair : **Dr. Leelavathi**

Assistant Professor, Department of Zoology

Ethiraj College for Women, Chennai

Co – Chair : **Dr. Sridevi Thiyagarajan**

Assistant Professor

Department of zoology,

Quaid - E - Millath College

Rapporteur : **Dr. Beema Jainab**

Assistant Professor, Department of Botany

J. B. A. S. College for Women

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Plenary Lecture V

DR. ANEESH NAIR

Principal Scientist & Head, Centre for Genomic Medicine, NIMS Medicity Hospital, Trivandrum, Kerala

TOPIC: GENOMICS IN HEALTHCARE – THE WAY FORWARD

Time : 02.00 pm – 03.00 pm

Mode : Offline

Venue : Auditorium

Paper Presentations – Session IV

Time : 03.00 pm – 04.00 pm

Mode : Offline

Venue : Main - Auditorium

Chair : **Dr. Asrar Sharieff**

Associate Professor & Head, Department of Zoology

The New College, Chennai

Co – Chair : **Dr. Jayanthi,**

Associate Professor & Head, Department of Zoology

Gurunanak College, Chennai

Rapporteur : **Dr. Sumitha. J**

Assistant Professor, Department of Applied Microbiology

J.B.A.S. College for Women, Chennai

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Paper Presentations – Session IV (Parallel)

Time : 03.00 pm – 04.00 pm

Mode : Offline

Venue : Library Convention Hall

Chair : **Dr. A. K. Sultan Mohideen**
Assistant Professor, Department of Zoology
The New College, Chennai

Co-chair : **Dr. Allen. J. Freddy, MCC**
Assistant Professor, Department of Zoology
Madras Christian College, Tambaram, Chennai

Rapporteur : **Dr. W. Parveen**
Assistant Professor, Department of Applied Microbiology
J.B.A.S. College for Women, Chennai

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ONLINE PAPER PRESENTATION

DAY 2 – 16th February 2023

PAPER PRESENTATION SESSION I

Time	:	10.00 am – 11.30 am
Mode	:	Online - Cisco Webex Platform
Venue	:	Room No: 11

Moderator- **Dr. K. Prabhakar**
Assistant Professor
Department of Zoology
Jamal Mohammed college
Tiruchirapalli

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	[3]Department of Allied Health Sciences, Noorul Islam Centre for Higher Education, Thuckalay, Tamil Nadu.	
11	**Effects of mango peel extract and Mangiferin on salt induced hypertensive rat** ***Jayanta Mistry*** *and Maharaj Biswas* Endocrinology laboratory, Department of Zoology, University of Kalyani, Kalyani-741235, Nadia, West Bengal, India.	79
12	**ANALYSIS OF ANTIBACTERIAL ACTIVITY OF BIO- ACTIVE COMPOUNDS FROM SHELL EXTRACT OF GOOSE BARNACLE, *LEPAS ANSERIFERA*** ***S.Shazra Ambarin, Amthul Azeez and M. Farzana Yasmeen*** P.G. and Research Department of Zoology, Justice Basheer Ahmed Sayeed College For Women (Autonomous), Chennai-18.	80

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PAPER PRESENTATION SESSION II

Time : 12.00 pm – 01.30 pm

Mode : Online - Cisco Webex Platform

Venue : Room No: 11

Moderator - Dr. Padmavathy

Proprietor, Nautilus Life Sciences, Chennai

S. N	TITLE	P. N
1	**Application of umbilical cord blood transfusion in post covid-19 anaemic patients.** ***Biplabendu Talukdar[1],*** *Niranjan Bhattacharya[2] and Rita Ghosh[1]* [1]Dept. of Biochemistry & Biophysics, Kalyani University, Kalyani, West Bengal. [2]Department of RMTS, STM, Kolkata, West Bengal.	81
2	**Evaluation of ethnoveterinary properties of *Cardiospermum helicacabum* and *Andrographis paniculata* against bacterial abscess of *Felis catus*** ***Akshara.M[1]****, Akshara Das[1], Megha Vinod[1], Sruthi Biju[1], Sheela S[1], Jasmine Anand[1], Monusha JJ[2], Aneesh Nair[2,3]* [1]Department of Zoology, TK Madhava Memorial College, Nangiarkulangara, Allepey, Kerala. [2]NIMS Centre for Genomic Medicine, Trivandrum, Kerala. [3]Department of Allied Health Sciences, Noorul Islam Centre for Higher Education, Thuckalay, Tamil Nadu.	82
3	**Exploring the pathogen-pathogen interactions in cystic fibrosis airways.** ***Sakshi Sandip Raipalli[1]****and Abhita Sandip Raipalli[2]* [1]Department of Life Science, Aston University, Birmingham, UK. [2]Shankar Rao Mohite Mahavidyalaya, Akluj, Maharashtra.	83
4	**Cadmium chloride induced mucin alterations: focused on mantle epithelia in slug, *Semperulamaculata* (Semper)** ***Vibhavari V. Dixit*** *and Nitin A. Kamble* Department of Biotechnology, Sinhgad College of Science, Ambegaon (Bk), Pune- 411 046.	84

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DAY 2 - 16th February 2023

PAPER PRESENTATION SESSION III

Time : 2.00 pm – 03.30 pm

Mode : Online - Cisco Webex Platform

Venue : Room No: 11

Moderator - Dr. J. Sivakumar

Assistant Professor

Department of Zoology

Gurunanak College, Chennai

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Assistant Professor, P.G. & Research Department of Zoology

Poompuhar College (Autonomous), Melaiyur, Mayiladuthurai, District, Tamil Nadu

S. N	TITLE	P. N
1	**Study of marine water zooplanktons in Chennai water bodies** ***Uzma Zareen I*** *and Dilshad Begum* P.G. and Research Department of Zoology, J.B.A.S. College for Women (Autonomous), Chennai-18.	105
2	**Phytochemical screening and anti-microbial activity of seed extract of *Strychnos potatorum* linn.** *E. Anupriya, Amtuz Zehra and* ***V.P. Shamna*** P.G & Research Department of Zoology, J.B.A.S College for Women Chennai, Tamil Nadu, India.	106
3	**Diversity of meiofauna on the sandy beaches of Chennai coast, Tamil Nadu, India** ***Kesavaraj. M*** *and Mohamed Saquib Naveen* P.G. and Research department of zoology, The New college, Chennai 600014	107
4	**Diversity and abundance of avifauna associated with S*amanea saman (jacq.) merr.* (rain tree) in Stella Maris College** ***N. S. Kiruthika*** *and S. A. Vidhya* U.G. Student, Department of Zoology, Stella Maris College (Autonomous), Chennai – 600086	108
5	***Noctiluca scintillans* - pollutant bioindicator in marine environment in Chennai** ***Hasmitha T V*** *and Dilshad Begum* P.G. and Research Department of Zoology, J.B.A.S. College for Women (Autonomous), Chennai-18.	*109*
6	**Study on biochemical analysis of koi carp (*Cyprinus carpio*) fish with different feed** ***Ishwarya. S*** *and S.M Asgari* P.G. & Research Department of Zoology, J.B.A.S College For Women, Teynampet, Chennai- 18	110
7	**Phytochemical and antibacterial effect of aqueous and commercially available rose water extract *(Rosa damascena)*** ***Nushrath Fathima J*** *and 2. Dr. V. Anuradha* Head of the Department, P.G. and Research Department of Zoology, J.B.A.S College for Women.	111
8	**Study on the biochemical analysis on fresh tuna fish and canned tuna fish** ***S.B. Yasmeen*** *and S.M. Asgari* P.G & Research Department of Zoology, J.B.A.S College For Women, Teynampet, Chennai- 18.	112

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JUDGE: Dr. NALINI

Assistant Professor, P.G. & Research Department of Zoology

Poompuhar College (Autonomous), Melaiyur, Mayiladuthurai, District, Tamil Nadu

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Day 2 - 16th February 2023

Valediction : 4.00 pm – 05.00 pm

04.00 pm – 04.05 pm	**Prayer**	
04.05 pm – 04.15 pm	**Welcome Address**	**Dr. Amthul Azeez** HoD & Principal, J.B.A.S. College for Women, Chennai.
04.15 pm – 04.25 pm	**Report of the Conference**	**Dr. Mubeen Sultana** Organizing Secretary, J.B.A.S. College for Women, Chennai.
04.25 am – 04.45 am	**Valedictory Address**	**Dr. B.C. Archana Kalyani, IFS** CF (CDM) & (TCPL) TGP, Chennai.
04.45 am – 04.50 am	**Prize Distribution**	
04.50 am – 04.55 am	**Feedback**	**Participants**
04.55 am – 05.00 am	**Vote of Thanks**	**Dr. V. Anuradha** HoD (I/C) J.B.A.S. College for Women.
05.00 am	**National Anthem**	

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PROCEEDINGS OF INTERNATIONAL CONFERENCE

"Frontiers of Biosciences in Sustainable Development"

SUSTAINABILITY CONCEPTS FOR EARTH'S SAKE – AN INSIGHT

Dr. Sultan Ahmed Ismail

"The greatest threat to our planet is the belief that someone else will save it…"

The dynamic nature of a soil is due to the tremendous activity of micro and macro organisms supported by availability of organic matter. It is this life in the soil that lends its name to soil as "living soil". A vast number of organisms engineer a myriad of biochemical changes as decay of organic matter takes place in the soil. Among the organisms, which contribute to soil health, the most important are the earthworms. Based on my continuous research on earthworms made me write "*earthworms are the pulse of the soil, healthier the pulse, healthier the soil*".

Soil is a living dynamic system whose functions are mediated by diverse living organisms which in agriculture requires proper management and conservation. Unfortunately in today's chemical agriculture importance is shown on soil fertility and not on the holistic soil health which provides an integrated sustainable mechanism to the soil to sustain its "living" fabric of nature.

Among the myriad of soil organisms, earthworms are one of the most vital components of the soil biota in terms of soil formation and maintenance of soil structure and fertility. They are extremely important in soil formation, principally through activities in consuming organic matter, fragmenting it and mixing it intimately with mineral particles to form water stable aggregates. During feeding, earthworms promote microbial activity by several orders of magnitude, which in turn accelerate the formation of organic matter as microorganisms are the ultimate decomposers and mineralizers in the detritus food chain and in organic matter decomposition. Fresh casts, urine, mucus and coelomic fluid which are rich in the worm-worked soil and burrows act as stimulant for the multiplication of microorganisms in the soil and are responsible for constant release of nutrients into it, which then facilitates root growth and a sustainable rhizosphere. Darwin's pioneering work on earthworms (*The*

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Formation of Vegetable Mould through the Action of Worms) published by John Murray in October 1881 remains one of the pioneering works of modern science, though ancient Indian literature has often quoted the benefits of earthworms. As one who pioneered the culture of local earthworms *Perionyx excavatus* and *Lampito mauritii* in India and also extensively worked with *Eudrilus eugeniae* after it was introduced into India by others; my students and I had done immense research.

EARTHWORMS:

Earthworms are one of the chief components of the soil biota in terms of soil formation and maintenance of soil structure and fertility. They are extremely important in soil formation, principally through activities in consuming organic matter, fragmenting it and mixing it intimately with mineral particles to form water stable aggregates. During feeding, earthworms promote microbial activity by several orders of magnitude, which in turn also accelerate the rates of break down and stabilization of humic fractions or organic matter. Microorganisms are the ultimate decomposers and mineralizers in the detritus food chain and in organic matter decomposition. Earthworms are the facilitators for the dormant microorganisms in soils providing them with organic carbon, optimum temperature, moisture and pH in their gut for their multiplication. Microorganisms are excreted in their casts and also harbored in the drilospheres. Fresh casts, urine, mucus and coelomic fluid which are rich in the worm-worked soil and burrows act as stimulant for the multiplication of dormant microorganisms in the soil and are responsible for constant release of nutrients into it, which then facilitates root growth and a healthy appropriate sustainable rhizosphere.

Though more than 3500 species of earthworms are in the world with India having about 500 species in its diversity, it is easier to recognize earthworms based on their ecological strategies… that is based on the nature of the position in the ecosystem. Based on this classification three broad based categories are recognized as surface feeders, sub-surface burrowers and deep burrowers.

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A healthy soil (in Indian condition) should at least have 2 to 5% organic matter, but conditions presently after the green revolution are poor with a national average of about 0.4%.A good healthy soil generally has air (about 25%), water (about 25%), organic matter consisting of humus, roots, organisms (about 5%) and mineral matter (about 45%). This enables a large biodiversity of soil organisms as well; enabling soil as a living "entity". This gives the fragrance to the soil… the "*mannvasanai…*"

We may have apprehensions but each of the non-chemical practices has been time tested. To be organic is to first "decolonize our minds". Even vermicompost prepared by the endemic (local) earthwormsis indeed superior to that produced by exotic (foreign) earthworms. There is no doubt about it. But at the same time there is no adverse information about compost by exotic varieties.

Most foliar sprays especially the organic ones have several components similar to plant growth promoter substances in them. Vermiwash is one such excellent liquid fertilizer. Studies in our laboratory have proved it. Vermiwash by its instinctive quality might probably promote humification, increased microbial activity to produce the plant growth promoting compounds and enzyme production. All the compounds present in vermiwash may not individually help in plant growth but perhaps act synergistically along with the beneficial soil microbes found in vermiwash.In organic farming practice we do not nurse the plant, we nurse the soil. The soil in turn promotes its group of biotic elements who churn the nutrients as desired by the plant.Traditional songs in Tamil state that in a plant, especially in cereals, "the roots are for the soil, the stems for the cattle, and the pinnacles for human consumption". Following the holistic practice of organic farming takes care of the soil which in turn takes care of the plant and not as in chemical farming where we may tend to ignore the soil and take care of the plant. A plant taken care, nursed and nourished by the soil has excellent potential and potency for the consumer. Though animal wastes are largely used in organic farms unfortunately intensive farming activities have eliminated the need of animals on farm.

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Phytonutrients, such as polyphenols and antioxidants, protect both people and plants. Several insecticides, herbicides, and fungicides actually block a plant's ability to manufacture these important plant compounds. Most changes in agricultural technology especially after the green revolution have ecological effects on soil organisms that can affect higher plants and animals, including man. Concentrating just on productivity has robbed human care for the soil. The use of chemicals such as ***glyphosate*** has been reported to cause spontaneous abortions among livestock. There are other chemicals such as ***glufosinate*** and ***neonicotinoids***to be made available in larger quantities in near future. Their impacts are likely to be beyond prediction.

Biodiversity has been thrown to the winds with "food" becoming dependent only on three cash crops in India in the form of Rice, Wheat and Sugar... the West taking up Corn. To make matters worse GMOs are surfing in the name of productivity, at what risk to environment and life is uncertain in our tropical country with high biodiversity. We are tending to move from biodiversity to genetic slavery. Bt Cotton, Bt Brinjal and of now the DMH11 mustard are all causing anxious moments. Corporatism would emerge taking control of "food", which does not appear to be a healthy trend. Recently fortified rice is one such not so healthy trend for a long run. It is sad to note articles contemplating towards "contract farming" or may I call it as "corporate farming" which probably may make the farmer a "labourer" in his own field.

Large scale usage of water and uncontrolled harvest an over exploitation of ground water associated with uncertain monsoons and water scarcity is riving farmers to risk. Rainwater harvesting and grey water recycling through Root Zone Treatments or constructed wetlands are thrust areas.

Organic farming is not a system of farming but a culture by itself. It is not addition of manure or botanical extracts that enables organic farming, but a way of life. There are several such practices that today are classified as alternative systems of farming in contrast to the conventional farming *alias*-chemical farming. These alternative systems are named as non-poisonous farming, biodynamic farming, permaculture, natural farming, low external input farming, eco-farming, biological farming,

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or just organic farming. Such systems consider soil health as their prerequisite. In organic farming apart from the use of manure/compost for soils, botanical extracts for protection from pests, bio-foliar sprays, native seed wealth, biodiversity, mixed cropping, crop rotation, gender participation, and associating animal heads in farming form important components. Foliar sprays like Vermi wash and *Panchagavya* have proved to be very effective as excellent liquid sprays on any crop. Traditional wisdom advocates the use of cow dung and cow's urine for manure and pest control. Today there is an enormous demand for organic food throughout the world.

According to Research on health disorders resulting from petroleum-based chemicals used in consumer products and job environments cause significant attritional effects to the nervous system and immune system after prolonged exposure. Illnesses identified in the medical research include adult and child cancers, numerous neurological disorders, immune system weakening, autoimmune disorders, asthma, allergies, infertility, miscarriage, and child behavior disorders including learning disabilities, mental retardation, hyperactivity and ADD (attention deficit disorders). Petroleum based chemicals are believed to cause these problems by a variety of routes including - impairing proper DNA (Gene) expression, weakening DNA Repair, accelerating gene loss, degeneration of the body's detoxification defenses (liver and kidneys) as well as gradual weakening of the brain's primary defense - (the Blood Brain Barrier).

Organic agriculture contributes to food and environment security by a combination of many features, most notably by:

- Increasing yields in low-input areas
- Conserving biodiversity & nature resources on the farm and in surrounding area
- Increasing income and/or reducing costs
- Recycle organic waste for manure production, solving waste management
- Micro-enterprises in rural economy
- Protect the health of the farmer and the consumer

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- Producing safe and varied food
- Being sustainable in the long term

Healthy soils support healthy produce. Personal observations and research have indicated that not just addition of organic inputs but the presence of soil biota in the soil, in fact, enhances the produce in its quantity and quality. Thus it is very much confirmed that "*earthworms are the pulse of the soil, healthier the pulse, healthier the soil*". I sincerely invite youth and Institutions to put hands together **for earth's sake**

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NANO-TECHNOLOGICAL APPROACH FOR NEURODEGENERATIVE DISEASES: SPECIAL REFERENCE TO ALZHEIMER'S

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Abstract: In 2021, there are over 50 million people worldwide living with dementia and it is estimated that this number will double every 20 years reaching about 82 million in 2030. Neurodegenerative diseases (NDDs) causing dementia are impairing and are expected to increase in prevalence worldwide with the increasingly aged population. One of the most severe neurodegenerative diseases threatening the aging population is Alzheimer's disease (AD). Amyloid βeta (Aβ) aggregation within neuronal cells and cellular uptake of extracellular Aβ aggregates can lead to a build-up of intracellular Aβ in neuronal cells, subsequently, leading to the onset of AD pathogenesis. Therefore, detection and inhibition of Aβ aggregation are of great importance for early detection and prevention of AD.

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TISSUE ENGINEERING STRATEGIES FOR CARDIAC AND BONE REGENERATION

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Tissue engineering is an interdisciplinary field of advanced science and engineering which deals with the development of biological tissues. It combines the principles of engineering and life sciences to develop biological substitutes that restore, maintain, or improve the function of damaged or missing tissue. It involves the use of biomaterials, cells, and biophysical, biochemical, and biomechanical signals to construct biological tissues. Recent cutting-edge technologies, such as 3D printing, stem cell engineering and gene therapy have revolutionized the way we treat diseases and injuries andhas shown promising evidence to the development of personalized treatments for a variety of medical conditions.

Cardiac tissue engineering is an emerging field that seeks to regenerate and restore function to damaged cardiac muscle tissue. The damaged left ventricular tissue fails to repair after myocardial infarction resulting in gradual thinning of left ventricle (LV remodelling) followed by fatal aneurysm. Recent advances have focused on the use of stem cells, growth factors, and scaffolds to repair and regenerate the damaged cardiac tissue. Stem cells, such as induced pluripotent stem cells or mesenchymal stem cells, are capable of self-renewal and differentiation into cardiomyocytes. Growth factors, such as vascular endothelial growth factor (VEGF) and basic fibroblast growth factor (bFGF), are used to promote angiogenesis and the differentiation of stem cells into cardiomyocytes. The biomaterial scaffolds made of synthetic and natural source not only provide mechanical supportto rescue from aneurysm, but also used to deliver the stem cells and growth factors to support the cardiac

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tissue regeneration.Furthermore, the scaffolds can be tailored to meet the specific requirements through various techniques like electrospinning, 3D printing etc. A unique combination of 3D scaffolds loaded with therapeutic factors have shown to repair the ischemic cardiac tissue and promote functional cardiac regeneration.

Bone tissue engineering is an area of research that seeks to regenerate and restore function to damaged or lost bone. Bone reunion during the critical sized defects is highly challenging and requires external support to bridge the gap. The use of stem cells, growth factors, and scaffolds have been explored so far, for successful bone regeneration in critical sized bone defects. Stem cells, such as mesenchymal stem cells; Growth factors, such as bone morphogenetic proteins (BMPs) and transforming growth factor-β (TGF- β), are used to promote angiogenesis and the differentiation of stem cells into osteoblasts. The biomaterial scaffolds, made of polylactic acid, polyglycolic acid, and polylactide-co-glycolide, can facilitate the delivery of stem cells and growth factors at the site of injury to aid the repair and regenerating bone tissue. Furthermore, the scaffolds can be tailored through techniques like, 3D printing etc. to meet the specific requirements based on tissue location and disease severity.

Overall, tissue engineering offers multifaceted treatment strategies for cardiac and bone repair and regeneration that have shown promising results in research and clinical trials over the last decade. The efficacy of these tissue engineered products in various clinical trial settings will help to revealtheir real time potentials and pitfalls for various clinical applications.

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OSMOTIC PUMP MEDIATED CONTROLLED DELIVERY OF HCG INDUCE OFF-SEASON BREEDING IN CATFISH: DEVELOPING NEW STRATEGIES TO UNRAVEL REGULATORY INFLUENCE OF BRAIN-PITUITARY AXIS

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Abstract: Among the aquaculture fish species, various breeding techniques were tried on different fish species for novel applications to augment fish seed production. In spite of this, seasonal or annual breeding pattern found naturally is one of the major limiting factors to get continuous supply of fish seeds. Artificial breedingin fishes during breeding season paved way to increase fish production to some extent, yet off-season breedingseems essential for continuous supply. Due to spatio-temporal pattern of gonadal development, it is often challenging and an uphill task to develop discrete methods for off-season breeding. Advancing gametematuration vis-à-vis spawning during the off-breeding seasoncertainly bring new strategy when spawning failure happens due to unforeseen monsoon changes. In view of this, osmotic pumps loaded with humanchorionic gonadotropin (hCG) was used for promoting spawning in catfish. The approach induced gonadal maturation as well as resulted in significant rise of gonadal transcripts associated with maturation and steroidogenesiswhich ultimately led tooff-season breeding in catfish. This study demonstrated slow and continuous release of hCG through osmotic pumpis an excellentreproductive technologyfor off-season breeding in fishes. Furthermore, using the strategy of osmotic pump deliver novel brain-specific markers were identified in line with gonadal development and also opens up a new research area of brain sex differentiation in fish. More in-depth studies on this line provided novel brain and gonadal biomarkers to understand the regulatory influence of brain-pituitary axis.

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NEW GENERATION VACCINE PLATFORMS WITH SPECIAL REFERENCE TO COVID-19 VACCINES

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Louis Pasteur first used the term vaccine in 1881 and demonstrated the feasibility of inactivating or attenuating microbes. Studies with fowl cholera and anthrax led to the concept of inactivation as a means to reduce the virulence of microorganisms. Serial passage of erysipelas and rabies organisms in heterologous hosts demonstrated attenuation, as an alternative strategy to reduce or eliminate virulence. These developments eventually led to eradication of small pox in humans and rinderpest in animals and control of several infectious diseases such as tuberculosis, foot and mouth disease, typhoid, polio, measles etc.

Some of the properties of ideal vaccines include:

- Safety especially in young ones and immune compromised hosts
- Provide long lasting protective immunity.
- Induce humoral, mucosal and cellular immunity.
- Do not to induce autoimmunity or hypersensitivity.
- Inexpensive to produce, easy to store, transport and administer.

Types of vaccines

The various types of vaccines include:

- Live, attenuated vaccines
- Inactivated vaccines
- Recombinant vector vaccines

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- Subunit vaccines
- DNA vaccines
- mRNA vaccines

Live Attenuated vaccine

This uses a non-pathogenic form of the infectious organism, limited in its ability to replicate in the host and therefore unable to cause disease. An attenuated microbe simulates an infection without causing disease pathology. Attenuation is done by growing microbe in abnormal conditions like low temperature/heterologous hosts or by modifying genes needed for virulence – site directed mutagenesis. Since the attenuated pathogen is adapted to grow in alien conditions, it has limited growth in normal environment.

Advantages

- Stimulates broad humoral and cytotoxic T-lymphocyte (CTL) responses.
- Attenuated organism replicates within the host and induces memory.
- Most vaccines require only one exposure.
- Vaccines can be administered at the normal route of entry, ensuring protection at this site by eliciting mucosal immune responses.

Disadvantages

- Danger of reversion of attenuated form to virulent form.
- Attenuated strain could recombine with natural pathogenic strain resulting in new form.
- Difficult to prepare.
- Growth substrate could be contaminated with other agents.

Inactivated Vaccines

Inactivated vaccines are made by killing or inactivating a pathogen by heat, or chemical means. The inactivation ensures that the pathogens can no longer replicate within the host but would

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generate immune responses.

Advantages

- The pathogen is killed / inactivated and hence it is no longer capable of replicating within the host.
- It is easily phagocytosed and presented to T-helper cells.
- The full range of antigens is presented ensuring a broad immune response.
- Since the organism is dead – there is no disease produced in the host.
- Vaccines are relatively heat stable.

Disadvantages

- Inactivated vaccines produce a strong humoral response but weak CTL mediated response.
- Since there is no replication in host, the presentation of antigen is short-lived necessitating booster vaccinations.
- Many pathogens have endotoxins, which when not removed completely, cause serious side effects.
- Inadequate killing may cause disease.

Recombinant Vector Vaccine

Genes encoding antigens of pathogenic target organisms are inserted into attenuated live vectors. The recombinant viruses are then able to replicate in and display the inserted proteins to the host. Both class I and II MHC pathway presentation is facilitated. These vaccines can also be targeted by viral tropisms for particular cells. Examples of viral vectors include vaccinia, canary pox, avipox, adeno, herpes viruses etc.

Advantages

- These vectors are easy to grow and are basically safe.

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- Development of multi component vaccines are possible

Disadvantages

- The live virus vector being used does have the risk of reversion to virulence.
- Vector virus has the potential to recombine with naturally occurring wild-type pathogenic strains and form a new hybrid virus.
- Induction of antibodies against vectors has the potential to neutralize subsequent doses of the vaccine

Subunit Vaccines

DNA coding for an immunogenic protein of a pathogen can be inserted into bacteria, yeast orbaculo virusesor by transfection of mammalian cells. The cells will then produce the protein endogenously and the protein can be harvested. Large amounts of antigen can be produced inexpensively. Genetic manipulation of antigen is possible. Antigens can be made more immunogenic or can be genetically inactivated. For example, the gene coding for the surface protein of hepatitis B virus is over expressed in yeast. Antigen self assembles forming aggregates resembling viral particles which are then secreted and purified.

Advantages

- Safe to use on immune-suppressed individuals
- Less possibility of side effects

Disadvantages

- Immune responses are primarily humoral. The antigens are processed via the MHC class II pathway and therefore do not induce CTL response.

DNA vaccines

Genes encoding antigens of an infectious organism are expressed by the host's own cells.Genes are inserted into a bacterial plasmid under the control of a mammalian promoter. The chimeric plasmid

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is directly injected into muscle or the DNA is absorbed to a solid matrix such as gold particles and injected intracutaneously by a gene gun. These particles are taken up by skin dendritic cells and the genes are expressed, as in a viral vector.

Advantages

- Full spectrum of immune responses can be generated.
- Neonates can be vaccinated with minimal interference with passive maternal antibody
- Can be used in immuno-compromised animals
- Thermostable
- Low cost production and administration
- Potential for use as marker vaccines to differentiate vaccinates from infected

Disadvantages

- Slow rising antibody titre
- Potential for integration of DNA into host genome
- Development of auto immunity

mRNA vaccines

A novel vaccine technology that delivers the mRNA coding for a antigen protein of pathogen to the cell. The mRNA then synthesises the antigen protein and then stimulates the immune response of the body. There are 2 types of mRNA vaccines – non replicating mRNA and self amplifying mRNA. The conventional non-replicating mRNA is composed of a cap, 5′-untranslated regions (UTR), open reading frame encoding vaccine antigens, 3′-UTRs and poly(A) tail.

Advantages

- Safe – non-infectious
- Does not integrate into the host genome
- No vector response – hence can be given multiple times
- Faster development

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- Fast, inexpensive, scalable and uniform production
- mRNA half-life can be regulated by modifications of the RNA sequence and its delivery method
- Offers a relatively simple and fast solution for newly emerging and re-emerging viral pathogens.

Disadvantages

- Low temperature storage requirement (-80 to -60^{0}C)
- Risk of unknown effects being a new technology
- Strong but transient reactogenic effects
- Low efficacy except for COVID-19

COVID-19 vaccines

Several vaccine platforms have been tested for COVID-19. Some of them include

Vaccine platforms	Examples
Inactivated vaccine	Bharath Biotech, Sinovac, Sinopharm
Vector vaccine (Adeno virus vector)	Oxford. Astra Zeneca, Johnson and Johnson; Cansino, Sputnik
mRNA vaccine	Moderna, Pfizer/BioNTech, CureVac
DNA vaccine	ZyCoV-D
Protein vaccine	Novovax

The conventional vaccine platforms such as live attenuated or inactivated vaccines have been used over centuries with positive impacts for control of several diseases. Newer vaccine platforms have specific advantages and disadvantages which have been highlighted above. The pandemic has given a renewed thrust on newer vaccine platforms such as mRNA and vector vaccines. While all

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these platforms have distinct advantages and all have been shown to be efficacious and thereby given emergency use authorization, such a variety of platforms have never been tried for a single pathogen, earlier. A clear understanding of these platforms would enable us to make an informed choice on the use of vaccines without vaccine hesistancy!

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GENOMICS IN HEALTHCARE - THE WAY FORWARD!

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Genomics is the study of the entire genome of an organism, including its DNA sequence, structure, function, and variation. With advances in technology and the development of high-throughput sequencing methods, the field of genomics has exploded in recent years, leading to numerous applications in healthcare.

Molecular diagnostics is a rapidly growing field that uses molecular techniques to analyze DNA, RNA, and other biomolecules to diagnose diseases and guide treatment decisions. The goal of molecular diagnostics is to provide precise and accurate information about the underlying causes of disease, allowing for individualized and effective treatment.

One of the most significant impacts of genomics on healthcare is personalized medicine. Personalized medicine involves tailoring treatment and prevention strategies based on an individual's genetic makeup. For example, genetic testing can help identify individuals at high risk for certain diseases, such as breast cancer, allowing for earlier detection and intervention. Additionally, genetic testing can also inform decisions regarding the use of certain medications, as some drugs may not work effectively in individuals with specific genetic variations. This is especially important in the treatment of cancer, where genetic mutations play a crucial role in the development and progression of the disease. With the help of genomics, doctors can now match patients with the most appropriate treatments, increasing the chances of success and reducing the risk of adverse side effects.

Precision oncology is a rapidly evolving field that leverages genomic information to inform cancer diagnosis and treatment. The goal of precision oncology is to provide individualized care for

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each patient based on their unique cancer profile, including its genetic makeup and molecular characteristics.

Genomics plays a critical role in precision oncology by providing insight into the underlying genetic mutations that drive cancer development and progression. Through genetic sequencing of tumor tissue, doctors can identify specific mutations that are driving the growth of the cancer, allowing them to select the most appropriate treatments. For example, genetic sequencing can reveal mutations in specific genes, such as EGFR or KRAS, that are associated with certain types of cancer. Molecular diagnostics can be used to identify specific gene rearrangements that are associated with certain types of cancer, such as chronic myeloid leukemia or non-small cell lung cancer, which can inform treatment decisions and improve patient outcomes.

Additionally, genomics can also help identify patients who are eligible for clinical trials, including trials for experimental treatments. By matching patients with the most appropriate trials based on their cancer genomics, doctors can increase the chances of success and accelerate the development of new treatments.

Furthermore, genomics can also aid in the development of new cancer therapies. By understanding the genetic mutations that drive cancer, researchers can develop new drugs that target these specific mutations, leading to more effective treatments with fewer side effects. In addition, the genomic information generated by precision oncology can also be used to monitor the disease, track treatment response, and identify resistance mechanisms, allowing for the development of new strategies to overcome resistance.

However, the use of genomics in precision oncology is not without challenges. One of the main challenges is the interpretation of genomic information, as the complexity of cancer genetics can be difficult to understand. Additionally, there is also the concern of potential harm from false-positive results, as well as the potential for harm from the psychological impact of receiving genetic

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information. To address these issues, it is essential to have a multidisciplinary team, including genetic counselors and cancer specialists, involved in the decision-making process.

Genomics is definitely playing a crucial role in the field of precision oncology, providing new avenues for personalized cancer care, improved treatment outcomes, and faster drug development. As the field continues to evolve and new technologies become available, we can expect to see even more progress in the use of genomics in precision oncology, leading to better care for cancer patients.

Another important application of genomics in healthcare is in the field of pharmacogenomics, which aims to understand the relationship between a person's genetics and their response to medication. By analyzing a patient's genome, doctors can determine if they are at increased risk for certain side effects or if they may not respond to certain drugs. This information can help inform treatment decisions, leading to better outcomes and improved patient safety.

Genomics is also playing a critical role in the development of new therapies for genetic diseases, such as cystic fibrosis, sickle cell anemia, and Huntington's disease. By understanding the underlying genetic mutations that cause these conditions, researchers can develop new treatments that target the specific mutations, providing hope for those affected by these diseases. In addition, genomics is also aiding in the development of new vaccines, with scientists using genetic information to better understand the biology of viruses and identify new targets for vaccine development.

In addition, molecular diagnostics is also playing a critical role in the diagnosis of infectious diseases. For example, molecular tests can quickly identify the presence of specific viruses, such as HIV or hepatitis C, allowing for prompt treatment and reducing the spread of disease. In addition, molecular diagnostics can also be used to monitor the effectiveness of treatments, identify resistance mechanisms, and track the spread of disease, contributing to the fight against infectious diseases. Moreover, genomics is contributing to the fight against infectious diseases, such as COVID-19. By sequencing the genomes of viruses and other pathogens, researchers can track the spread of disease,

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identify outbreaks, and monitor the emergence of new strains. This information can help inform public health decisions and response efforts, leading to more effective containment and control of infectious diseases.

Despite the many benefits of genomics in healthcare, there are also significant ethical and privacy concerns associated with the use of genetic information. For example, the fear of genetic discrimination, such as insurance or employment discrimination based on genetic information, remains a concern for many individuals. Additionally, the protection of genetic information, such as the confidentiality of genetic test results, is also a significant concern. To address these issues, it is essential to have clear and comprehensive policies in place to ensure the responsible use of genomics in healthcare.

Despite the many benefits of molecular diagnostics, there are also significant challenges associated with its use. One of the main challenges is the cost of molecular tests, which can be prohibitively expensive for many patients. Additionally, there is also the concern of potential harm from false-positive results, as well as the potential for harm from the psychological impact of receiving genetic information. To address these issues, it is essential to have clear and comprehensive policies in place to ensure the responsible use of molecular diagnostics in healthcare.

In conclusion, genomics is having a profound impact on healthcare, offering new avenues for personalized medicine, improved treatment outcomes, and better patient safety. With the continued growth and development of the field, we can expect to see even more advances in the coming years, offering new hope for those affected by genetic diseases and providing new tools for the fight against infectious diseases. However, it is crucial to address the ethical and privacy concerns associated with the use of genetic information to ensure that the benefits of genomics are realized in a responsible and equitable manner.

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PROCEEDINGS OF INTERNATIONAL CONFERENCE

"Frontiers of Biosciences in Sustainable Development"

MONITORING AIR QUALITY AND EXPLORING REAL-TIME AIR QUALITY USING AIR QUALITY INDEX (AQI)

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Abstract: A major health concern nowadays is the quality of air we breathe. This leaves us with the option for Air Quality monitoring. This paper deals with air quality monitoring at Stella Maris College. A full one month data (December 2022) has been analysed with respect to the following parameters – Particulate matter- PM1, PM2.5, PM10, and levels of SO_2, NO_2, O_3, CO, along with Temperature and Humidity levels. Highest value was recorded for these parameters in the third week of December. Comparative analysis of two-year data for 2021 and 2022 has been made. Explanation of AQI calculation, terms associated with air quality monitoring, interpretation of colour code for AQI and health impact has been indicated. The most polluted cities in India, the least polluted cities in India and world ranking have been highlighted. A reference to Exhaust Emission index is made as it is directly proportional to air quality.

Keywords: AQI, Air quality monitoring, AQI ranking, Particulate matter (PM).

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ESTIMATION OF MICROPLASTICS IN THE KOSASTHALAIYAR RIVER OF METROPOLITAN CITY, CHENNAI

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Abstract: Microplastics are smaller plastic polymers (less than 5mm) distributed in different habitats from terrestrial to aquatic environments worldwide. In freshwater bodies microplastics accumulate from the various sources. Rivers are the vectors of microplastic accumulation in the marine ecosystems. This study was aimed at demonstrating the microplastic debris in the river. The Kosasthalaiyar or Kortalaiyar, is one of the three major rivers in Chennai that flows through a large industrial area. The river joins the Bay of Bengal through Ennore Creek and Pulicat lake. In this study, the surface water samples (Sample Stations, n = 31) were analysed for the microplastic contamination. Through this study, the highest microplastic accumulation was found in Tamaraipakkam Reservoir station. The microplastics were classified according to the size, colour and type. The fibre particles were dominant (78%), followed by film (12%), fragment (7%) and foam (3%). The microplastic particles were examined under FTIR spectroscopy and Scanning Electron Microscopy (SEM). The SEM image illustrated significant morphological alterations of the MPs particles. Further seasonal sampling is required to assess the contamination range in the river.

Keywords: Kosasthalaiyar, Microplastic, Scanning Electron Microscopy (SEM), FTIR spectroscopy

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PROCEEDINGS OF INTERNATIONAL CONFERENCE

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STUDIES ON THE TOXICITY OF PESTICIDE FIPRONIL 5% SC (MAHAVEER SC) ON THE HISTOPATHOLOGICAL INDICES IN DIFFERENT TISSUES OF*OREOCHROMIS MOSSAMBICUS*

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Abstract: The toxic effect of pesticide fipronil on histopathological changes in the gill, liver, intestine, kidney, and muscles of *Oreochromis mossambicus* were studied. In the present study, the lethal concentration (LC_{50}) value of pesticide fipronil on *Oreochromis mossambicus* at 96 hours was calculated as 0.006 ppm. Fishes were subjected to two different sub-lethal concentrations of fipronil(10% and 30%) based on the 96 hours LC_{50} value for histological study. Histological changes such as fusion of lamellae, vacuolization, disintegration of cell boundaries, detachment of gill epithelium, hyperplasia, hypertrophy of respiratory epithelium in the gills; vacuolation, dilation of blood sinusoids, degeneration of hepatocytes, necrosis of the liver; necrotic lesions in the epithelial layer, disintegrated columnar epithelial cells, ruptured villi; vacuolization in the intestine; enlargement of renal tubules, hyperplasia, vacuolation, necrosis and shrinkage of glomeruli in the kidney; degeneration of muscle bundles, edema, splitting of muscle fibres, atrophy and necrosis in the muscle fibres were observed. The toxicity study revealed that the pesticide fipronil is highly toxic to tilapia fish even at a low sub-lethal concentration.

Keywords: Pesticide, Fibronil, *Oreochromis mossambicus*, Toxicity study, Histopathological study.

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EVALUATION OF HEAVY METAL LOAD IN OPEN WELL WATER FROM A RURAL KERALA VILLAGE BY USING INDICES

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Abstract: Water is an essential part of all living organisms. India is already experiencing the effects of the impending global freshwater crisis in terms of water quantity and quality. The objective of this study is to evaluate the concentration of heavy metal mass in groundwater of a rural village in Kerala. In the pre-monsoon, samples from twenty-two public wells that are utilised by locals for their daily living are taken for the analysis. The water samples were analysed for heavy metals namely Aluminium (Al), Arsenic (As), Cadmium (Cd), Iron (Fe), Lead (Pb), and Zinc (Zn) by using ICP-MS. The acquired value from ICP-MS analysis is compared with BIS standard values of drinking water quality. From the analysed heavy metals, cadmium and iron in some of the wells are exceeding the permissible limit of BIS. HPI of each well was carried out and found out that DW1, DW2 and DW14 are not fit for drinking purposes. By analysing the Metal Index (MI) out of 22 wells, 9 wells are pure in quality and others are slightly to moderately affected. Certain metals in different wells showedslightly greater concentration than the permissible limits of BIS. These might be taken into account for safer drinking water.

Key words: HPI, Heavy metal, Metal Index, Drinking water, Groundwater.

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EFFECTS OF CHOLORPYRIFOS ON *EISENIA FOETIDA*; OBSERVATION OF ITS BEHAVIOURAL AND MORPHOLOGICAL CHANGES

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Abstract: The earthworms are essential organisms which indicate the soil fertility and are utilized for the purpose of producing the vermicompost used as manure in farming. *Eisenia foetida* is used constantly in the vermiculture which are very good indicators of environmental pollution and suffers a lot from the pollutants and effluents such as pesticides discharged from industries polluting the agricultural fields. As pesticides are widely used by the farmers an experiment was done in the laboratory of MCC by using an acute toxicity test with Chloropyrifos as the test substance. Paralysis and mortality rate was recorded in different concentrations in different time intervals. Some morphological and behavioural changes were observed in the body of the earthworm due to the pesticide concentrations (Chlorpyrifos EC20). Fragmentations, swelling and various changes during the experiment were observed and the worms became hyperactive in the presence of insecticide for a few minutes. These insecticides are hazardous to the human by causing itching, difficulty in breathing and various health related issues.

Keywords: *Eisenia foetida*, Chlorpyrifos EC20, Mortality, Paralysis, Filter paper.

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ORGANOPHOSPHORUS PESTICIDES INDUCED HISTOPATHOLOGICAL ALTERATION IN THE VARIOUS TISSUES OF FRESHWATER FISH KOI CARP (*CYPRINUS CARPIO*)

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Abstract: The ornamental fish, koi carp fingerlings were exposed to sub-lethal concentration (1/5th of 96 h LC_{50}) of Malathion (7.2 mg/l) and Glyphosate (13.2 mg/l) along with control group for a period of 30 days. Exposure to sublethal concentrations of Malathion and Glyphosate induced remarkable pathological changes in the tissue architecture of muscle, liver, brain, and gills tissue of fish *C.carpio*koi carp. Muscle showed degeneration in fiber tissue arrangement. The gills showed edema in the filamentary epithelium and intense lamellar vasodilation. Liver showed increased vacuolation associated with lipid accumulation. Brain showed degenerative changes in neural cells and vacuolization and structural damage. Therefore, the finding of the present investigation could be considered as a possible biomonitoring tool for the assessment of pesticide contaminations in aquatic ecosystems.

Keywords: Koi carp fish, Pesticide pollution, Malathion, Glyphosate, Histopathological alterations.

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IMMUNOLOGICAL RESPONSE IN THE SERUM OF MOLE CRAB *EMERITA ASIATICA* IN AND AROUND CHENNAI COAST

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Abstract: The occurrence of multiple agglutinins proved binding of carbohydrate in the serum agglutinins of mole crab. The hemagglutinating activity (HA) was found to be high between temperature 20℃ and 50℃, The level of calcium in the serum was between 0.9 to 1.9 mg/ml of mole crab serum. The naturally occurring agglutinin activity was assessed in the haemolymph of four species of anomuran crabs and maximum HA activity was recorded in the haemolymph of *Emerita asiatica* with equine erythrocytes. Monsoon has little or no effect on the availability of *Emerita asiatica* and on HA titre. Among the population components, mature females irrespective of the stages of egg development showed the maximum HA titre. A significant increase in HA titre with increase in size (carapace length) and weight of the animals were observed. Biochemical factors such as water, protein and calcium content in the haemolymph of *Emerita asiatica* had no influence on the hemagglutinating activity. The presence of agglutinin in various tissues was also investigated.

Keywords: Agglutinin, *Emerita asiatica*, Haemagglutinating activity, Monsoon, Temperature.

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EFFECTS OF *ILLICIUM VERUM* HOOK.F EXTRACT ON DRUG RESISTANT BACTERIA AND ESTIMATION OF ITS ANTIOXIDANT EFFICACY

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Abstract: *Illicium verum* extracts of three different solvents, diethyl ether, methanol and hexane were screened for potential secondary metabolites. Methanol extract established the highest yield of bio active compounds like phenols, tannins, flavonoids, saponins anthocyanin, carbohydrates, coumarins, terpenoids, steroids, glycosides, quinones, terpenoides followed by diethyl ether and hexane extracts. As methanol extract was rich in flavonoids, tannins followed by phenols and other phytocompounds, it was tested for antibacterial efficacy against clinical pathogens like *E. coli, K. pneumoniae, P. mirabilis and S.aureus* and also its antioxidant activity was determined. Different concentrations of methanol extracts of*I.verum* like 20 µg/ml, 40 µg/ml and 80 µg/ml demonstrated a significant inhibitory action against all the selected pathogens. Methanol extract of *I.verum* was also subjected for free radical scavenging by DPPH assay, which displayed an exceptional antioxidant activity. The phytochemicals of methanol extract were analysed by Gas Chromatography-Mass Spectrometry (GCMS) which revealed the presence of Estragole, Benzene, 2.1-methoxy-4-(1-Propenyl), Anetholes, Phenolic compounds, Sesquiterpenes, Benzene acetic acid and Anisoles. These findings indicate that*I.verum* could be explored more in the development of novel antibiotics and natural antioxidants to be used in various lifestyle disorders and in the food, industry suppressing the oxidative deterioration.

Keywords: *Illicium verum*, Phytochemicals, GC-MS, Antibacterial activity, Antioxidantactivity.

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PREDATOR-PREY INTERACTION AMONG CALANOID COPEPODS WITH REFERENCE TO CALANOID-CYCLOPOID INTERACTION ON THE CHENNAI COAST.

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Abstract: The aim of the present study is to find out the relationship between predator and prey species of calanoid copepods from Ennore and Kovalam and compare it with the calanoid-cyclopoid relationship from the same stations. Samples were collected from both stations over a one-year period, from January 2019 to December 2019, with a total of 32 species of calanoids and 14 species of cyclopoids (including Poecilostomatoida). Pearson correlation was used to determine the relationship between copepods. Linear regression was used to highlight the relationship between calanoid and cyclopoid copepods in the given stations. 10 species of predator and prey copepods were selected to find out the relationship between them. On the other hand, predator and prey calanoid copepods compared with cyclopoid copepods to find out the relationship between them. In Kovalam station, predator copepod densities were positively correlated with prey, while cyclopoids have negative correlation with calanoids in both stations. However, at Ennore, relatively low density of predatory calanoid species were observed, which is dominated by cyclopoid copepods.

Keywords: Calanoid, Cyclopoid, Predator-prey, Chennai coast, Correlation.

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BIRDS - A POTENTIAL DISSEMINATOR OF ANTIBIOTIC RESISTANCE

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Abstract: Antimicrobial resistance has proven to be a major global concern, making treatment of infection more difficult. Wild birds have been hypothesized as reservoirs and potential spreaders of antibiotic resistance. Pulicat Lake is the third most important wetland for the migratory shore birds of East Coast of India. The prevalence and rate of dissemination of antibiotic resistance genes in the brackish water ecosystem of Pulicat Lake is unknown. This study was carried out on the birds of Pulicat Lake and the presence of extended spectrum beta lactamase genes was determined while screening the pooled faecal matter of birds (Terns and Egret) after collecting from mudflats near the mouth of the Pulicat lake. The DNA from the faecal sample was extracted using DNeasyPowerSoil Pro Kits – QIAGEN and amplified by PCR using the extended spectrum beta lactamase primers and their presence was confirmed by gel electrophoresis. This study concludes that the birds are reservoirs of antibiotic resistant microbes and could be a significant reason for the spread of the same in the environment.

Keywords : Pulicat lake, Birds Faecal matter, Antibiotic Resistance, Beta Lactamase, PCR.

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USE OF BIOFLOC TECHNOLOGY ON GROWTH AND SURVIVAL OF*LITOPENAEUS VANNAMEI* EVIDENCED BY ELECTRON MICROSCOPICAL AND HISTOLOGICAL OBSERVATIONS

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Abstract: Biofloc technology is an intensive shrimp rearing practice in which we can efficiently utilize the nutrient inputs by producing natural micro feeds and feeding them to shrimps. In a 90-day feeding trial with 0.7g juvenile shrimp randomly distributed in six FRP tanks at a stocking density of 100 shrimps/ton. The experiment consisted of two treatments, control without any additional carbon source and treatment with rice bran as a carbon source. Both the treatments were maintained on zero water exchange and were fed by commercial shrimp feed in 3 rations per day. At the end of the trial, shrimps obtained body weight of about 19.58±2.11g and 17.05±0.73g in treatment and control respectively. The histological investigations of shrimp hepatopancreas showed biofloc treatment had large distinctive secretory B-cell with large vacuole comparing control. Scanning Electron Microscopy (SEM) of the gut evidenced the shrimp as a voracious feeder on biofloc by depicting diverse microalgae and other detritus material inside the digestive tract which were similar to the suspended biofloc in the respective tanks. This study is convincing that biofloc is positive in promoting shrimp growth and its contribution to its nutrition is evidenced by the electron microscopic and histological observations of the digestive tract.

Keywords: Biofloc, Growth performance, *Litopenaeusvannamei*, SEM, Histology.

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AVIFAUNAL DIVERSITY OF PALLIKARANAI MARSH

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Abstract: Wetlands are dynamic ecosystems that offer several tangible and intangible services to communities living around them. The Pallikaranai marsh, one of Chennai's last remaining natural wetland is notable for birds, both resident and migratory. Avifaunal diversity at the marsh was observed and documented. A total of 81 species of birds, including four that were designated as Near Threatened, were recorded. The data was uploaded to eBird, a global repository of bird sightings. eBird checklists uploaded by other individuals were also examined, in an attempt to determine the avian species richness at the marsh. Over the years, the rapid decimation of the marsh owing largely to anthropogenic factors has been a cause for concern. Despite this, Pallikaranai marsh now a designated Ramsar site continues to harbour several resident bird species and attracts thousands of migratory birds year after year. It is therefore of vital importance to protect the marsh and its denizens.

Keywords: Pallikaranai marsh, Wetland, birds, Diversity, eBird, Species Richness

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EFFECT OF AQUEOUS EXTRACT OF GARLIC ON LEAD INDUCED CHANGES IN THE TISSUES OF RAT, *RATTUSNORVEGICUS*

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Abstract: Heavy metals and metalloids that occur in nature have high density and atomic weight. Lead is a heavy metal that is denser than most common materials and ubiquitous in nature. Lead's toxicity became widely recognized in the late 19th century. Lead is a neurotoxin that accumulates in soft tissues and bones. *Alluimsataivum* (Garlic) contains approximately 33 sulphur compounds, several enzymes,17 amino acids and minerals. The present study is aimed to evaluate the toxicity of lead acetate and the effect of aqueous extract of garlic in various tissues of rat, *Rattusnorvegicus* for a period of 28 days. The concentration of the lead acetate was within LD_{50} value and it is effective in bringing out the toxic effects on animals administered. It was found that when lead was administered changes were seen in the tissues viz., liver, kidney, thymus, spleen, bone marrow. The present finding confirms that when garlic is administered simultaneously along with lead or when garlic is administered after the lead exposure, the animals were able to counteract the toxic effects produced by lead. The efficiency of the garlic was perhaps due to the presence of sulphur compounds having carboxyl and amino groups. Here it can be concluded that garlic acts as a curative regimen for lead induced toxicity.

Keywords: Lead, *Rattusnorvegicus*, Garlic extract, Histopathology and Curative regimen.

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STUDY ON PHYSICO-CHEMICAL CHARACTERISTICS, ZOOPLANKTON DIVERSITY AND POPULATION DENSITY IN THE FRESHWATER PONDS OF SOUTH CHENNAI

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Abstract: Ponds are important inland water bodies that act as small reservoirs of freshwater biodiversity, so it is important to scale up research importance to aquatic biodiversity. Studying the different components of water ecosystems is essential to elucidate the diversity and processes that change freshwater ecosystems. Zooplankton communities occupy a dominant position in freshwater ecosystems, playing an essential role in maintaining the ecological balance of the environment they live in. Because of their rapid response to environmental changes, they serve as an ecological indicator of the aquatic environment. The aim of this study was to analyse the physico-chemical characteristics and study the zooplankton diversity and density in three different ponds of South Chennai i.e., Pallikaranai Lotus pond, Nanganallur pond and Tirusulam quarry rock pond. Physico-chemical parameters like pH, electrical conductivity, dissolved oxygen, calcium, magnesium, sulphate, nitrate, chloride, total dissolved solids, total alkalinity and total hardness were analysed. The diversity showed the presence of rotifers, cladocerans, ostracods, calanoid copepods and cyclopoid copepods in all the three ponds. The population density of zooplanktons in the three different ponds was (i) Pallikaranai Lotus Pond - Rotifers > Cyclopoids > Calanoids >Cladocerans> Ostracods, (ii) Nanganallur Pond – Cyclopoids > Calanoids > Rotifers >Cladocerans> Ostracods, (iii) Tirusulam quarry Rock Pond – Calanoids > Cyclopoids > Rotifers > Ostracods >Cladocerans.

Keywords: Ecological indicator, Calanoids, Cyclopoids, Cladocerans, Dominance index.

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A PRELIMINARY INVESTIGATION ON MICROFOULING COMMUNITY IN MUTTUKADU BACKWATERS, SOUTH INDIA

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Abstract: Biofouling is a successional process of colonization of various organisms especially microbes and invertebrates on both natural and artificial substrates. A temporal analysis of the microfouling community and its relationship with environmental variables was evaluated in the Muttukadu backwaters, Tamil Nadu during October 2022. The biochemical composition of the biofouling sample was studied. To study the microfoulers, especially bacterial communities, the biofilms were scraped off and isolated on three media namely nutrient agar, blood agar and MacConkey agar and then the isolated colonies with different morphological characteristics were identified by biochemical tests. This study specifically embarks to determine the microfouling community structure, abundance and diversity of the study area.

Keywords: Backwaters, Biofouling, Biofilm, Agar, Microfoulers.

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BIOMONITORING OF ADYAR ESTUARY CHENNAI, INDIA THROUGH BIODIVERSITY DYNAMICS OF MEIOFAUNA.

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Abstract: Estuaries are dynamic and productive systems, besides supporting important ecological functions and services, resources provided by estuaries have been a target of human exploitation, compromising estuarine ecological integrity. Furthermore, human induced impacts and their negative effects on estuarine systems triggered the attention towards the need for monitoring, assessing and managing ecological integrity to promote the long-term sustainability of these systems. The behaviour and physiology of different meiofaunal taxa, such as foraminiferans, nematodes and copepods, can provide vital information on how organisms respond to these challenges and can provide a warning signal of anthropogenic impact. Meiofauna samples were collected by using a stainless steel corer with an inner diameter of 3.57 cm which comes to 10 cm^2 surface areas. Three sites for collection were selected: Site I, II and III. In general, higher density of meiofauna was recorded at site I (1529.33±353.67) of Adyar estuary followed by Site II (1161.53±252.47) and Site III (1041.87±311.13) Ind./10 cm^2. Further, it is inferred from the present study that in sites II and III, lesser diversity and density of meiofauna might be due to the retention of pollutants in soil sediments rendering unfavorable conditions for their growth and survival. The sustainability of estuarine biodiversity is vital to the ecological and economic health of coastal regions. It is important, therefore, to have techniques that enable society to assess the degrees of exposure of estuaries to anthropogenic toxic contamination and the significance of this exposure to

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the ecology of the biota living there, especially the effects on biota of commercial significance. Due to great abundance, low mobility, rapid replication, short-life cycle and extreme sensitivity to entering materials, meiofauna are most appropriate bio-indicators for assessing the health of marine environment. Scientific studies of the Adyar estuary require a comprehensive and holistic approach taking into consideration the topography, tidal flow, water quality and assessment of flora and fauna like meiobenthos, zooplankton and macro biota which could be a pointer toward the successful assessment of the status of the Adyar estuary. Moreover, this study suggests that more exploration of the meiofaunal community will allow us to understand how the community patterns influence the ecosystem functioning in Adyar Estuary.

Key words: Meiofauna, Adyar Estuary, Bioindicators and Pollution Assessment.

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DISTRIBUTION AND RISK ASSESSMENT OF HEAVY METALS IN COCHIN BACKWATER SYSTEM -WEST COAST OF INDIA

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Abstract: Heavy metal pollution is a worldwide issue in both developing and developed countries. Its presence in sediment is a significant concern due to its toxicity to aquatic species, human beings and their presence in the food chain. Elements are introduced into the water bodies by natural and anthropogenic processes. Thus, there is a need to regularly monitor heavy metal levels in aquatic mediums. The present study was conducted to assess the heavy metals concentration in the sediment samples from Cochin backwater system. The concentration of various heavy metals Cd, Cr, Cu, Ni, Pb and Zn in sediments were analysed using ICP-MS to understand the pollution level and the impact in the backwater environment. Cd ranged from 8.86 to 32.12, Cr varied from 74.97 to 138.06, Cu was between 52.03 to 182.8, Ni ranged from 25.95 to 87.77, Pb varied from 22.75 to 66.94, and Zn was between 50.43 to 634.66. The Risk assessment of heavy metals was done using Contamination Factor (CF) and Geoaccumulation Index (Igeo) and Pollution Load Index (PLI). Igeo value was noted between 0 and 3, showing that the sediment was uncontaminated to moderately contaminated. Metal contamination factor indicates that the Anthropogenic input in the deposit was in the range of (0.028 -0.103) for Cd, (0.833-1.534) for Cr, 1.156-4.06) for Cu, (0.381 – 1.290) for Ni, (1.136 – 3.347) for Pb and (0.53-6.88) for Zn. Some metals present in the samples exceeded the EPA maximum permissible limit. Thus, there is a need to establish strategies for limiting the number of heavy metals entering the lake.

Keywords: Backwater sediments, Heavy metals, Ecological Risk Assessment, ICP-MS and Cochin backwater.

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MACRO, MESO, AND MICROPLASTIC DEBRIS IN THE SHORE AND SEDIMENTS OF KOLAVAI LAKE IN CHENGALPATTU, TAMIL NADU

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Abstract: Plastic pollution has been recorded in the soil, surface water and biota of the marine environment, with limited research focusing on freshwater systems. Therefore, this study examined the presence and distribution of micro, meso, and macro-plastic wastes along the shoreline and sediments of Kolavai Lake, Chengalpattu, TamilNadu There is a strong correlation between the abundance of macroplastics in shoreline sediment and the abundance of microplastics in lake sediment. In spite of the fact that macroplastics contribute significantly to the weight of plastics, reports from the most polluted freshwater systems are quite limited. Additionally, submerged macroplastics can play a significant role in the movement of plastic debris that has been inappropriately disposed off as well as the creation of micro-and nano plastics. It is concluded that there is a continuing need to expand the survey on plastics of all sizes in freshwater environments.

Keywords :Macroplastic, Mesoplastic, Microplastic, Shoreline sediment, Plastic debris.

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OCCURRENCE OF MICRO AND MESO-PLASTICS IN THE GASTROINTESTINAL TRACT OF INDIAN MAJOR CARPS OF POONDI LAKE, THIRUVALLUR, TAMIL NADU, INDIA.

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Abstract: Microplastic contamination is becoming a threat to all types of ecosystems including freshwater bodies. This study focuses on the quality and quantity of microplastic contaminants in the gastrointestinal tract of Indian major carp fishes collected from Poondi lake in Thiruvallur, TamilNadu. A total of 300 fishes of three different species (*Catlacatla, Labeo rohita, Cirrhinus mrigala*) were examined. From 300 fish samples 43 plastic particles were collected using an alkaline digestion method of which 14 were meso-plastics and 29 were microplastics. These plastic particles were confirmed with the help of ATR FTIR in which four different types of polymers like polyethylene, nylon, polythene and polyamide were identified. This research work could be a baseline data for microplastic contamination in commercially important freshwater fishes. Microplastics in fishes could have effects on the ecosystem and human beings and thus steps are needed to prevent plastic pollution in the environment.

Keywords: ATR- FTIR, Poondi lake, Microplastic, Mesoplastic, Freshwater.

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COMPARATIVE STUDY OF ANTI-INFLAMMATORY ACTIVITY OF *VIGNA MUNGO* IN PCOS BLOOD SAMPLE AND NON-PCOS BLOOD SAMPLE

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Abstract: Polycystic ovary syndrome (PCOS) is a hormonal disorder common among Women of reproductive age. Urad dal (*Vigna mungo*) helps in lowering inflammation due to its anti-inflammatory properties. Benefits with respect to the female reproductive system – it is Used in the treatment of painful menstruation, amenorrhea, and PCOS. The blood samples – one from a person with PCOS and one from a person without PCOS are taken. After processing, the optical density of the samples obtained using a Spectrophotometer was noted and the percentage of haemolysis inhibition was calculated and noted the percentage of haemolysis inhibition caused due to the presence of the *Vigna mungo* seed extract and the *Vigna mungo* seed coat extract was noted where the inhibition was caused due to the anti-inflammatory effects of *Vigna mungo*. The results were analysed and presented in the form of graphical representation. The percentage of inhibition in the samples was more than 50% which showed that the anti-inflammatory effect of the extracts in the samples was high. The inhibition was seen to be higher in the presence of *Vigna mungo* seed coat. Extract than the *Vigna mungo* seed extract comparatively. From the experiment, it is concluded that the haemolysis inhibition is more in the PCOS blood sample than in the Control blood sample in the presence of the seed extract. This is due to the anti-inflammatory effect of the *Vigna mungo* which prevents the Destruction of RBCs. From the experiment, it is concluded that the haemolysis inhibition is comparatively less in the PCOS blood sample than in the Control blood sample in the Presence of the *Vigna mungo* seed coat extract. Comparing the values obtained from both the *Vigna mungo* seed extract and the *Vigna mungo* seed coat it is clear that the *Vigna mungo* seed coat shows a higher haemolysis inhibition than the seed.

Keywords: PCOS, *Vigna mungo*, Haemolysis inhibition, Blood samples, Anti-inflammation.

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INVENTORY OF NUCLEOTIDES OF INDIAN SNAKES IN THE NATIONAL CENTER FOR BIOTECHNOLOGY INFORMATION

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Abstract: Nucleotide sequence and genetic data entries of Indian snakes in the National Centre for Biotechnology Information (NCBI) is significantly increased in recent years. However, not many have been quantitatively documented as to which Indian snake species are well-represented in the database. To proceed with advanced research studies in Indian ophiology, this information is of much importance. Many species of Indian snakes have not been genetically sequenced yet. Hence, this study is a compilation of information collated after checking each and every species of Indian snake in the NCBI. The resolution of details available in the NCBI is varied, ranging from no data, to up to the presence of the whole genome. A lot of such variations in data resolution were scored among many families of Indian snakes. Access to ready reckoner information about the genetic sequences of Indian snakes in an authentic portal like the NCBI helps wildlife scientists, veterinarians and herpetologists to widen the scope of study on the genetics of Indian snakes in the future.

Keywords: India, Serpentes, Taxonomy, DNA, GenBank.

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IN SILICO ANALYSIS OF THE GENOMES OF SARS-CoV-2 VARIANTS OF CONCERN (VOC) REPORTED IN INDIA, WITH RESPECT TO THE REFERENCE GENOME AT NUCLEOTIDE LEVEL

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Abstract: The SARS-CoV-2 virus responsible for the major outbreak of COVID-19 disease globally belongs to a large family of viruses called the coronaviruses and accumulation of novel mutations in their genome has led to the emergence of new variants of the virus which has caused increased morbidity and mortality. This study aims to present an in-silico analysis of the genomes of SARS-CoV-2 variants of concern (VOC) reported in India with respect to the reference genome of SARS-COV-2 at a nucleotide level by performing pairwise sequence alignment using the NCBI BLAST tool. The VOCs taken for this study are delta variant (B.1.617.2) and sub-lineages of omicron variant – BA.1, BA.2, BA.1.1. From the pairwise sequence alignment of the VOCs with the reference genome, we are able to determine their degree of similarity(percent identity) to the reference genome and also the single nucleotide polymorphisms (SNPs) in the genomes of VOCs, which greatly influences their structural and functional properties. From this study, the omicron sub-variant BA.2 is concluded to have the closest nucleotide sequence homology with the reference genome with a percent identity of 99.88% and BA.1.1 sub-variant is quite distantly-related(percent identity of 99.81%) to the reference genome than compared to the other variants taken in this study. Such in-silico analysis of the genomes of variants can help us to identify the mutations in their genomes that cause changes in their structural and functional properties. Hence this provides for us the information based on which we can deduce effective preventive strategies, diagnostic tools and therapeutic approaches to keep the widespread of the disease in check.

Keywords: In-silico analysis, SARS-CoV-2, Variants of concern(VOC), Pairwise sequence alignment, Single Nucleotide Polymorphisms (SNPs).

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METAGENOMIC ANALYSIS ON THE GUT MICROBIOME OF DIPTERAN BLOWFLY MAGGOT REARED IN SOLID FISH WASTE

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Abstract: Blow flies are members of the *Calliphoridae*family. These flies play a significant role in the dissemination of microorganisms in urban and natural settings as they are the first organisms to swarm on carcasses or decompose organic debris for laying eggs. This study focuses on microbial diversity of the gut of Dipteran blowfly maggot feeding on solid fish waste using Illumina Miseq 16s rRNA Sequencing. The adult dipteran blow flies were procured from the Pulicat fish market and reared *in vitro* on solid fish waste feed from Pulicat. The DNA from 3rd instar maggots was isolated with DNeasyPowerSoil Pro Kits – QIAGEN and using V3-V4 amplicon sequencing, the gut microbiota of the maggots was analysed. The bacterial communities in the maggots were dominated by the phyla Firmicutes. *Enterococcaceae*and*Vagococcus*were the predominant bacteria at family and genus levels, respectively. The metagenome results of the gut microbiota in blow fly maggots will open up possibilities for research on their impact on solid fish waste management, the transfer routes and also the use of solid fish waste as a superior diet for rearing maggots.

Keywords: Blowfly Maggots, Solid Fish Waste, Gut Microbiota, 16s rRNA Sequencing, Firmicutes, *Enterococcaceae.*

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EXTRACTION, ISOLATION AND CHARACTERIZATION OF BIOACTIVE COMPOUND WITH ANTI-MRSA ACTIVITY

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Abstract: The present study aims to purify, characterize and evaluate the antibacterial activity of bioactive compounds against methicillin-resistant *Staphylococcus aureus* (MRSA). The anti-MRSA compound produced by a halophilic bacterial strain which was identified as *Bacillus amyloliquefaciens*based on16S rRNA gene analysis. The pure bioactive compound was isolated using silica gel column chromatography and Semi-preparative High-performance liquid chromatography (Semi-preparative HPLC). The Thin layer chromatography (TLC), Fourier transform infrared spectroscopy (FTIR) and proton NMR (^{1}H NMR) analysis indicated the phenolic nature of the compound. The molecular mass of the purified compound was revealed by Liquid chromatography-mass spectrometry (LC-MS) analysis. The compound inhibited the growth of MRSA with minimum inhibitory concentration (MIC) of 62.5 µg mL^{-1}. MRSA bacteria were exposed to 4X MIC of the compound and the cell viability was determined using flow cytometric analysis. Scanning electron microscope (SEM) and Transmission electron microscope (TEM) analysis was used to determine the ultrastructural changes in bacteria. This is the first report on isolation of anti-MRSA compounds from halophilic *B. amyloliquefaciens* and could act as a promising antimicrobial agent.

Key words: *Bacillus amyloliquefaciens*; phenolic compound; anti-MRSA activity; Flow cytometry; Electron microscope.

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ESTIMATION OF TOTAL PHENOL, ALKALOID AND FLAVONOID CONTENTS IN *ANISOMELES INDICA (L.)* WHOLE PLANT EXTRACT AND SCREENING OF THEIR *IN VITRO* ANTI - INFLAMMATORY EFFICACY USING THE ALBUMIN DENATURATION TECHNIQUE.

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Abstract: This research was conducted to evaluate the *in vitro* anti-inflammatory potential of whole plant of *Anisomeles indica Linn* (Lamiaceae) by albumin denaturation inhibition *(in vitro*) assay in different solvent (ethyl acetate, methanol, and aqueous) extracts. Total phenolic (TPC), total flavonoid (TFC), and total alkaloid contents of the crude extracts were estimated by aluminium chloride and the Folin-Ciocalteu method, respectively, whereas alkaloid content was estimated based on the reaction between alkaloid and bromocresol green (BCG). The percentage of inhibition of albumin denaturation was dose-dependent. Aqueous extract demonstrated the highest protection against denaturation (81.04%) (IC50: 26.44 g/mL),followed by the methanol extract (76.10%) and then ethyl acetate extract (28.25%). Ibuprofen, the reference drug, had the highest inhibition rate of 88.73%. Highest quantities of phenols (148.5 mg GAE/g) and flavonoids (133.55 mg Quercetin/g), were observed in the aqueous extract, indicating a positive correlation to the extract's anti-inflammatory potency and thereby validating the plant's pharmacological significance.

Keywords: *Anisomeles indica L,* Albumin denaturation, Anti-inflammatory activity, Phenol, Alkaloid and Flavonoid.

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DETERMINATION OF ANTIBIOTIC RESISTANCE CAPACITY OF *KLEBSIELLA PNEUMONIAE* STRAINS IN DIABETIC PATIENTS.

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Abstract: Antibiotic resistance is a form of drug resistance whereby some (or, less commonly, all) sub- populations of microorganisms, usually a bacterial species, are able to survive exposure to one or more antibiotics. *Klebsiellapneumoniae* is a Gram negative, non-motile, encapsulated lactose fermenting facultative anaerobic rod-shaped bacteria with a prominent capsule and is responsible for causing urinary tract infection (UTI) in diabetic patients. In the present work, antibiotic resistance capacity of *K. pneumoniae* strains (MA1, MA2, MA3, MA4, MA5) from diabetic patients were studied using standard antibiotics such as Gentamycin, Neomycin, Kanamycin, Trimethoprim and Oxacillin by Kirby Bauer disc diffusion assay. The results implied antibiotic resistance capacity of strains to varying extents with total resistance against trimethoprim and oxacillin by all the five strains.

Keywords: Diabetes, UTI, *Klebsiella pneumoniae*, Diffusion assay, Antibiotic resistance.

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ANTIDANDRUFF ACTIVITY AND GC- MS ANALYSIS OF ESSENTIAL OIL OF *MANGIFERA INDICA.L* SEED KERENEL

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Abstract: *Mangifera indica.L*belongs to the family *Anacardiaceae.* Mango seeds kernel oil and its derivatives are of much important in various industries including cosmetics, Pharmaceuticals etc. In the present study, compounds present in the essential oil of mango seeds (Neelam Variety) kernel extracted by hydrodistillation method was characterized by GC-MS and also assessed for its antidandruff activity against *Pityrosporum species, Aspergillus niger, Aspergillus fumigates, Aspergillus terreus, Candida albicans and Aspergillus flavus*isolated fromthe scurf samples of selected volunteers. The results revealed significant antidandruff activity with highest zone of inhibition against *Pityrosporum species* (20mm) which was above the zone of inhibition shown by the standardantibiotic nystatin(17mm). GC- MS analysis reported the presence of 22 peaks with Octadecenoic acid, Methyl ester, (E) (36.05%) as the active compound.

Keywords:*Mangifera indica.L,*Essential oil, GC-MS, Antidandruff activity.

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RADIOPROTECTION STUDIES USING *MORINGA OLEIFERA* LEAF EXTRACT IN THE BLOOD CELLS OF *PANGASIUS SUTCHI* IRRADIATED WITH CO^{60} GAMMA RADIATION

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Abstract: All living organisms are exposed to some level of ionising radiation in their lifetime. Naturally occurring radionuclides and radioactive effluents released either accidentally or intentionally are sources of radioactivity in the aquatic environment. Furthermore, the Chernobyl nuclear disaster and the Fukushima disaster serve as wake-up calls for radiation protection for humans and the environment. Fish species respond to genotoxic agents in the same way that higher vertebrates do, making them an excellent model organism for estimating the teratogenic, mutagenic or carcinogenic substances to humans. Synthetic compounds have been used to counteract the harmful effects of radiation on living cells, but these synthetic compounds may also be harmful to the organism being treated. Herbal formulations are thus being investigated as a treatment option. In this regard, *M. oleifera's* antioxidant properties could be attributed to their ability to act as direct scavengers, neutralising free radicals. 30% ethanolic extract of *Moringa* (130 mg/kg body weight) showed a slightly lesser radioprotective effect than the approved synthetic radioprotective drug, Amifostine (80 mg/Kg body weight), but the same concentration of *Moringa* had shown an increased radioprotective effect than natural plant phenolic antioxidant compounds such as kaempferol and quercetin (both with 20 mg/ Kg body weight concentration).

Keywords: *Moringa oleifera,* Amifostine, Quercetin, Kaempferol, Cytotoxicity

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LABORATORY SCALE PRODUCTION OF VIRAL TRANSPORT MEDIUM TO PRESERVE AND TRANSPORT BIOLOGICAL SPECIMENS FOR VIROLOGICAL INVESTIGATION AND VALIDATION USING REAL-TIME POLYMERASE CHAIN REACTION

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Abstract: The viruses are the leading cause of world epidemics and pandemics resulting in the depletion of commercially available inventories of swabs and other consumables creating a huge demand during these periods.The viral transport media was formulated using the CDC protocol in the laboratory using Hanks balanced solution, gelatine, antibiotics and phenol red.The prepared medium is assessed by sterility test, pH meter and RT-PCR.The main aim of the study is to produce VTM and check the viability of the cell using internal endogenous control. It shows that there is neither contamination nor significant changes in the viral transport medium. It suggested that the viral transport medium formulated in the laboratory is an indigenous,cost effective and viable. Hence further research can be carried out to develop this into a commercially available pharmaceutical product.

Keywords: RT-PCR, VTM, CDC.

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BIOREMEDIATION OF SELECTED TEXTILE DYES USING *STAPHYLOCOCCUS HOMINIS* SFT3 ISOLATED FROM TEXTILE INDUSTRY EFFLUENT

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Abstract: Kanchipuram and Tirupur are considered as the major textile industry hubs in Tamil Nadu and obviously most vulnerable to environmental pollution because of their xenobiotic compounds. It is a proven fact that textile effluent's native microbial diversity is definitely a better choice for bioremediation of wide variety of textile dyes because of their better adaptability and resistance to toxicity, which makes it an appropriate candidate for the decolourization of textile effluents.With this view, 55 bacterial strains were isolated from effluents, soil and sludge collected from the Kanchipuram and Tirupur region. All the strains were screened for Methylene Blue (MB) and Malachite Green (MG) dye degradation by plate assay method. The results revealed that one bacterial strain SFT 3, which showed promising dye degradation potential was selected for further studies. Among the different cultural and medium components tested, 1% glucose and soybean meal at pH 7 was found to influence dye degradation. Strain SFT 3 was identified as *Staphylococcus hominis* by 16S rRNA sequencing. Degraded products were further analysed by FTIR and GC-MS analysis. Evaluation of toxicity profile of MG was done by phytotoxic assay on *Vigna mungo* and cytotoxic assay on human cell line (MCF 7) came out with the propitious results when compared to the parent MG. The main objective is to implement bioremediation on a large scale, which can control environmental pollution to a greater extent thereby leading to a sustainable and healthier living.

Keywords: Bioremediation · Malachite Green · Methylene Blue · *Staphylococcus hominis* · Kanchipuram, Tirupur and Toxicity assay.

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SCREENING FOR ANTIBIOTIC RESISTANCE GENES IN FRUIT EATING BATS IN MADRAS CHRISTIAN COLLEGE

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Abstract: Antimicrobial Resistance (AMR) occurs naturally over time, through genetic changes, misuse and overuse of antimicrobials causing microbes to no longer respond to medicines making infections harder to treat. Bats (Chiroptera) are increasingly recognized as natural vectors for a number of zoonotic pathogens and favourable hosts for zoonotic infections. Enteric pathogens found in bats are often considered to originate from the bats' diet and foraging habitats. Some bacterial pathogens common in human and animal diseases, the pathogenic potential has been confirmed for bats. Madras Christian College has a considerable amount of bat population, which has never been tested for presence of antimicrobial resistance. Hence in the present study,faecal samples were collected from the bat infested trees in MCC. The DNA was extracted from the bat faeces using Qiagen - DNeasypowerSoil Pro kit. Extended spectrum beta lactamase genes were amplified using Polymerase Chain Reaction with selected primers. This study has shown that with the detection of Extended spectrum beta lactam resistance genes which are of multidrug resistance, there is a potential threat in the community to enter into the food chain of other wildlife, as hundreds of bats are present in Madras Christian College campus.

Key words: Bat, Antibiotic resistance, ESBL, Madras Christian College, DNA Extraction

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STUDY OF SYNERGIC EFFECT OF *PSIDIUM GUAJAVA* WITH *MANGIFERA INDICA* LEAVES EXTRACT AGAINST THE HUMAN HEPATOMA G2 (HEPG2)

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Abstract: Cancer is a multifaceted and a heterogeneous disease. Researchers are focusing on medicinal plants for new therapeutics with less side effects. *Psidium Guajava* (Guava) and *Mangifera indica* (Mango) leaves used in folk medicine have ethnomedicinal applications. The current study is aimed to evaluate the combined effect of guava and mango. Leaf extraction was done in three different solvents of increasing polarities (Ethanol Extract-GMEE, Ethyl Acetate-GMEA and water-GMDW) to examine the antioxidant activity using DPPH and FRAP assay and anti-inflammatory activity using albumin denaturation and membrane stabilization assay. The efficacy of these extracts was tested for anti-cancer potentialagainst the liver cancer cell line compared to human normal cell lines through MTT assay. Phytochemicals were analyzed using standard method. Of all the three extracts tested, those from GMDW exhibited strong antioxidant potential in free scavenging activity at high concentration 100 µg/mL in DPPH and FRAP (IC_{50} value; 57.29±7.519 µg/mL and 71.6±9.760µg/mL respectively). The lowest IC_{50} value (31.508±2.406 µg/mL and 46.071±6.079 µg/mL respectively) observed in the albumin denaturation and membrane stabilization assay. The results of anticancer activity with GMDW working on HepG2 revealed that the cell viability increased in low concentration 15.625 µg/mL with 93.402% at high concentration 250 µg/mL with 19.873% the viability of cell decreases (IC_{50} value 64.395±11.67 µg/mL). Phytochemical study showed good sources of bioactive compounds. This study is evident that combined leaf extract of guava and mango with distilled water has strong potential antioxidant, anti-inflammatory and anticancer activity with lesser side effects.

Keywords: *Psidium guajava, Mangifera indica*, Phytochemicals, GCMS, Antioxidants, Anti-inflammatory, Anticancer.

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A PRELIMINARY APPROACH TOWARDS BIOREMEDIATION FOR THE REMOVAL OF LEAD ON AN INDUSTRIAL AND RESIDENTIAL AREA OF CHENNAI- MANALI

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Abstract: The extensive use of chemicals like pesticides, herbicides, insecticides have aided in the accumulation of chemicals in the soil and cause soil pollution. This will ultimately affect human life, in the near future. Soil pollution is also caused due to increasing industrial activities, agricultural runoff, improper waste management and so on. This results in the aggregation of pollutants like contaminated organics and heavy metals in the soil which leads to secondary effects like decrease in land productivity, water scarcity and climate change. As a solution for this problem, this study focuses on exploiting the microbial metabolism of *Pseudomonas sp.*Inorder to remove the heavy metals from the soil. Iron nanoparticles immobilized with *Pseudomonas sp.* are synthesized accordingly to remove a targeted heavy metal from the soil. The removal efficiencies however will depend on the nature of the soil, concentration of the pollutant and the dosage of the magnetic beads. The concentration of lead present before and after the experimental trial were measured using ICP - OES. The maximum removal efficiency of lead using the synthesized magnetic beads was observed in the pH range of 7.6 to 8.0 in the temperatures 24^{o}C to 28^{o}C. The present study will thereby help us to understand the removal efficiency of *Pseudomonas* immobilized iron magnetic beads as a potential bioremediation material in the long run which could be used as a sustainable solution for soil pollution.

Keywords:Soil pollution, Ironnanoparticles, *Pseudomonassp*, Bioremediation and Sustainability.

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BUTTERFLIES OF ADYAR ECO-PARK BASED ON THEIR ABUNDANCY AND STATUS SURVEY.

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Abstract: Butterflies are stunning and beautiful flying insects that are included in the second largest order Lepidoptera. They play dual roles as good pollinators and bio-indicators. Large butterfly communities are attracted by the regions with undisturbed plants and a high floral range. The present study work was carried out at Adyar Eco-Park, which has a total area of about 358 acres. The present study deals with the abundancy and status survey of about 72 species of butterflies belonging to 5 different families. They were observed, identified and photo documented along with their host and nectar plants by using the line transect counting and direct visual counting method from January 2021 to December 2021. Fixed transects were chosen in which each transect covered most of the study area. At each fixed transect, varieties of species occur more or less in numbers among all over five families. Butterflies observed were divided into 5 groups based on their abundancy and sightings such as very common, occasional, rare during the study period. The present study provides information for designing the conservation measures in the study area.

Key words: Butterflies, Adyar Eco Park, Abundancy, Status survey.

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COMPARATIVE STUDY OF AQUATIC AVIAN DIVERSITY BETWEEN PULICAT LAKE AND ADYAR ECO PARK, TAMIL NADU.

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Abstract: Wetlands are one of the most thriving ecosystems in our environment. Their value is gaining more and more needed attention as it contributes to a healthy environment in many ways. They play an important role for local flora and fauna, as well as for the societies that resides around and outside the wetlands. They are highly diverse ecosystems and are exposed to various threats especially with regard to bird species. Due to the presence of ample shelter and lack of large predators, wetlands make a desirable layout for birds to refuel and rest during migrations. Wetlands have an immense amount of aquatic bird species, which are born, reproduced, feed, and die in wetlands. Two such diverse ecosystems were taken as the study areas: Pulicat lake and Adyar Eco-Park. Pulicat lake is the second largest brackish water lagoon in India. It is an unrestored ecosystem which harbours rich, floristic treasures and faunal diversity. The banks of the lagoon are suitable nesting sites for terns, gulls and waders. Adyar Eco park, a restored ecosystem of Coromandel Coast with freshwater ponds, brackish water areas, mangroves, mudflats, dunes and islands. This place has been a substantial link for wading birds on their annual migrations which feed on the coastal mudflats. The aquatic avian fauna of the unrestored Pulicat wetland and restored Adyar Eco Park were observed and documented from July 2021 – November 2021. The observation of the birds was carried out by point count method. Random sites were chosen on the study areas and birds of various species were counted around a 20m radius from the point of view. Water quality, pH, temperature, salinity, vegetation and size of the areas were also analysed. As a result, 22 species of aquatic birds were recorded in Pulicat and 20 species were found in Adyar Eco Park.

Keywords: Wetlands, Aquatic avian species, Diversity, Pulicat lake, Water quality.

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INVESTIGATION ON THE EFFECT OF CRUSHED SEASHELLS IN IMPROVING GARDEN SOIL TEXTURE

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Abstract: In the maintenance of the garden beds mulching is the essential process. Regular mulching process regulates and maintains the moisture of the soil, maintains root temperature and controls the weeds. It also improves the texture of the soil, such as balancing pH, moisture and organic matter. Crushed seashells could be utilized for effective mulching. The present Study aims to study the texture of seashells and also utilizing seashells for or excellent garden hack and the seashells serves to control the Soil insects.

Key Words: Seashells, Mulching, Weed Control, Insect control and Organic matter.

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WATER CONTAMINATION IN TEA GARDENS AREA: A CASE STUDY IN SELECTED TEA PLANTATION FROM SOUTHERN WESTERN GHATS-TAMIL NADU, INDIA

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Abstract: Tamil Nadu is one of the major tea producing states in India. The soil leaches agrochemicals into drinking water sources, which contaminate them. The right to safe drinking water is a basic human right irrespective of a person's socio-economic status. In Tamil Nadu,tea is produced mainly in the district of Nilgiris and Valparai taluk of Coimbatore, making up approximately half of its total output of Tamil Nadu. The Nilgiris mountains lie on the border between Tamil Nadu, Keralaand Karnataka, but are primarily found in the district of Nilgiris, Tamil Nadu. A huge amount of agrochemicals is used in tea gardens for high yield, but their impact on soil and water is ignored. Tea plant associated water bodies are highly polluted. Stream water is the main source of river important tributaries. A growing population and industrialization have resulted in deteriorating the ground water quality of this area which has been assessed to see the suitability of groundwater for drinking purposes. There is an urgent need to conserve the elixir of life to reduce this pressure on the streams. To ensure the safety of the streams, a strong legislation clause is necessary with tight vigilance and people contributing to efforts towards its safety. BIS, EPA and WHO standards were used to analyze the data.

Keywords: Physico-Chemical,Parameters,Heavy-metals, Lakes, Water quality, ICP-MS.

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PCR BASED DETECTION OF BIOCONTROL GENES IN PLANT GROWTH PROMOTING BACTERIA (PGPB)

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Abstract: The detection of the genes in PGPB encoded for the production of antibiotics enable us to comprehend the molecular mechanisms involved in biocontrol of plant diseases. Moreover, polymerase chain reaction (PCR) facilitates the identification of the biosynthetic genes. The biocontrol genes such as 2,4-diacetylphloroglucinol (DAPG), pyrrolnitrin, pyoluteorin, bacillomycin D, fengycin and iturin A were detected in the genomic DNA of *P. aeruginosa* MML2424, *B. subtilis* MML2406, *B. amyloliquefaciens* MML2547, *B. tequilensis* MML5816, *B. vallismortis*MML5820 and *B. velezensis* MML5745 isolated from rhizosphere and phyllosphere of turmeric. The gene-specific primers were synthesized and the reactions were performed in an automated thermal cycler. The amplified biosynthetic gene cluster primers showed corresponding base pair bands to the respective biocontrol genes. The PCR products were analyzed with 1 kb DNA ladder as a marker. Particularly, the amplified bacillomycin D gene of *B. subtilis* MML2406, *B. amyloliquefaciens* MML2547 and fengycin gene of *B. subtilis* MML2490 were sequenced and deposited in the GenBank database of NCBI.

Key words: Plant disease, Biocontrol, Gene, PCR

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BIODEGRADATION OF MONOCROTOPHOS BY INSECT GUT MICROBE AND SOIL ISOLATED MICROBIOME.

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Abstract: Pesticides are widely used in preventing and controlling the pests of various crops. The continuous application of these pesticides causes serious threats to human health and the environment. Many pesticides like Chlorophirophos, imidacloprid, deltamethrin, endosulfpon, monocrotophos, etc., were used as an effective pesticide. The persistence of pesticide residues in the soil will decrease the quality of the plant and also makes the soil infertile. Therefore, it is highly important to explore an alternative to degrade the pesticide. Thus, the present study focuses on degradation of Monocrotophos, an organophosphate insecticide by microbiome. Monocrotophos is used principally in agriculture due to its economic cost. But the pesticide residues in the soil should be degraded before the next plantation, to avoid the soil infertility. So, one of the effective biological methods of degrading pesticide is by employing insect gut microorganisms and soil microbiome. This novel way of biodegradation of pesticide will pave the way for a sustainable environment in an eco-friendly manner.

Keywords: Biodegradation, pesticide, monocrotophos, insect gut and soil microbiome.

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USE OF *MORINGA OLEIFERA* SEEDS AS A NATURAL ADSORBENT FOR TREATMENT OF DAIRY AND PETROLEUM EFFLUENTS.

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Abstract: Population growth, rapid urbanization and industrial growth have all contributed to the escalation of pollution levels across the globe. Companies that treat water employ synthetic or natural coagulants. The polymers used in the manufacture of synthetic coagulants contain contaminants that are harmful to human health. However, naturally occurring coagulants are primarily considered safe for humans. Dairy and Petroleum industries are considered to be major contributors to environmental pollution. Hence, an effort was made to remediate the effluents from the dairy and petroleum industries with *Moringa oleifera*. Petroleum and Dairy effluent samples were collected and treated with seed extract of *M.oleifera*. Techniques were used to analyze physico chemical parameters of treated and untreated samples by following standard methodology. Following *M.oleifera* treatment, TS, TSS, TDS, phosphate, alkalinity, turbidity, hardness, ammonia, nitrate, chloride, phosphate and heavy metals were decreased drastically among various physico-chemical characteristics. As *M. oleifera* seeds are easily accessible, affordable, sustainable, renewable, and eco-friendly. They can be used for the treatment of water in developing countries.

Keywords: Seed Extract, Dairy Effluent, Petroleum Effluent, Bioremediation, *Moringa oleifera.*

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ANTIMICROBIAL, ANTIDIABETIC AND ANTICANCER ACTIVITY OF PIPER BETEL (BETEL LEAF)

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Abstract: The present investigation was conducted to study the phytochemical analysis, antibacterial, antifungal, antidiabetic and anticancer activities of methanol extract of Piper betel. Piper betel leaves are a good source of phenolic compounds and possess antioxidant, activity, ability to reduce blood sugar, protection against both gram positive and gram negative. The antimicrobial activity was evaluated by using agar well diffusion method. Agar disc diffusion method was performed for antifungal activity, antidiabetic activity was carried out through alpha-amylase inhibition assay and MTT assay for anticancer activity. The results of phytochemical screening showed the presence of bioactive components such as Carbohydrates, Tannins, Flavonoids, Phenol, Coumarins. The Antibacterial activity against *Escherichia coli* showed the zone of inhibition varying from 6.6 to 11.2mm and with *Klebsiella* sp. showed the zone of inhibition varying from 9.3 to 17.4mm. Zone of inhibition recorded in *Klebsiella*sp was high when compared to *Escherichia coli*. The Antifungal activity reveals a significant zone of inhibition against *Candida tropicalis* varying from 0.6 to 3.2mm and *Trichoderma* varying from 9.3 to 17.4mm. The zone of inhibition recorded in *Trichoderma*sp was high when compared to *Candida tropicalis*. The antidiabetic activity showed 20.81 in 1000µl concentration 5.19 in 200 µl. The result of anticancer activity with *Piper betel* working on PC3-Prostate cancer cell-line reveals that the cell viability increases in lower concentrations 3.4µg with 98.4% with high cell viability. At higher concentration 32.4% in 1000µg the viability of the cell decreases. This study is evidence that *Piper betel* has antimicrobial, antidiabetic, anticancer activities with less side effects.

Keywords: Piper betel, *Escherichia coli*, *Klebsiella* sp., *Candida albicans*, *Trichoderma*, PC3-Prostate cancer cell-line.

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CHARACTERIZATION AND ANTIBIOGRAM PROFILING OF PATHOGENIC BACTERIA FROM SOIL

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Abstract: The microbial load of the pathogenic bacteria in the soil directly influences environmental habitats. Three samples were collected from three different parks in north Chennai. All samples were transferred to the microbiology laboratory for the isolation of microbes. The soil samples were reconstituted in the sterile distilled water and was cultured on Nutrient agar, Blood agar and MacConkey agar. The plates were incubated at 37°C for 24 hours. The colony morphology was examined and was performed by Gram staining. The microbes were identified using standard phenotypic confirmation methods. The antibiogram profiling of the isolates were examined by Kirby Bauer Disc diffusion method using antibiotics classes recommended by CLSI guidelines, 2021 and graphically depicted by mean and t test. The findings of the present study showed the presence of Gram-positive cocci and Gram-negative Bacilli with few resistant isolates. Thus, by identifying and characterizing the pathogenic bacteria from the soil which indicate that it could be a potential threat and could pass from one person to another and by doing the antibiogram profiling of the bacteria the disease could be prevented and treated.

Keywords: Soil, Bacteria,Isolation, Bacterial pathogen and Drug resistance

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EXTRACTION OF CRUDE PROTEIN FROM EARTHWORM (*LAMPITO MAURITII*) AND ASSESSING ITS ANTITHROMBOTIC ACTIVITY

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Abstract: Earthworms are beneficial residents of the soil. Earthworms break down dead and decaying organic matter into rich humus soil, thereby supporting plant growth.In the present study, the crude proteins are extracted from the earthworm and the antithrombotic activity of the same is assessed. The Earthworms were collected from the garden of J.B.A.S College in a perforated container along with some amount of soil. The protein was extracted from the earthworm by dissolving the lyophilized earthworm powder in HEPES Buffer and precipitating the protein using ammonium sulfate. The presence of protein was confirmed by total protein test and the presence of thrombolytic enzyme was confirmed using SDS-PAGE.Thrombolysis is the process of breakdown of blood clots formed in the blood vessels.The antithrombotic activity was assessed using clotted blood present in a microcentrifuge tube. Clot lysis was done by addition of different concentrations of the protein to the clotted blood. It is found that as the concentration of the active compounds in the extract increases, the percentage of clot lysis also increases. This assay confirms the antithrombotic activity of the protein extract. In future research, these crude proteins can be purified for further extensive studies.

Key words: Crude protein, *Lampito maurutii*,Protein precipitation, Antithrombotic activity, SDS-page and Clot analysis.

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IMPACT OF FUMIGATION ON COMMON BACTERIAL AND FUNGAL CONTAMINANTS OF MICROBIOLOGY LABORATORY

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Abstract: Microbiology laboratories specialize in the isolation, cultivation and identification of microorganisms. Microbiology lab counters and instruments are most susceptible to contamination from indoor contaminants. Bacteria such as coagulase-negative *staphylococci (CNS),* Gram-positive Bacilli *(Corynebacterium sp), Micrococcus, Bacillus subtilis, Staphylococcus aureus,* and *Diphtheroids* are some of the most common bacterial contaminants. The most common fungi found in all types of laboratories are the genera *Alternaria, Aspergillus, Cladosporium, Penicillium, Rhizopus. etc*. Sterilization should be performed to remove such organisms from the laboratory. Gassing or Fumigation is the process by which fumigants that are chemicals at the required temperature and pressure, can become gaseous in sufficient concentrations, making them lethal to microorganisms. Fumigants like formaldehyde, potassium permanganate, peracetic acid quaternary ammonium compound etc., with broad biocidal activity can affect microbial communities that contaminate laboratories. It is often found that laboratory contaminating microbial communities make a relatively rapid recovery following fumigation. However, recently it has been found that repeated application of fumigants over time can have greater and longer lasting impacts on microorganisms than single fumigation events.Fumigation process depends on room size, temperature and exposure time.

Keywords: Microorganisms, Laboratory,Contaminants, Fumigation, Bacteria and Fungal Sp.

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SYNTHESIS OF *PSEUDOMONAS AERUGINOSA* IMMOBILIZED IRON NANOPARTICLES FOR THE REMOVAL OF LEAD FROM THE POLLUTED WATERS OF ENNORE, CHENNAI

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Abstract: Ennore Creek, a tidal estuary located in the north-eastern part of Chennai, is the point of confluence of the Kosasthalaiyar river and the Bay of Bengal. It is an extremely sensitive ecosystem that supports a variety of floral and faunal life by acting as a transition zone between inland freshwaters and the sea. Unfortunately, North Chennai for many decades has been the hub of numerous industrial activities. Water pollution due to heavy metals and toxic effluents released by industries and human activities threatens to destroy not just the biodiversity but also the livelihood of local fisherfolk communities whose existence depends on the creek. The present study aims to conduct a preliminary assessment of the current hydrological scenario of Ennore. Further, the study intends to investigate the efficiency of *Pseudomonas aeruginosa* immobilized iron nanoparticles to remove lead, one of the most common heavy metals found in polluted waters, at varying concentrations, temperature and pH and plans to propose bio remedial measures using the same. Restoration of the creek is of paramount importance to maintain its ecological integrity and to protect the communities who depend on it for survival. The study is in progress and the results would be discussed later.

Keywords : Ennore, Iron nanoparticles, Lead Pollution, Heavy metals.

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SEASONAL VARIATIONS OF SPIDER DIVERSITY IN THE PADDY FIELD OF NAMAKKAL DISTRICT OF TAMIL NADU, INDIA

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Abstract: The current study examined spider diversity in agricultural settings, particularly paddy fields at Anichampalayam site-I, NanjaiEdayar site-II, and Pandamangalam site-III, Namakkal District, Tamil Nadu, India. The diversity analysis revealed that 20 different species of spiders were found, with the Araneidae family having the greatest seasonal dominance, followed by the Gnaphosidae, Hersiliidae, Lycosidae and Oxyopidae. In total, 4,679 spiders were spotted in a few carefully chosen paddy fields during the monsoon, winter and summer months. In all the three paddy sites studied, the winter and monsoon seasons had the highest count of spider species whereas the lowest diversity of spider species was recorded during the summer month. Araneidae reported the highest number of spider species (21%), followed by Clubionidae (14%), Gnaphosidae (12%), Oxyopidae (10%), Sparassidae (10%), Lycosidae (9%), Hersiliidae (9%), Tetragnathidae (8%) and Salticidae (5%). The Shannon-Wiener index ranges from 1.78 to 2.90, Pielou's Evenness Index is between 0.49 and 0.72 and the species density is between 8.0 and 8.7. Richness ranges from 18 to 20. In this study, Site 3 had the highest species richness of any of the studied regions. Despite their diversity, spiders are the one among the most important predators for the survival of terrestrial ecosystems.

Keywords: Agroecosystem, Paddy field, Spider diversity, Species abundance, Diversity index.

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EFFECTS OF PIPERINE ON TESTIS AND EPIDIDYMIS OF ADULT WISTAR RAT

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Abstract: Piperine is a natural compound isolated from *Piper nigrum* Linn. belongs to the family Piperaceae. The aim of this study is to study the effects of Piperine on the histoarchitecture of testis and epididymis of adult male Wistar rat. Piperine was administered to mature male Wistar rats at doses of 6mg/kg body weight and 12 mg/kg body weight for a period of 28 days. 18 adult male Wistar rats were used for this study. They were divided into three groups, each containing 6 rats: Group I (control); Group II (6mg/kg bw), and Group III (12mg/kg bw). The testes and epididymis of each rat were dissected out, processed and stained by Hematoxylin and Eosin and studied under light microscope. Piperine treatment caused a significant reduction in the weight of testis and epididymis of the group III animals. Histological studies revealed that Piperine at 12 mg dose caused severe damage to the seminiferous tubule. The weight of the caput, corpus and cauda epididymis after Piperine administration were found to be significantly decreased in the group III animals. In rats treated with 6 mg/kg body weight, epididymis and testis presented showed normal architecture. Changes in the histoarchitecture of testis and epididymis revealed that piperine may have other broader ranges of impact on the reproductive system of male Wistar rat.

Keywords: Piperine, Seminiferous tubule, Epididymis, Spermatogenesis, Spermatozoa.

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ANTI BACTERIAL ACTIVITY OF INSECT EXTRACT OF *DYSCERCUS CINGULATUS* (COTTON BUG)

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Abstract:*Dysdercuscingulatus*, is commonly known as cotton bug or the red cotton stainer, belongs to Pyrrhocoridae, family of class Insecta. It is a dangerous pest of cotton crop, but also known to infect other plant species such as okra (*Abelmoschus esculentus*) and eggplant (*Solanum melongena*). Majority of studies on these insects have focussed upon the destructive aspects of the insect, however for the first time, in the present study a different and a useful aspect has been attempted. Insects were collected from the college campus and an insect extract was prepared using hexane as a solvent. The extract was then used to test for its antibacterial activity. Well diffusion method was used to test the antibacterial activity of the extract. The insect extract at a concentration of 150 µl (100mg/ml) showed antibacterial effects against the bacterial species, *staphylococcus aureus, Escherichia coli, Klebsiella pneumonia,* and Pseudomonas aeruginosa. From these observations, for the first time, it is quite interesting to note and suggest that an insect which has attained a pest status can be of great value, as it is known to have antibacterial activity.

Keywords:*Dysdercuscingulatus,* Antibacterial activity, *Staphylococcus aureus, Escherichia coli, Klebsiella Pneumoniae, Pseudomonas aeruginosa.*

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A SUMMER CROP OF *PENAEUS VANNAMEI* USING AQUAMIMICRY WITH THREE SPECIES OF COPEPODS

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Abstract: Aquamimicry based nursery rearing carried out in cement tanks at a stocking density of 10,000 nos/m3 for a period of 30 days using 3 species of copepods namely *Dioithona rigida*, *Pseudodiaptomusannandalei* and *Evansulapygmaea*maintained at a density above 1200 nos/litre throughout the nursery. Nursery reared juvenile *P. vannamei* were stocked in lined pond at the rate of 60 nos/m^3 maintained copepod density above 1000 nos/litre throughout the culture period of 60 days attain an average weight of 20.2g with 92% survival in aquamimicry based lined pond with feed conversion ratio (FCR) of 1.28. There is a significant difference in growth, survival and FCR was noticed in aquamimicry based farming ponds compared to the control pond with average growth, survival and FCR of 12.5, 72.5% and 1.55 respectively. There are no significant changes in water quality parameters in the treatment ponds compared to control which may be due to the maintenance of copepod density throughout the culture period. The overall study shows the potential scope of aquamimicry concept during the shrimp farming practices and will improve the livelihood and efficiency of the stakeholders to do a more successful crop in a year.

Keywords: Aquamimicry, Copepods, Feed conversion ratio, Nursery, Stakeholders.

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GROWTH RESPONSE OF *LABEO ROHITA* FINGERLINGS FED WITH VARIOUS FEEDING REGIMES UNDER INTENSIVE REARING

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Abstract: Feeding trials were conducted to determine the efficiency of varying dietary protein regimes on growth of *Labeo rohita*fingerlings under intensive rearing for a period of six months. Stocking density was 20 fish/glass aquarium m^{-2} (280 litre water volume). Seven different diets were tested. Out of seven diets, three low cost based diets having (35%, 40% and 45% crude protein) and three high cost based diets having (35%, 40% and 45% crude protein) were determined against a control (rice polish) having (12% crude protein) in triplicate glass aquaria. Fish were fed daily @ 4% of wet body weight twice a day. Mean body weight gain, mean length gain, specific growth rate (sgr), feed conversion ratio (fcr) and survival rate were evaluated to determine the growth performance in different treatments. The survival rate was 100 % at all feeding levels. In aquarium fish fingerlings fed with a 45% low cost based diet showed significantly higher ($P<0.05$) weight gain (26.17g) than other diets and highly significant to control diet (9.77g). Water quality variables such as temperature, dissolved oxygen, total hardness, etc. were found approximately constant for rapid growth and survival for *Labeo rohita*fingerlings.

Keywords: Feed conversion ratio, Specific growth rate, Freshwater fish, Fingerlings, *Labeo rohita.*

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DIVERSITY OF THE GENUS EUGLENA FROM BHARATHAPUZHA RIVER, PALAKKAD DISTRICT

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Abstract: The present investigation aims to assess the taxonomy and distribution of the genus Euglena in Bharathapuzha River, Palakkad district. During the algal study, a notable diversity of Euglenoids were observed. 28 taxa were identified belonging to the genera *Euglena.* The phytoplankton diversity and environmental characteristics were analysed during the year 2019-2020. Parameters like pH, temperature, EC, Nitrate, Phosphate and Silicate were estimated. The samples were transferred into 1000ml labelled plastic containers and immediately preserved with 4% formalin solution. Each sample concentrated to 10 ml volume in the laboratory by centrifugation and this was used for slide mount for microscopic examination. Identification of phytoplankton organisms was done by standard literature. The present study revealed that species distribution depends upon the physico-chemical parameters and attained their maximum density during pre-monsoon, whereas minimum populations were observed during monsoon. The diversity profile was high during pre-monsoon and low in monsoon season. They are usually pollution tolerant and their abundance and diversity indicates the quality status of the water. The heterogeneity and diversity of phytoplankton observed in this study shows the river to be eutrophic. This is the first documented report on the diversity of euglenoids from Bharathapuzha River.

Keywords: Bharathapuzha River, Palakkad district, Monsoon, Euglena, Phytoplankton.

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EXPOSURE TO DI (2-ETHYLHEXYL) PHTHALATE ALTERS THE REPRODUCTIVE AND NEUROBEHAVIORAL FUNCTION IN MICE, *MUS MUSCULUS*

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Abstract: Endocrine disrupting chemicals are common environmental toxins that cause negative impact on hormone biosynthesis, fertility and testicular and neurobehavioral abnormalities. Di (2-ethylhexyl) phthalate (DEHP) is one of the most widely known endocrine disrupting chemical and humans are extremely exposed to DEHP in daily life. DEHP is a high molecular weight phthalate that is mostly employed as a plasticizer in the manufacture of flexible vinyl, which is then used in consumer goods, flooring, food packaging, personal care products, and medical equipment. In the present investigation, the long term effects of DEHP on the reproductive and neurobehavioral function was studied in mice, *Mus musculus*. The data suggest that the decreased levels of serum FSH and elevated serum LH leads to testicular abnormalities and fluctuations in the steroid hormones. The neurobehavioral function was evaluated using the Elevated plus maze and Y-maze test. The treated mice displayed anxious tendencies in spatial and learning memory. In conclusion, this work demonstrates that exposure to DEHP alters hormonal levels, fertility and behaviour resulting in reproductive and neurobehavioral disorders in male mice.

Keywords: Endocrine DEHP, Mice, FSH, LH and Neurobehavioral function.

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INHIBITORY POTENTIALS OF *LOLIGO DUVAUCELLI INK* AGAINST CLINICAL PATHOGENS

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Abstract: The vast and diverse range of marine organisms provides a rich source of natural products with a wide range of biological activities, such as anti-inflammatory, anti-cancer, and anti-viral properties. Marine bioprospecting has the potential to lead to the discovery of new medicines, cosmetics and other products with significant economic and societal benefits. Marine bioprospecting is the search for new natural products from marine organisms, such as algae, invertebrates and fish, with the aim of discovering new drugs, bioproducts, and other useful compounds. The applications of chemicals from marine organisms have been under extensive research recently. The dependence of marine invertebrates on innate immune mechanisms for host defence offers wide potential for development of new bioactive compounds with antimicrobial, anti-inflammatory and anti-cancer properties. Increased drug resistance warrants identification and development of novel sources with anti-microbial potential.*Loligoduvaucelli* ink has been used traditionally in food and pharmacological products. The current study investigated antimicrobial effects of *Loligoduvaucelli* ink against clinically isolated pathogens including *E.coli, Pseudomonas aeruginosa, Klebsiella pneumoniae* using agar well diffusion technique. Moreover, future studies are essential to elucidate the structural interactions of the active compounds and to evaluate its pharmacological properties.

Keywords: Marine bioprospecting,*Loligo*, Ink,Isolated pathogen and Agar diffusion technique.

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PREVALENCE OF MICROORGANISMS AND ITS ANTIMICROBIAL SUSCEPTIBILITY PATTERN FROM A TERTIARY CARE HOSPITAL IN PALAKKAD, KERALA

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Abstract: Urinary tract infection is one of the most common bacterial infections seen in clinical practice particularly in developing countries. The changing pattern of antimicrobial susceptibility of bacterial pathogens causing acute UTI is a growing problem. Hence, the knowledge of the local pattern of urinary pathogens and their susceptibility to various antimicrobials is of at most importance for selection of the appropriate empiric therapy. The retrospective cross sectional study was carried out for duration of six months, from April 2022 to September 2022 at the Microbiology Department in Ahalia Hospital, Palakkad, Kerala. The objective of the study was to find out the common bacteria causing UTI and to determine the antibiotic susceptibility pattern of the urinary pathogens from a tertiary care hospital. A total of 200 mid-stream urine samples from the suspected UTI patients were tested microbiologically and antimicrobial susceptibility tests were performed for the isolated pathogens using Kirby-Bauer disk diffusion method. The rate of culture positivity in females was 54% and in males was 45%. *E-coli* was the most frequently isolated urinary pathogen (54.5%), followed by *Klebsiella* (13%) and *Enterococcus* (9%) *Enterobacter* (5%).The most susceptible age group in females was 20-60 years and for males it was 0-5 year age group. *E-coli* was highly sensitive to Amikacin (76.14%),Imipenem(71.55%) and Meropenem (71.55%) and it was highly resistant to Ampicillin (83.4%) and Ciprofloxacin(40.36%) Cefexime (43.11%). *Klebsiella* was highly sensitive to Gentamycin, Amikacin, Meropenem and Imipenem and it was highly resistant to Ampicillin and Cefotaxime. The conclusion of the study is that higher prevalence of UTI was recorded in females. Gram negative organisms were the most commonly isolated organisms in UTI. Urinary pathogens showed resistance to commonly used antibiotics like Ampicillin, ciprofloxacin. The susceptibility and resistance patterns of urinary pathogens should be considered before starting empirical treatment for UTI.

Keywords: UTI, Palakkad, Isolated pathogens, Bacterial sp and Susceptibility.

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SCREENING AND ISOLATION OF PROBIOTIC BACTERIAL STRAINS FROM *GALLUS GALLUS DOMESTICUS*

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Abstract: Probiotics has been increasingly used in livestock and poultry industry as it can prevent the incidence of enteric diseases, in addition to improving performance and productivity. Probiotics are microorganisms, such as bacteria and yeast, that have a beneficial impact on animal health when consumed in adequate amounts. In the context of chicken feed, probiotics are added to the diet to improve the digestive health of the birds, enhance their immunity, and reduce the risk of diseases caused by harmful bacteria. Some of the commonly used probiotics in chicken feed include species of *Lactobacillus, Bacillus, and Enterococcus.* These probiotics help to establish a healthy gut microbiome, which supports nutrient absorption and digestive health. The benefits of probiotics in chicken feed include improved feed conversion efficiency, reduced diarrhea, increased weight gain, and improved egg production. In addition, probiotics can also reduce the incidence of pathogens and decrease the need for antibiotics in the production of poultry.This study was aimed at screening and isolation of probiotic bacterial strains from digestive tract of domestic chicken (*Gallus gallus domestics*). The chicken gut was smashed in PBS, serially diluted and identification of isolated strains were done through microscopic morphology, Gram staining, and biochemical tests. Survival tolerance of the isolates were tested in different pH and in the presence of bile salts. Our study identified 3 strains with potential probiotics properties. Further investigations are warranted to evaluate the isolates to be incorporated into poultry feed supplements.

Keywords: Probiotics, Gut Microbiome, *Gallus gallusdomestics,* Screening and Bacterial stains.

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EFFECTS OF MANGO PEEL EXTRACT AND MANGIFERIN ON SALT INDUCED HYPERTENSIVE RAT

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Abstract: The ethanolic extract of *Mangifera indica* Linn. has an ethno-medicinal value as an antihypertensive agent. The most active biological constituent of *Mangifera indica* is mangiferin, followed by phenolic acids, benzophenones and other antioxidants such as flavonoids, carotenoids, quercetin, isoquercetin, ascorbic acid and tocopherols. Mangiferin is the main contributor to most of the biological activities of its extract. On account of the presence of alkaloids and its antioxidant properties, it was hypothesized that *Mangifera indica* may attenuate the development of salt-induced hypertension. Wistar rats (n=6 each) were treated for 7 days as follows: control (Tc) (normal diet + water), salt-loaded (Ts) (3% salt water + normal diet), salt-extract-loaded (Tse) (3% salt water + normal diet + 200mg/kg b.w. extract), and salt-mangiferin-loaded (Tsm) (3% salt water + normal diet + 20mg/kg b.w.mangiferin). The serum electrolyte, protein and urine electrolyte profiles were estimated. The kidney and the adrenal gland responses to aldosterone secretion were studied. The findings indicate that mango peel extract and mangiferin are effective in reducing or attenuating hypertensive effects in salt-induced hypertensive rats. The Tse and Tsm groups do not differ significantly from the control group.

Keywords: *Mangifera indica*, Mango peel, Mangiferin, Hypertension, Electrolyte, Aldosterone.

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ANALYSIS OF ANTIBACTERIAL ACTIVITY OF BIO- ACTIVE COMPOUNDS FROM SHELL EXTRACT OF GOOSE BARNACLE, *LEPAS ANSERIFERA*

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Abstract: Owing to the rise in multidrug resistance among microorganisms, there is an increasing demand for the identification of new bioactive compounds with antibacterial characteristics. Crustaceans are an excellent source of potential novel medicinal ingredients, which were less explored. The current study aims to analyze the antibacterial activity of a bioactive compound from the shell extract of a goose barnacle. Following the collection and identification of the sample, the ethanolic and methanolic shell extracts were prepared and concentrated. The Kirby-Bauer technique was used to determine the antibacterial activity of the extracts against*Escherichia coli, Pseudomonas aeruginosa, Streptococcus pneumoniae* and *Staphylococcus aureus*. The best antibacterial activity was observed in methanol extract with the highest zone of inhibition against *Pseudomonas aeruginosa* and the lowest was observed against *Streptococcus pneumoniae* while in ethanol extract the highest zone of inhibition was seen against *Pseudomonas aeruginosa* and the lowest was observed against *Staphylococcus aureus*. The Thin-layer chromatography for methanol ic and ethanol ic shell extracts showed 3 and 2 bands of retention factor respectively. GC-MS for methanol extract revealed the presence of 6 compounds such as Diethyl phthalate,1; 2-Diphenyl-1,2- dimorpholi; 9-Desoxo-9-x-acetoxy-3,8,12; 2-cyclopropyl-n-2,6- dimethyl; n-Butoxycarbonyl demecolcine; 7aH-cyclopenta (a) cyclopropa. Thus, it is evident from the result of the study that the methanol ic extract of *Lepasanserifera* shell exhibited the best antibacterial activity.

KeyWords: Crustaceans, Antibacterial, Bio-active compounds, Shell extraction and *Lepas anserifera.*

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APPLICATION OF UMBILICAL CORD BLOOD TRANSFUSION IN POST COVID-19 ANAEMIC PATIENTS.

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Abstract: Discarding Umbilical Cord Blood (UCB) is common globally. In spite of various ethical issues, observing safety efficacy and improvement of anaemia in post COVID-19 anaemic patients by UCB transfusion due to its unique composition has been conducted.It was a prospective, academic, none to minimum risk experimental study. Out of 500 COVID-19, RT-PCR positive 36 anaemic patients were enrolled. The study was conducted at Department of RMTS, STM, Kolkata vide memo no. CREC-STM/2020-AS-27 dated 18/08/2020 & Department of Biochemistry & Biophysics, Kalyani University, Nadia, West Bengal. Cord Blood was collected and transfused in sterile condition according to compatibility, from Medical College and Vidyasagar Hospital, West Bengal. After transfusion the selected patients and control were monitored for 4 months.P-valuewas significant and showed median difference between Hb Follow up, statistically significant median increase in Hb (8.89 gm/dl.) when patient accepted the treatment compared to initial stage of the treatment (8.20 gm/dl). No adverse events were observed after giving Umbilical Cord Blood transfusion. Thus this study proves that Umbilical Cord Blood transfusion is beneficial for the treatment of anaemia in COVID-19 anaemic patients.

Keywords: Umbilical Cord Blood, Corona Virus Disease 19, Real-time Polymerase Chain reaction, Anaemia.

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EVALUATION OF ETHNOVETERINARY PROPERTIES OF *CARDIOSPERMUM HELICACABUM* AND *ANDROGRAPHIS PANICULATA* AGAINST BACTERIAL ABSCESS OF *FELIS CATUS*

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Abstract: A bacterial abscess in a cat (*Felis catus*) is a localized collection of pus that is caused by a bacterial infection. Abscesses can occur anywhere on the body, but are most commonly found in the skin and subcutaneous tissues. The cause of a bacterial abscess in a cat is typically a bacterial infection, often as a result of a bite or wound. It is important to treat a bacterial abscess in a cat promptly to prevent the spread of infection and reduce the risk of complications such as sepsis. Ethnoveterinary practices are often based on generations of experience and are tailored to the specific needs of local animal populations and ecosystems. Some of the common ethnoveterinary practices include the use of medicinal plants to treat various ailments, such as wounds, infections, and digestive problems, as well as the use of acupuncture, massage, and other traditional treatments to promote animal health and wellbeing. Despite their importance, ethnoveterinary practices are often undervalued and overlooked, and there is a need for greater recognition and support for these traditional approaches to animal care. Ethnoveterinary practices hold the potential to contribute to the development of more sustainable and holistic forms of animal care and can be integrated into modern veterinary practices to improve animal health and wellbeing. In the current study, Swab samples of abscess of *Felis catus* was collected and the bacteria were enumerated on an agar plate. Simultaneously, leaf extracts of *Cardiospermum helicacabum* and *Andrographis*

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*paniculata*werepreprared and analysed for the presence of phytochemicals. Various concentrations of the plant extracts were used for the screening of their inhibitory potentials against the pathogens. The results showed significant potentials of the extracts.

Keywords: Bacterial abscess, *Felis cactus,* Ethnoveterinary practice, *Cardiospermum helicacabum, Andrographis paniculata,* and Inhibitory potential.

EXPLORING THE PATHOGEN-PATHOGEN INTERACTIONS IN CYSTIC FIBROSIS AIRWAYS.

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Abstract: Cystic fibrosis (CF) is a genetic condition that is characterised by the production of thick sticky mucus within the airways. CF airways subsequently become colonised by a diverse mix of opportunistic pathogens, including the Gram negative bacteria *Pseudomonas aeruginosa* and *Burkholderia cepacia*. How different bacterial species interact with each another within CF airways and how this contributes to disease progression remains poorly understood. This study aimed to better understand the interactions between *P. aeruginosa* and *B. cepacia* CF clinical isolates in mixed species biofilms and planktonic co-culture. Initial resulted showed that there was a wide diversity in the phenotype of the CF clinical isolates studied. *P. aeruginosa* laboratory CF isolates and the laboratory strain PAO1 were shown to outcompete *B. cepacia* isolates in mixed species biofilms and in planktonic co-culture. Interestingly, no difference in the growth of *P. aeruginosa* isolates was seen in the presence of *B. cepacia*. Future work seeks to identify the compound(s) and mechanism that facilitates *P. aeruginosa* dominance over *B. cepacia*.

Keywords: Cystic fibrosis, Pathogen-pathogen interactions, *Pseudomonas aeruginosa, Burkholderiacepacia*, Biofilms.

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CADMIUM CHLORIDE INDUCED MUCIN ALTERATIONS: FOCUSED ON MANTLE EPITHELIA IN SLUG, *SEMPERULA MACULATA* (SEMPER)

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Abstract: Terrestrial slugs, *Semperulamaculata, were* exposed to cadmium chloride ($CdCl_2.H_2O$). As the exposure period was increased from 24 hrs to 96 hrs and animals were more sluggish with increased mucus secretion from the mantle. Mean LC_{50} concentration of cadmium for the slug *S. maculata* was383.5ppm, whereas the safe concentration was 34.92ppm in the environment. Bioaccumulation of cadmium in the mantle of the control group was 0.16 mg/100 gm and in the experimental group, it was increased up to 4.24 mg/100 gm after completion of 96 hrs of exposure period. By applying histochemical staining technique, it was observed that metal induction disturbs concentrations of neutral and acidic mucins to overcome toxicity stress, which may affect vital functions of the mantle.

Keywords: *Semperula maculate,* $CdCl_2$, Mantle epithelia, Histochemistry.

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IMPLICATIONS OF LAND USE CHANGE ON SPATIOTEMPORAL CHARACTERISTICS OF THE WATER QUALITY

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Abstract: Urbanization, industrialization, enhanced population and demand for water along with climate change are cumulatively aggravating the global water crisis. Knowledge and comprehension of land use and water quality nexus is an important precursor for assessing human-water interactions and sustainable management of freshwater. The spatiotemporal characteristics of river water quality are understood to be the key indicators for ecosystem health evaluation. Precisely, land use pattern is one of the prime driving forces for changes in water quality that affect differently with variation in the spatiotemporal scales. Hence, quantitative analysis of the relationship between land cover types and river water quality would contribute to better comprehension of the effects of land cover on water quality, and will also help in integrated water resources management. In the present study the water quality of Manjeera river at 11 different locations was studied. The results show that there are some different typologies of land use that affect water quality. Further, results also highlighted the spatial scale and seasonal dependence of land use on water quality, which can provide a scientific basis for land management and seasonal pollution control. Irrespective of the seasonality, the land use change -water quality nexus showed elevated concentrations in the proximity of the urban settlements. The present study could be helpful for the restoration of water quality by sustainable land-use practices in the region. Therefore, the government needs to improve the land use management to improve the surface water capacity to become one of the urban clean water resources.

Keywords: Urbanization, Land Use Pattern, Manjeera River, Water Quality, Surface water.

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NATURAL COAGULANTS FOR TREATING INDUSTRIAL WASTEWATER

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Abstract: Treatment of industrial effluents is a challenge and an enormous tedious task owing to complex composition of the wastewaters containing high loads of chemical and biological oxygen demand, turbidity, total solids and extreme pH values etc. Natural coagulants have been explored, tested and proved to be effective in treating industrial wastewaters, leading to greater attention to natural coagulants. Further, the process of coagulation is deemed to be simple and safe. In the present study, efficacy of four natural coagulants against treating pharmaceutical and steel plant wastewater was analysed. The results revealed removal of 65% of total dissolved solids, 80% removal of colour and 95% removal of turbidity. This reveals that the natural coagulants used are composed of active coagulating substances like fibre, polysaccharides and proteins that have contributed to the coagulating activity. Thus, this study shows that natural coagulants are a promising alternative for the conventional metal coagulant salts.

Keywords: Coagulants, Coagulation, Industrial wastewater, Jar test apparatus.

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THE ANTI-OBESITY AND CARDIOPROTECTIVE ROLE OF NARINGIN, A NATURAL FLAVONOIDS, IN WISTAR RATS

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Abstract: Plant secondary metabolites have enormous therapeutic role to serve for mankind. Naringin, is a natural flavonoid profoundly present in citrus fruits but mainly in grapefruit (*Citrus paradisi*) of the family Rutaceae. It has diversified anti-diabetic, anti-obesity, anti-hypertensive, anti-oxidant, hepatoprotective, cardioprotective properties. In the present study total 4 groups of rats (each containing 5 rats), *viz.* control, High Fat Diet (HFD), HFD+ Naringin (THN), HFD+ Fenofibrate (THF) respectively, were used to determine the anti-obesity role of naringin. After 4 weeks of treatment, the histochemical study of adrenal, liver, heart and adipose tissue using Sudan III & IV (Kay & Whitehead, 1934) were studied which showed deposition of lipids in the form of lipid droplets. The HFD treated group showed excess amount of lipid deposition in adipose tissue and heart tissue. Whereas, THF and THN groups showed less amount of lipid deposition in adipose tissue in respect to the HFD group. On the other hand, less amount of lipid deposition was found in THF group but in THN group, there was no such deposition recorded. The histochemical study described abnormal appearance of adrenal, liver, heart and adipose tissues in the HFD group compared to the control. Contrary, the THN group showed more promisingresults than THF which was similar to the control group.

Keywords: Natural Flavonoids, Naringin, Fenofibrate, Cardioprotective, Obesity.

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COMPARISON OF PHYSICO- CHEMICAL AND MICROBIOLOGICAL QUALITY OF A CONVERTED AND A FUNCTIONAL PADDY FIELD IN THIRUVANANTHAPURAM CORPORATION, KERALA, INDIA

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Abstract: Rice is one of the chief grains of India. Globally, the culture, cuisine and economies of billions of people have been affected by rice cultivation. Overpopulation has affected food security due to field conversions. Physical, chemical and microbial properties change due to this. A comparison of these is vital for planning measures to reclaim paddy fields. This study aimed to compare the nutritional status, physicochemical composition and microbial characteristics of a converted and a functional paddy field in Thiruvananthapuram Corporation. Soil and water samples from both fields were analyzed using standard APHA procedures. The study ascertained that both fields' soil and water parameters varied somewhat, revealing a slight variation in the concentration of essential nutrients such as N, P, K, Ca & Mg in the converted field soil, which was analyzed statistically. The results of the microbial analysis in both fields observed the presence of potassium-solubilizing bacteria (KSB), phosphorus-solubilizing bacteria (PSB) and nitrogen-fixing bacteria. By controlling the concentration of essential nutrients in converted fields, it is possible to recuperate the potential for paddy cultivation. In the current food shortage scenario, the study suggests measures to rejuvenate unused agricultural lands to tackle the situation.

Keywords: Physico-chemical analysis, Microbial Characteristics, Converted and functional paddy fields, Potassium solubilizing bacteria (KSB), Phosphorus solubilizing bacteria (PSB), Nitrogen-fixing bacteria.

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ASSESSMENT OF PHYSICOCHEMICAL PROPERTIES OF WATER IN SEWAGE FED WETLANDS, A RAMSAR SITE, WEST BENGAL, INDIA

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Abstract: East Kolkata Wetlands (EKW) is entitled as a Ramsar site and is the hotspot for large-scale wastewater aquaculture exercise. The EKW receives pollutants like heavy metal, oil, grease, solid wastes etc. through effluent of various industries like tannery, electroplating, dye and plastic industries of surroundings and alters the aquatic ecosystem. However, the continued surveillance of physicochemical properties of water and the application of an eco-friendly approach are necessary to assure safe aquaculture activity. In the current study, the seasonal variation in the physicochemical parameters of water across EKW were estimated. The water parameters like pH, total dissolved solids, dissolved oxygen, electrical conductivity, turbidity, total alkalinity, total hardness, chloride, and nitrate nitrogen of four sewage fed aquaculture systems, locally named Bheri were investigated. The study was carried out for four seasons from July 2021 to June 2022. The physicochemical parameters of water were measured following the APHA protocol. The physicochemical properties of water samples were statistically analyzed. The results of the statistical analysis indicated a significant variation in all the physicochemical parameters across the selected water bodies of EKW. The result indicates the deterioration of water quality which needs continuous monitoring to design suitable measures for multiple use of this water body.

Keywords: East Kolkata Wetlands, Physicochemical parameters, Sewage-fed Aquaculture system.

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DETERMINATION OF MICROPLASTICS IN THE BASINS OF KARAMANA RIVER, KILLIYAR RIVER AND AKKULAM-VELI LAKE, THIRUVANANTHAPURAM, KERALA, INDIA.

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Abstract: Microplastics are tiny plastic particles measuring less than 5mm, which poses growing environmental concerns due to their high environmental persistence and potential toxic effects imparted within the biological systems. Quantification of microplastics is needed for advanced studies and for pursuing management activities. This study focused on the determination and characterization of microplastics in the basin soils of some vital water channels under the Thiruvananthapuram Corporation area, including Karamana river, Killiyar and Akkulam-Veli lake. The results of this study indicated the presence of microplastics in all the samples collected. A total of 281 microplastic items with varied sizes, shapes, colors and polymer types were identified. The shapes identified were flakes, fragments, filaments, sheets and foam. The majority of the identified particles were white and the polymer type of particles varied as PP, PE, PS and Low-Density Polyethylene (LDPE). Some physical parameters, Land use Land cover (LULC), slope and the area under settlements within the sampling site's buffer zones were also determined to know its influence on microplastic abundance. This study confirms the presence of microplastics within the study areas and suggests the possible threats on the biological systems associated with the water sources.

Keywords: Microplastics, Toxic pollutants, Basin soils, Polymer types, Physical parameters, LULC (Land Use Land Cover), Buffer zones.

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INSECTICIDAL ACTIVITY OF *MUNTINGIA CALABURA* AGAINST THE *SITOPHILUS ORYZAE*- RICE WEEVIL (CURCULIONIDAE: COLEOPTERA)

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Abstract: The stored product pest is a major threat in the food industry. The nutritional value of the stored product also foreshortens by the growth of pests. The economic fluctuations are a very common criteria happening because of the infestation. Rice and wheat are the major food source of daily diet in India and endure significant damage during storage. Rice weevil (*Sitophilus oryzae*) infects rice and wheat. Resistance has developed as a result of the widespread use of synthetic pesticides and fumigants to combat stored-product insects. Hence, the objective of the current study is to evaluate the insecticidal activity of acetone leaf extract of *M.calabura* against *Sitophilus oryzae*. Insecticidal activity of MCAE (*Muntigiacalabura* acetone extract) was determined by direct contact activity to the adult pests, larvae and pupa at different concentrations. The extract exhibits mortality ratio upon the concentration variation. In other words, it can be simplified as when the concentration increases, the mortality increases. The inhibitory effects of acetonic extract of *M.calabura* on rice weevil can be researched for its potential use as a natural pesticide.

Keywords: *Muntingiacalabura*, Acetone extract, Stored product pest, Infestation, Economic fluctuation.

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GREEN SYNTHESIS OF SILVER (Ag) NANOPARTICLES AND THEIR CHARACTERIZATION

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Abstract: Silver Nanoparticles were synthesized by green synthesis method, an aqueous solution of silver nitrate with effective reducing agent of *Carica papaya* leaf extract. The structural and optical properties of the synthesized bio material were characterized by using XRD and UV- Vis spectroscopy analyses. The result of X-ray diffraction (XRD) analysis showed that Ag Nanoparticles were crystalline in nature with face centred spherical shape. UV-Vis Spectroscopy is used to study the optical property of synthesized Silver Nanoparticles, which shows that the UV-Vis spectra give surface plasmon resonance for synthesized silver nanoparticles at 425 nm.

Keywords: Silver Nanoparticles Green synthesis, *Carica papaya*, Effective reducing agent.

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INNATE PLANT BASED COAGULANTS FOR TREATING INDUSTRIAL WASTEWATERS

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Abstract: Being a basic amenity, access to safe drinking water has become challenging attributed to pollution of surface and groundwater. Among available treatment techniques, coagulation is deemed to be a simple and safe process for removing most of the impurities from water. While several chemical coagulants have proved to be effective, they also come with their own set of drawbacks. On the other hand, natural coagulants have been gaining attention owing to the fact of them being sustainable alternatives. The present study aimed to evaluate the efficiency of four natural coagulants compared against a chemical coagulant to treat two industrial wastewaters. Four doses of coagulants were tested to optimise the dose. Tested coagulants have reported 97% removal of turbidity and 30 – 40% removal of total dissolved solids and color respectively. Removal of other chemical impurities along with the aforementioned was governed by pH. Higher pH of pharmaceutical wastewaters reduced the efficiency of the coagulants. Nevertheless, the lower coagulant doses proved to be quite effective. The current results present a sustainable option for pre/treatment of industrial wastewaters.

Keywords: Industrial wastewater, Natural coagulants, Turbidity, PH and Sustainable development.

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WETLAND MONITORING USING REMOTE SENSING

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Abstract: Ecosystem services provided by wetlands are multitude such as being habitats for several plant and animal species, transformation and retention of chemicals, flood control and water storage etc. Apart from these, wetlands also contribute significantly to our society both ecologically and economically. While wetlands are threatened with multitude of dynamic forces along with factors such as urbanization, agricultural activities and climate change, constant monitoring is essential for their conservation, planning and sustainable management. Mapping and monitoring wetlands across large spatial and temporal scales is challenging. The increasing availability of remote sensing products have provided unprecedented opportunities for monitoring the wetland status. The present study aims to study the water quality of the Bisalpur wetland using Landsat 8 satellite imagery. The results of the study indicate that the different spectral band combination and individual band reflectance value are playing an important role in monitoring suspended particles of water.

Keywords: Wetland, Satellite, Spatial Analysis, Water Quality, Monitoring.

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SUSTAINABLE UTILIZATION OF FOXTAIL INFLORESCENCE- ORCHID *RHYNCHOSTYLIS RETUSA*(L) BL. THROUGH *IN VITRO* SEED CULTURE.

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Abstract: A study was undertaken for initiation of germination and growth of immature seeds from the green pods of medicinal and rare orchid, *Rhynchostylis retusa* B1. The results of the work were recorded in three different media with three different concentrations of 1 - Naphthalene acetic acid (NAA) out of the five different media with different media tested in the present study This species revealed optimal growth of 92% in Orchimax medium within 126 days. In case of Knudson C medium, 82% of seeds germinated and in Vacin& Went medium, the percentage of germination was 25%. The growth regulators added were 10% to 20% coconut water and 0.5 mg/L to 2mg/L NAA. The highest percent of germination was obtained when combined with 20% coconut water and 2mg/L NAA. The percentage of germination of seed varied in different media although all the basal media were supplemented with the same growth regulators.

Keywords*: Rhynchostylis,* Seed germination, Plantlets, Conservation.

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SELECTION OF HIGH-YIELDING RICE VARIETIES FOR IMPROVEMENT OF PHOSPHORUS USE EFFICIENCY

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Abstract: In Asia, approximately 60% of rice (*Oryza sativa* L.) cultivating on soil in rain fed areas is affected by many abiotic factors. Among them, phosphorus (P) nutrient deficiency is one of them. It is the second most essential element after nitrogen (N) in plants on arable land for its productivity. Therefore, to reduce the application of costly synthetic Phosphorus fertilizers as well as to enhance crop productivity, it is very important to identify desirable rice crops for adaptation to low-phosphorus-input environments. In the present study, two parameters (shoot and root length) were taken into account to compare among five rice varieties (ADT36, ADT43, ADT45, ADT51, IR20). These varieties were grown under control and in conditions with high, medium and low concentration. Growth of shoot and root of these varieties was higher in all treatments when compared to control. Here, the root development played a significant role in differentiating rice varieties from each other rather than shoot development. In ADT51, there was less difference between control and treatment in both shoot and root growths and only shoot length in ADT43 compared to other varieties. In ADT36 and ADT43, there was less significant difference in root length among three different concentrations of phosphorus fertilizer and this result indicates that these two varieties could grow well in low concentration of Phosphate also. Here, some rice varieties such as ADT36, ADT45 and IR20 have shown more and less growth in shoot and root development to high and low concentration, respectively. The aim of this study is to identify the rice varieties that can be utilized to improve the phosphorus use efficiency at low concentration for more rice production.

Key words: Phosphorus-deficiency, Rice varieties, ADT36, ADT43, Shoot length and Root length.

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ISOLATION, IDENTIFICATION OF ACTINOMYCETES AND THEIR METABOLITES FOR BROAD SPECTRUM ANTAGONISTIC ACTIVITY

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Abstract: The current investigation is aimed at identifying actinomycetes and their metabolites as broad-spectrum antagonistic activity. Total thirteen morphologically distinct actinobacteria strains were isolated from the farm soil and identified using biochemical and cultural characteristics. Out of these thirteen isolates, eight showed remarkable antagonistic activity against bacterial and fungal pathogens. Isolate showing highest antagonistic activity was identified by using 16S rRNA as *Streptomyces rochai.*

Keywords: Actinomycetes, Metabolites, Antagonistic activity, Pathoges and 16S rRNA.

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IN VIVO ANTITUMOUR AND ANTI-INFLAMMATORY ACTIVITY OF AN ENDOPHYTIC BACTERIUM, *BREVUNDIMONAS VESICULARIS* JAP IN SWISS ALBINO MICE

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Abstract: Endophytic bacteria residing in the host plants are identified to have numerous bioactive compounds. The present research is focused on the active compounds present in the endophytic bacteria to investigate the in vivo anti-inflammatory and antitumor activity. *Brevundimonasvesicularis* JAP has been isolated from the fresh and healthy leaves of the plant *Morindacitrifolia* L. Extraction of the secondary metabolites from the extracellular culture supernatant of isolated endophytic bacterium was carried out with ethyl acetate solvent. The active compounds in it were evaluated for anti-inflammatory property and in vivo anticancer study of bacterial extract using EAC- induced in mice. The sample exhibited anti-inflammatory activity- a higher dose depicted the reduction of paw edema followed by a lower amount compared to the diclofenac standard. The in vivo antitumor study reports that there is an increase in life span of drug treated mice of higher dose (48.83%), followed by lower dose (22.09 %) compared to standard cyclophosphamide (60.46%). Our study revealed that active compounds in the sample labeled in vivo anti-inflammatory and antitumor effects, justifying the chemical constituents present in the endophytic bacteria, may meet the criteria for the drug discovery in the future.

Keywords: Endophytic bacteria, *Morindacitrifolia*, EAC, Anti-inflammatory.

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OPTIMIZATION OF ENVIRONMENTAL FACTORS AFFECTING BIODEGRADATION OF RED C2B DYE

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Abstract: Numerous coloured wastewater discharges from the textile industry are harmful to aquatic life and humans. Azo dyes are intricate diazene compounds used in the production of food and textiles. They are extremely recalcitrant substances that cause serious environmental and health issues. Because of how frequently it is used and how challenging it is to degrade, azo dye requires special consideration. Due to their toxic, carcinogenic, and mutagenic properties, the majority of dyes and the intermediate compounds they produce are hazardous to flora and fauna. There are several methods for decolorizing synthetic dyes, most of which are based on physical and/or chemical treatment, but their use is subject to some restrictions. Due to its cost-effectiveness and eco-friendliness, the removal of colours via biological techniques has drawn particular attention. The biological system is dominated by microorganisms. Red C2B dye was used as a model azo dye in the current study. Around 87% decolorization was observed in 48 h at 37 °C and pH 7.0 under static conditions. The addition of sugar as a co-substrate increased the decolorization. The new peaks in FTIR and the extra peaks in HPLC at different retention times confirmed the dye degradation.

Keywords :- Azo dye, Bioremediation, Decolorization, Impact of dyes.

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LCMS-QTOF ANALYSIS: AN EFFECTIVE TOOL IN DETERMINING METABOLIC REPROGRAMMING AND INDUSTRIAL CONTAMINANTS IN FISH ADIPOCYTES

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Abstract: High performance liquid chromatography coupled to high definition quadrupole time-of-flight (Q-TOF) mass spectrometry was employed for lipodomic analysis and detection of environmental pollutants in fish adipocytes. Various industrial units serve as the major driver for the conduit of contaminants in the Ennore estuary test site and considered Kovalam estuary as control for comparative analysis, which is free from pollutants. LCMS-QTOF analysis executed to analyze the persisted environmental pollutants and its impact on the structures, functions, interactions and dynamics of adipocytes. Results reveal the presence of industrial, pharmaceutical components such as fendiline, benzethonium, timolol, netilmicin, zolpidem metabolite, erythromycin, bifemelane, promazine sulfoxide, acrylic acid in test fish adipocytes along with variation in the adipocyte membrane lipid (carnitine, sphinghomyelin, sphinganine and ceramide). It hints that adipocytes act as a prime depot for toxic compounds due to the lipophilic nature of these toxic elements in turn limiting the systemic toxicity. Our findings are the first to demonstrate that LCMS-QTOF analysis is an effective tool in determining lipid profiling (reflecting metabolic reprogramming) and industrial contaminants in fish adipocytes and its correlation with adipocyte maturation process. Current study highlights the source identification and eco-toxicity assessment to reduce loads of pollutants into aquatic environments favouring healthy ecosystems.

Keywords: Adipocytes, LCMS-QTOF, Toxicity, Membrane, Lipid.

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INVESTIGATING SINGLE NUCLEOTIDE POLYMORPHISMS IN GENES RELATED TO ENDOMETRIAL CANCER AND TYPE 2 DIABETES

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Abstract: Single Nucleotide Polymorphisms (SNPs) are genetic variants in the DNA and can function as important biological markers by locating disease-associated genes. Endometrial cancer (EC) is the most prevalent gynecological malignancy in the world causing approximately one lakh deaths per year. The incidence rate of EC has been increasing yearly by 2.5% and doubled in the last three decades. Type 2 diabetes (T2D) is a prevalent chronic disease that results from genetic and environmental interactions and is a major health problem, with populations affected worldwide. T2D has similar risk factors to EC, such as obesity and a sedentary lifestyle. T2D and obesity are major risk factors for EC. While associations between EC and T2D have been made in several studies, the associations remain uncertain. SNPs in*Polymerase Epsilon* (*POLE*) and *Catenin Beta-1* (*CTNNB1*) genes associated with EC and T2D were identified using online databases and investigated using PCR, RFLP-PCR, TaqMan (qPCR) assay and DNA sequencing. The genotypes of the SNPs from the TaqMan assay were heterozygous for *POLE* rs139075637 with AT alleles identified, which are contradictory to the previously published data and homozygous for *CTNNB1* rs121913228 with TT alleles identified. In the *POLE* and *CTNNB1* variants, no DNA changes were observed in the sequencing results. However, additional DNA changes were observed in rs1057519945 and rs121913399 in normal Uterus and adenocarcinoma endometroid samples. The study results indicate the presence of DNA changes in the genes and there might be similarities between EC and T2D. The results from this pilot study are important to allow for more in-depth research on a large scale to investigate further the potential links between these SNPs EC and T2D.

Keywords: Type 2 diabetes, Single Nucleotide Polymorphisms (SNPs)

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DNA BARCODING OF *RASTRELLIGER KANAGURTA, TRICHURUS LEPTURUS AND TRACHAURUS TRACHAURUS*

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Abstract: DNA barcoding is a technique used in genetics and molecular biology to identify species based on a short, standardized region of DNA. In the context of fish, DNA barcoding has become a valuable tool for species identification, especially in cases where traditional morphological identification methods are difficult or unreliable. The DNA barcode of a fish species is usually a specific region of the mitochondrial cytochrome c oxidase subunit I (COI) gene. This region is selected because it evolves rapidly and can provide sufficient variation to distinguish between species. DNA barcoding of fish has a number of applications, including Species identification, Monitoring biodiversity, Fisheries management and Food safety. Overall, DNA barcoding has become a valuable tool for the study of fish biodiversity and has wide-ranging applications in the fields of conservation, food safety, and fisheries management. The present study was conducted to generate the DNA Barcodes of respective selected fishes of commercial value. Our study aimed at establishing using cytochrome c oxidase I gene (COI) of the mtDNA of *Rastrelligerkanagurta* (Indian Mackerel), *Trichiuruslepturus* (Large head hairtail/belt fish) and *Trachurustrachurus* (Atlantic horse mackerel). Genomic DNA was isolated from fish fins and quantified spectrophotometrically. PCR amplification of three DNA samples were done with COI primers under optimum conditions. In conclusion, the results from the study not only strongly authenticated the efficacy of COI in identifying the fish species and processed fish products with designated barcodes, but also can devise and improve the strategies to manage and conserve endogenous fish species. The barcodes obtained have been submitted to the NCBI GenBank Database.

Keywords: DNA Barcoding,Species identification, COI,*RastrelligerKanagurta,TrichurusLepturus, TrachaurusTrachaurus,* PCR and NCBI

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COI GENE BARCODE GENERATION OF AVIAN SPECIES, *COLUMBA LIVIA* AND *MELOPSITTACUS UNDULATUS*

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Abstract: The DNA barcode of a bird species is usually a specific region of the mitochondrial cytochrome c oxidase subunit I (COI) gene. This region is selected because it evolves rapidly and can provide sufficient variation to distinguish between species. DNA barcoding has become a valuable tool for the study of bird biodiversity and has wide-ranging applications in the fields of conservation, food safety, and biodiversity monitoring. In the context of birds, molecular taxonomy is used to resolve taxonomic questions and to infer evolutionary relationships among species.The current study focussed on generated DNA barcodes for the traded avian species, *Columba livia* and *Melopsittacus undulatus.* Genomic DNA was isolated from bird feathers and quantified spectrophotometrically. PCR amplification of three DNA samples were done with COI primers under optimum conditions. The results obtained inferred the optimised conditions for the molecular taxonomy of the avian species respectively. The barcodes obtained have been submitted to the NCBI GenBank Database.

Keywords: DNA barcoding, COI, *Columbalivia* ,*Melopsittacus undulatus* ,PCR and Molecular biology.

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DYNAMICS AND SUCCESSION OF PHYTOPLANKTON COMMUNITIES WITH CHANGING NUTRIENT LEVELS IN TROPICAL PONDS OF *PENAEUS VANNAMEI*

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Abstract: The dynamics and succession of phytoplankton and microzooplankton assemblages and their interrelationship with water-quality parameters in 2 commercial ponds growing Pacific whiteleg shrimp, *Penaeus vannamei* at the rate of 40 nos/m^2 in Chengalpattu district, Tamil Nadu were assessed through periodic sampling during 100 days of culture. Of the many centric diatoms that were encountered during the initial stages of culture in nitrogen-rich conditions, only 2 dominant species both belonging to *Thalassiosira*sp, persisted throughout the progression of the culture to produce a healthy bloom (5 to 6 × 10^6 cells l^{-1}). Blooms of *Thalassiosira* spp. contributed significantly to the increased phytoplankton biomass towards the end of culture period, with a concomitant decrease in concentrations of ammonia and nitrate. The succession of pennate diatoms such as *Nitzschia*sp, *Pleurosigma elongatum*, *Gyrosigma*sp, *Naviculas*p and *Thalassionemanitzschioides* in moderate abundance was also discernible. Results of canonical correspondence analyses revealed that the progression of a diatom bloom, the emergence of dinoflagellates and the occurrence of intermittent blooms of the mixotrophic flagellate *Eutreptiella marina* were closely linked to factors such as higher temperature, salinity and phosphate level. Grazing by the herbivorous-bacterivorous ciliate communities, copepods and rotifer species may have controlled the blooms of undesirable groups of phytoplankton, ensuring better shrimp growth, higher survival and a lower food conversion ratio. Effective uptake of ammonium and nitrate by the blooming diatoms and phytoflagellates possibly prevented nutrient concentrations from reaching toxic levels, thereby generating an eco-friendly successful production during the culture with little impact on the environment.

Keywords: Diatoms, Nutrients, *Penaeus vannamei*, Dynamics, Phytoplankton.

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STUDY OF MARINE WATER ZOOPLANKTONS IN CHENNAI WATER BODIES

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Abstract: The present investigation aims to study the seasonal variation between physico-chemical parameters and zooplankton diversity, community structure and abundance. Three sampling stations were selected for the study purpose to analyse various factors in three sites, Pattinapakkam estuary, Kasimedu beach and Pattinapakkam beach during and after the idol immersion period in Chennai, Tamil Nadu. Statistical analyses were performed on physico-chemical parameters such as salinity, alkalinity, Dissolved Oxygen (DO), pH, temperature, nitrate, nitrite, calcium, chloride, heavy metals, and Inorganic Phosphate (IP). Temperature, pH, dissolved oxygen were recorded within the acceptable limits in marine habitat. The slight alkaline medium initiates the zooplankton bloom. Plankton was analysed by qualitative and quantitative methods. Planktons were counted in a counting chamber sedge wick rafter. The dominance of species differs in different stations due to variation in environmental factors. Rotifers were found to be higher in Sample II (36%) and I (35%) when compared to Sample III (28%). The density of Cyclopoids were more in Sample III (30%) when compared to Sample I and II. The population density of the other three zooplanktons were more or less similar in number. The present study reveals that zooplankton consists of a diverse assemblage of major taxonomic groups. It provides a clue for environmental conditions suitable for its distribution and diversity.

Keywords: Physico-chemical parameters, Zooplanktons, Population Density, Pollution.

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PHYTOCHEMICAL SCREENING AND ANTI-MICROBIAL ACTIVITY OF SEED EXTRACT OF *STRYCHNOS POTATORUM* LINN.

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Abstract: The use of natural products in healing and treatment of various diseases has been on the rise in the last few decades because of the concern about the side effects of conventional medicine. The present study deals with the antimicrobial activity and phytochemical screening of 'clearing nut tree' (*Strychnospotatorum*). The ethanolic extract of the seed powder was used for the study. The antimicrobial assay was carried out against two gram positive bacteria (*Staphylococcus aureus* and *Enterococcus faecalis*), two gram negative bacteria (*Escherichia coli* and *Klebsiella pneumoniae*) and a fungal species (*Candida albicans*) using agar disc diffusion method. The seed extract showed maximum inhibition against *E.coli* followed by *S.aureus, S.faecalis, K.pneumoniae*and*C.albicans*. The phytochemical screening showed that phenols were found to be in higher amounts followed by antioxidants, flavonoids and tannins. These results reveal that the seeds possess antioxidant, anti-inflammatory and anti-clotting activities. The seeds reflect the hope for the development of many novel therapeutic agents and antimicrobial agents against resistant pathogens.

Keywords: *StrychnosPotatorum*, Seed Extract, Phytochemical Screening, Anti-Microbial Activity, Anti inflammatory activity.

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DIVERSITY OF MEIOFAUNA ON THE SANDY BEACHES OF CHENNAI COAST,TAMILNADU,INDIA

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Abstract: Meiofauna are the tiny organisms that occupy the benthic regions of marine habitats. They can pass through a size of 500µm and retain a mesh size of 44µm. In the present study, diversity of meiofauna was studied from the intertidal region of five stations namely Royapuram, Napier, Marina, Adyar and Besant Nagar for thirteen months [Feb 2021 – Feb 2022]. Physicochemical parameters such as Dissolved oxygen, Salinity, Temperature, and ph were recorded from each stations during present study.Totally twenty groups of meiofauna have been recorded throughout the study slowed Harpacticoid copepods, Oligochaetes, Polychaetes, Isopods and Insects. High diversity of meiofauna was recorded in Marina station where low diversity was observed in Royapuram station.

Keywords: Meiofauna, Intertidal regions, Stations, Physicochemical parameters, Diversity.

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DIVERSITY AND ABUNDANCE OF AVIFAUNA ASSOCIATED WITH *SAMANEA SAMAN (JACQ.) MERR.* (RAIN TREE) IN STELLA MARIS COLLEGE

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Abstract: Bird species visiting Rain trees (*Samanea saman*) in Stella Maris College, Chennai were studied using the point count method. Fifteen species of birds, belonging to nine orders and twelve families visited the Rain trees for foraging, breeding and resting. The utilisation of different parts of the tree (base, crown and trunk) by the different species of birds was also recorded. The intense use of Rain trees by birds may be due to the availability of preferred prey and fruits as well as several factors like a wide and dense canopy, foliage structure, and the height of the tree. The study suggests that there is a significant relationship between the Rain tree and the bird species that are associated with it. Rain trees seemed to provide an ideal habitat for insectivores, omnivores, and frugivores. They were also the preferred breeding site for several bird species on the Stella Maris campus. Conserving Rain trees and perhaps planting more of them could conserve resident bird species.

Keywords: Birds, avifauna, Rain tree, Diversity, Foraging, Breeding and Resting.

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NOCTILUCA SCINTILLANS - POLLUTANT BIOINDICATOR IN MARINE ENVIRONMENT IN CHENNAI

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Abstract: Physico-chemical parameters of three different beaches in Chennai, Tamil Nadu, were determined and compared for possible interaction and correlation. Water samples were collected accordingly during and after the idol immersion period, physico- chemical analyses were tested for the samples. Results obtained from different beaches showed variations in many parameters. The total hardness, alkalinity, chloride as well as nitrate sulphate & phosphate were found to be relatively higher when compared to the permissible limit. Similarly, heavy metal ions were of lower value in all three samples, Fe^{2+} (1.0 – 0.60mg/l); Ni^{2+} (3.7 – 0.8 mg/l), but lower values Fe^{2+} (1.0 – 0.63 mg/l) and Ni^{2+} (3.7–0.7 mg/l) for the water samples. The result showed that properties of the different beaches have their respective distinct properties. This suggests that the two bodies of water have little or no interaction. Study of physico-chemical parameters in three sites influences the diversity of phytoplankton population. Planktons were analysed by quantitative and qualitative methods. *Noctiluca scintillans* species of plankton were found after the idol immersion which is one the main cause of the sea water intrusion.

Keywords: Water parameters, Phytoplanktons, *Noctiluca scintillans,* Bioindicator, Pollution.

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STUDY ON BIOCHEMICAL ANALYSIS OF KOI CARP (*CyprinusCarpio*) FISH WITH DIFFERENT FEED

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Abstract: Koi fish are an extremely popular and colourful form of the fish. In the present study an attempt has been made to investigate the different feed of ornamental fish koi carp. On the basis of analysis, the fish have been categorized with three different feeds such as commercial feed, live feed (blood worms), processed feed (dry shrimp). There were three replicates for each treatment. To study the growth and biochemical content of fishes using different feed. In conclusion blood worms have shown high levels of protein, carbohydrate and lipid content compared to commercial feed and processed feed. Consumption of this makes the fish grow nutritious and healthy.

Key words : Koi carp fish, Live food (blood worms), Commercial food, Processed food (dry shrimp), Protein, Carbohydrate and Cholesterol.

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PHYTOCHEMICAL AND ANTIBACTERIAL EFFECT OF AQUEOUS AND COMMERCIALLY AVAILABLE ROSE WATER EXTRACT *(ROSA DAMASCENA)*

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Abstract: Roses are beautiful flowers having enormous variety in colours. They have been in use since ancient times in the fields of medicine, decorations, perfumes, culinary, spiritually etc. Many studies have shown that they contain many phytochemical components. Due to this they possess anti-inflammatory, anti-diabetic, anti-oxidant, antibacterial, astringent, and analgesic activities. *Rosa damascena*Mill (Rosacea) is a well-known ornamental plant. The aim of the present work is to compare aqueous rosewater sample with that of commercial rose water sample and to study their phytochemical and antibacterial effect. The methodology followed was steam distillation method, Qualitative phytochemical analysis and agar well diffusion method. Two Gram-positive bacteria and one Gram-negative bacteria were used for this purpose. The results showed the presence and absence of phytochemical constituents. The present study also showed that the aqueous rose water extract had better antibacterial activity when compared with the commercial rose water sample. Furthermore, homemade remedies are used to overcome many health issues. This work also showed that the aqueous extract started degrading within a few weeks and it was of pure form without any mixture of chemicals. This work paves a way for entrepreneurship.

Keyword: Phytochemical, Rosewater, Paneer rose

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STUDY ON THE BIOCHEMICAL ANALYSIS ON FRESH TUNA FISH AND CANNED TUNA FISH

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Abstract: Tuna is a low-calorie and high-quality protein food, full of healthy nutrients that boost the health and metabolism and reduce fat. The high levels of omega-3 fatty acids in tuna fish may help to reduce the level of omega-6 fatty acids and LDL cholesterol that can accumulate inside the arteries of the heart. The main aim of the study is to determine the variation in biochemical constituents of fresh tuna fish and canned tuna fish. The muscle samples were collected and the estimation of protein, carbohydrates, lipids and sodium were carried out. In conclusion, fresh tuna tends to be high in protein, lipids and Carbohydrates. Whereas canned tuna is high in cholesterol and sodium. The high amount of sodium can cause blood pressure and stroke. Over-consumption of canned food can also lead to botulism, hyperglycemia and mercury poisoning.

Key words: Tuna fish, Protein, Lipids, Carbohydrates, Cholesterol, Sodium.

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ROLE OF HEAVY METALS IN ALTERATION OF GENETIC MAKE UP

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Abstract: Toxicants are man-made harmful substances like insecticides, pesticides, herbicides, fungicides etc. and many other industrial wastes which are released to the environment by various human activities. These are carcinogenic, mutagenic, allergic and endocrine disruptors. People exposed to these toxicants have a long-term health impact. Major environmental intoxicants are Arsenic, Lead, Cadmium and Mercury. Chronic exposures have been associated with diabetes, cardiovascular diseases, gallbladder cancer and various long term health hazards. Genetic variations and mutations may be caused by heavy metals which will result in species diversity and survival rates. Heavy metals have the potential to enter into the food chain and they accumulate in the human body and cause various hazardous effects as well as change in nuclear protein and DNA. Symptoms of heavy metal poisoning can be life threatening and they can cause irreversible damage. Bio-accumulation of these heavy metals lead to disruption in cellular events like growth, proliferation, differentiation and damage repair process and apoptosis. This study reviews the sources, hazardous level, toxic effect of heavy metals on human beings, how they bind to parts of human cells and prevent the organs from doing their function.

Keywords - Carcinogenic, Mutagenic, Allergic, Chronic, Hazardous and Bio-accumulation.

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SUSTAINABLE UP-GRADATION OF POULTRY LITTER INTO A VALUABLE PRODUCT

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Abstract: Poultry industry is one of the fastest growing industries in developing countries like India and South East Asian countries. This industry is producing a huge amount of solid waste in the form of poultry litter which is directly disposed off into the agricultural or barren lands located near the poultry farms. This could pose an environmental threat as the poultry litter contains massive amounts of ammonia and coliform bacteria. So the present investigation is designed to upgrade the poultry litter into a valuable product with the help of earthworm species. The poultry litter were pre-treated in a tank as it contains more amount of ammonia and other toxic chemicals. Three earthworm species *Eudrilluseugineae*, *Eisenia fetida* and *Lampito mauritii* were used for the bioconversion. The result of this experiment revealed that the poultry litter treated with *Eudrilluseugineae*was found to have significant composting activities.

Keywords: Poultry industry, Solid waste, Poultry litter, Coli form bacteria, *Eudrilluseugineae*, *Eisenia fetida* and *Lampito mauritii.*

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ETHANOL PRODUCTION FROM FISH WASTE - ON OVERVIEW

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Abstract: Fish waste has rich nutrients of Protein, Lipid, Carbohydrates, Fatty acids, and Amino acids. Fish waste is creating a pressing issue in the surrounding environment. Polluting novel solutions to implementing sustainable fish waste management practice. Fish waste leftovers and their processing by-products represent a significant portion of fish, and their disposal has a high environmental and economic impact. The utilization of fish as raw materials for the production of ethanol from waste flesh. In this context, to extract fish waste pulp for a process of ethanol production from the fish waste collected from fishing harbors and fish markets. The extraction of fatty acids from fish waste to process the bioethanol from fish waste crud. Moreover, the high value of the products makes this waste a powerful tool that simultaneously protects the environment and benefits the global economy. This research aims to provide a complete overview of the fish waste to be used as Bio-ethanol.

Key words: Fish waste, Ethanol, Biofuel, Extraction and Biorefinery.

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PHYSICOCHEMICAL PROPERTIES OF WATER IN AN INTENSIVE AGRICULTURAL REGION: A PRELIMINARY STUDY FOR WATER QUALITY

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Abstract: Leaching of fertilizers and pesticides from agricultural activities is the most common example of diffuse pollution. Further, agricultural runoff is understood to be a significant contributor for nitrogen and phosphorus pollution in surface waters. Various nutrient sources present in agricultural fields such as crop residues, soil organic matter and transformed fertilizers are likely to contribute to the diverse composition of dissolved organic nitrogen and phosphorus in the runoff, which will likely alter the surface water quality. The present study is aimed to evaluate the surface water quality along the stretch of river Godavari flowing through agricultural zones. Nearly 24 samples were collected and analysed for spatiotemporal variation in the water quality. The results revealed that the surface water alongside the agricultural zones is having higher levels of nitrogen and phosphorus with respect to the temporal variations of intense agricultural activity seasons.

Keywords: Leaching, Agricultural runoff, Water quality.

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A REVIEW ON ADVANCED GLYCATION END PRODUCTS IN AGE RELATED DISORDERS

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Abstract: Aging is a major risk factor in most diseases. The disease pathophysiology includes the accumulation of some neuronal proteins in the form of aggregates inside the cell. These aggregates need to be degraded or removed, via the protease system. Sometimes, the protein aggregates, which are protease sensitive, become protease resistant due to certain modifications occurring in the proteins. One such protein modification is the formation of Advanced Glycation End Products (AGEs). Advanced glycation is the non-enzymatic and irreversible process of macromolecules that occurs due to various metabolic stress conditions. The AGEs are formed not only in proteins but other macromolecules which lead to progression of disease. It enhances binding factors to form a complex of cell bound multi ligand receptors that leads to transcription of pro-inflammatory genes. This interaction of AGEs and RAGEs are associated with different age-related disorders like diabetic related retinopathy, nephropathy, heart problems, kidney malfunctions, cancer, Autism, Alzheimer's disease, Parkinson's disease, schizophrenia, bipolar disorder, PCO's etc. In the present review, we focused on the factors which induced AGE formation in different neurological diseases and their pathological mechanism in progression of the disease. Finally we discussed the mechanism to prevent the formation of AGEs and also ways to eliminate the already formed AGEs.

Keywords : Aging, AGEs, Neuronal proteins and Disorders.

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STUDY ON THE EFFECT OF DIFFERENT ORGANIC MEDIA ON THE GERMINATION AND GROWTH PARAMETERS OF THREE SELECTED FRUIT VEGETABLES

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Abstract: Organic farming is commonly regarded as a system for improving vegetable quality. Organic farming can be considered as a system providing good conditions to improve the vegetable quality. Nevertheless there are many possibilities to ameliorate the methods of cultivation and storage of organic crops to obtain better production and qualitative results. The aim of this work was to analyze the effects of the different organic manures namely Cow dung manure, Goat manure, *Pseudomonas* and Coconut peat with a control, on the seed germination and growth parameters of three selected fruit vegetables such as*Abelmosches esculentus, Solanum melongena* L. *and Capsicum annum*. During the growing period, *Solanum melongena* L. showed early flowering and fruit setting in Goat manure treated soil compared to other treatments. *Abelmosches esculentus* (L) Moench. showed maximum performance in Cow dung manure, goat manure and coconut peat. *Capsicum annum* L. yields maximum in goat manure and Coco peat in all aspects. It showed highest results in growth parameters when cultivated in Goat manure, while quality and quantity of fruits were better in coconut peat. The present investigation concludes that cow dung, goat manure and coconut peat are the best organic manure for the chosen fruit vegetables.

Keywords: Organic Fertilizers, Okra Chilli, Brinjal, Growth, Germination.

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VITACEAE - COMPARATIVE ACCOUNT ON SELECTED MEMBERS OF PALAKKAD

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Abstract: Taxonomy is a science; based fundamentally on morphology with the support of all interrelated sciences. Taxonomic revisions, monographs, and floras are the most important and often the only source of data for assessing the extinction risk of organisms. The process of undertaking a taxonomic revision is central to taxonomy. A revision involves restudying a group to correct or improve its diagnosis, description or phylogeny. India has one of the earliest known civilizations and plants have been studied in this part of the world from time immemorial. The flora of India is one of the richest in the world. Among this flora, the grape family, Vitaceae, is an economically important fruit family.

Keywords: Vitaceae, Systematics, Anatomy, Palynology.

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ISOLATION AND IDENTIFICATION OF BIOFLOC FORMING BACTERIA FROM MARINE ALGAE

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Abstract: Biofloc technology is becoming both popular and successful in the field of aquaculture. Biofloc acts as a source of additional nutrients, improving immunity of the culture species. In this context, there is a need to identify biofloc forming bacteria and therefore present study was undertaken. Initially marine algae belonging to *Gracilaria* sp., *Ulva* sp. and Cladophora sp. were selected to isolate microbial populations. Marine algal samples were collected from shallow waters of the coastal area of Visakhapatnam during the low tide period. The samples were surface sterilized and macerated, solution obtained was subjected to serial dilution to isolate individual colonies. A total of 12 bacterial strains were isolated. Preliminary identification of pure isolates was carried out by both culture and biochemical methods and it was observed that the majority of the organisms belong to the genus *Bacillus* and *Vibrio*. Individual pure isolates were tested for their ability of floc formation under in vitro conditions. In this experiment, biofloc was formed with strain NPZ within two days of incubation. The Strain NPZ was identified as *Bacillus cereus* based on culture and biochemical studies. By these findings, it was evident that bacterial strain NPZ belonging to the genus *Bacillus* had the ability to form biofloc, which has potential application as inoculum in the field of Aquaculture and further studies are being carried out in both *invitro* and *invivo* conditions.

Keywords: Aquaculture, Biofloc, Marine algae, *Bacillus*, *Vibrio*.

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SYNTHESIS OF SILVER NANOPARTICLES BY BACTERIAL ISOLATE *E.COLI*SP., AND THEIR ANTIBACTERIAL ACTIVITY

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Abstract: The use of microorganisms in the synthesis of nanoparticles emerges as an eco-friendly and exciting approach. The scope of the study is to derive a standardised technique to synthesizesilver nanoparticles and to assess its antibacterial activity. In the present study, the synthesis of silver nanoparticles were observed and the biosynthesis of silver nanoparticles employing the bacterium *E.coli*was reported. The multi drug resistant pathogen *E.coli* was chosen due to its highest AgNP synthesis. The higher level of nitrate reductase activity was measured at 731.24 U/ml in the 60th run with presence of (%) glucose: 0.1%, peptone: 1%, yeast extract: 0.4%, KNO3: 0.4%, pH: 7.5 at 25 ˚C and 3 days incubation period. The spectrophotometric analysis of Ag NPs at the band ƛ 431 nm for characteristic Surface Plasmon Resonance indicating the Ag nanoparticles are in spherical or roughly spherical shaped. FT-IR spectrum of AgNPs the bands observed at 1359.35 cm^{-1}, 1350.3 cm^{-1} and 1398.40cm^{-1}. $AgNO_3$ showed more effective treatment with gamma radiation after mixing than before mixing with silver nitrate solution. The AgNPs synthesis showed the antimicrobial activity for the *E.coli* measured was 18.67±2.082 diameter in zone on inhibition. The AgNPs synthesized values of MIC against the tested clinical pathogen showed the antimicrobial activity at 200 ppm for *E.coli* respectively. The antibactericidal activity has proved that AgNPs kill microorganisms at such low levels (units of ppm), does not disclose acute dangerous effects on human health, in addition to that resistance, and low cost compared to conventional antibiotics. It was found to be a cost effective and eco-friendly method.

Keywords: SilverNanoparticles,E.coli, UV-Vis- spectroscopy, TEM and Antibacterial activity.

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A REVIEW ON RECENT USE OF β - CHITOSAN IN SELECT BIOMEDICAL APPLICATIONS

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Abstract: β - chitin is an allomorph of chitin available abundantly in nature, chitosan is the deacetylated form of chitin, biomedical applications of chitosan have been established and reviewed over the years. In this review, the biomedical applications of β - chitosan researched and established in recent years will be reread.Well established biomedical applications of chitosan are available in literature, however based on the review articles β chitosan has better results when compared to α chitosan in the biomedical applications, which may attributed mainly to the structural differences between β chitosan and α chitosan. Although the source of extraction of β chitin is a waste product of the squid and cuttlefish processing, it remains an underutilized resource compared to α chitosan and therefore a dearth of research on particular applications like biomedical ones are seen, the authors suggest β chitosan would perform comparatively better than α chitosan for Biomedical applications and thus warrants greater research efforts.

Keywords: β chitosan, α chitosan, Biomedical applications, Allomorph.

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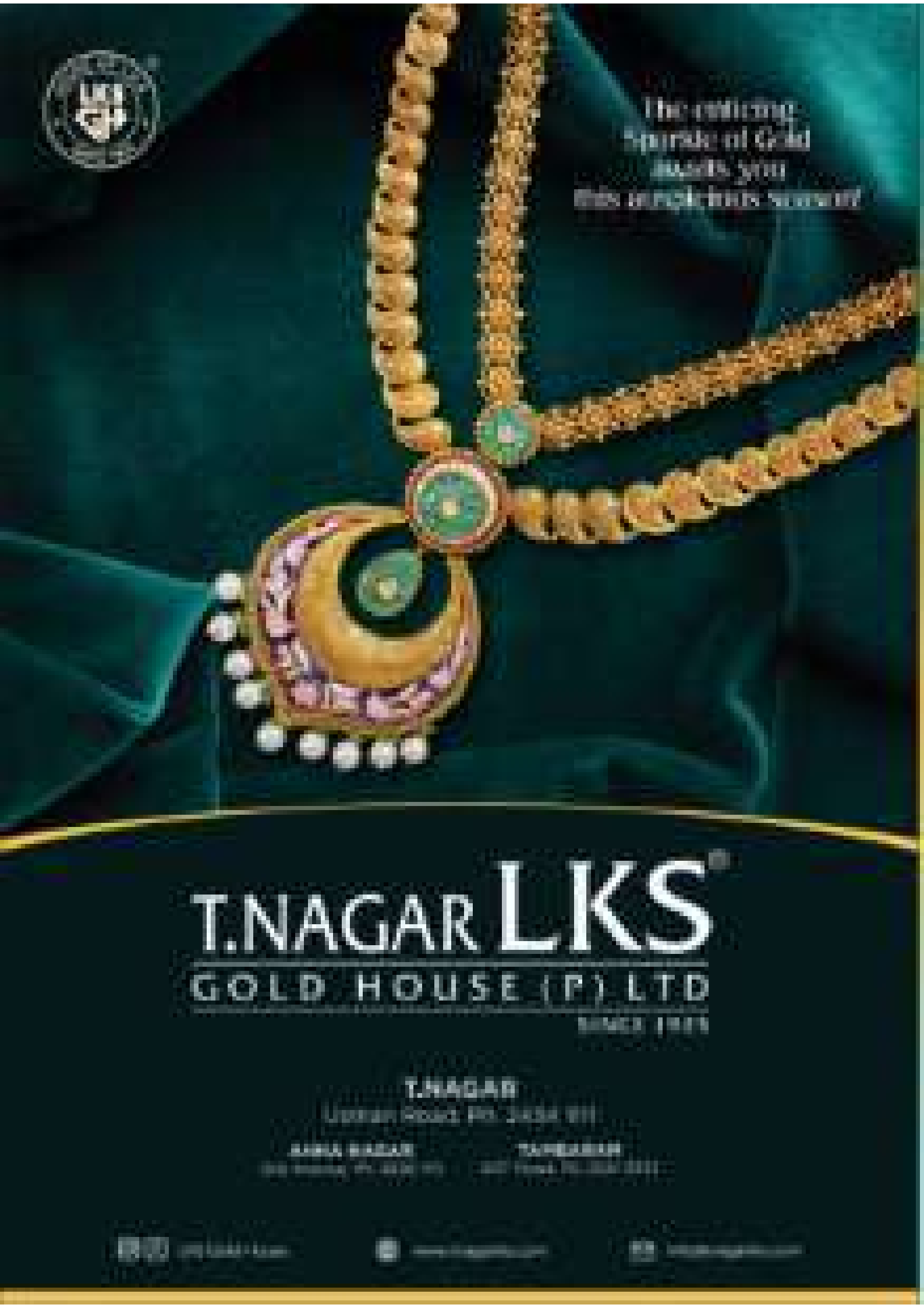
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