Second International Conference On
SOCIOECONOMIC IMPACT OF POLLUTION IN WATER BODIES AND REMEDIAL MEASURES
(ICPWRM-2025)

Scheme for Promotion of Academic & Research Collaboration (SPARC)
A Government of India initiative

EDITORS

Dr. MUTHUKUMAR KUPPUSAMY

Prof. SENTHILARASU SUNDARAM

Dr. DHANDAPANI GURUSAMY

Dr. VADIVELAN GANESAN

SECOND INTERNATIONAL CONFERENCE ON

SOCIOECONOMIC IMPACT OF POLLUTION IN WATER BODIES AND REMEDIAL MEASURES

(ICPWRM-2025)

As a part of

Scheme for Promotion of Academic and Research Collaboration (SPARC)

A Government of India initiative

Jointly Organized by

Kongunadu Arts and Science College (Autonomous), Coimbatore, India Teesside University, Middlesbrough, United Kingdom

Tamil Nadu Agricultural University, Coimbatore, India In association with

Dr. M. Aruchami Research Foundation

On

6th & 7th January, 2025

CONTENTS

About Institution

ABOUT

SCHEME FOR PROMOTION OF ACADEMIC AND RESEARCH COLLABORATION (SPARC)

The Scheme for Promotion of Academic and Research Collaboration (SPARC) is a Ministry of Education (MoE) initiative that aims to improve the research ecosystem of India's Higher Educational Institutions by facilitating academic and research collaborations between Indian Institutions and the best institutions in the world. This scheme will improve the research ecosystem of India's higher educational institutions by facilitating academic and research collaborations between Indian Institutions (overall top- 100 or category-wise top-100 in NIRF) and the best institutions in the world (top-500 overall and top-200subject-wise institutions listed in QS World University Ranking) from 28 selected nations to jointly solve problems of national and international relevance. As per the criteria mentioned above, 254 top Indian Institutes and 478 top-ranked global Institutes have been already identified. A set of 5 Thrust Areas (Fundamental Research, Emergent Areas of Impact, Convergence, Action- Oriented Research and Innovation- Driven) and subtheme areas in each thrust area have been identified for collaboration under SPARC based on emergent relevance and importance for the nation. This Scheme is expected to have a major impact in providing the best international expertise to address major national problems, expose Indian academicians to the best collaborators abroad, enable international faculty to stay in India for a longer duration, provide Indian students an opportunity to work in the world-class laboratories, to develop strong bilateral relationships in research, and improve the international ranking of Indian Institutes.

Our College being continuously ranked among top 100 colleges in NIRF Rankings every year, SPARC has recognized our Institution by sanctioning a Major Research Project titled 'Socio-economic Analysis of textile effluent pollution impact in Noyyal river and Exploration of Remediation through Algae and Graphene membrane' in collaboration with University of Exeter, United Kingdom. During the first year of this project, PI from India visited University of Exeter, United Kingdom and shared his knowledge. PI and Co-PI from UK visited our Institution and shared their expertise in the International Workshop and International Conference. 128 articles submitted in the conference were published as Proceedings with ISBN.

PROFILE OF

KONGUNADU ARTS AND SCIENCE COLLEGE

Kongunadu Arts and Science College, was established in the year 1973. The College has grown magnificently in academic stature with autonomous status having 13 Research Departments, 14 PG Departments and 24 UG Departments. Our college is an institution of high repute recognized at the National Level for its Academic and Research accomplishment. The University Grants Commission, New Delhi, conferred the Autonomous Status to our College in the academic year 2004 - 05. Recognizing the quality of teaching imparted in this college, the University Grants Commission has awarded the prestigious status of College of Excellence. The College has been Re-accredited by NAAC with A+ Grade in 4th Cycle. In the NIRF Rankings 2024, our college has secured 52nd Rank. Number of MoU's and Collaborative Research with Eminent Institutions across the globe is increasing every year which stands as proof of our Institution's Research caliber. The Institution's wide commitment to the development of innovative thinking in a culture of collaboration makes the learners an ideal venue for sharing ideas about futuristic research, which connects academics across disciplines and cultures.

The following bodies functioning in the college are actively engaged in promoting research and extension activities are Dr. M. Aruchami Research Foundation, ISCA- Indian Science Congress Association- Coimbatore Chapter, Institution Innovation Council (IIC), KASC i-Hub, KASC Tech hub, Eco Club, Bird club, NCC, NSS, YRC, RRC, Women Empowerment Cell.

The Library and Information Centre in the college has a collection of 88,000 volumes of Books, 167 Periodicals, 10,00,000 e-books (N-List / INFLIBNET), more than 6500 e-journals, 32 computers, 2 Laptops and one Mini theatre. The library is fully computerized, bar coded and functioning from 8.00 a.m. to 8.00 p.m. without any break including Saturdays and vacation. Digital Library Online public access catalogue, e-gate register are the special features, Lecture capturing System, Video Conference facilities are the latest updating in the library. KASC NDLI club is functioning effectively with more than 5000 students as members in this club. Around 65 activities were organized and received the recognition award from NDLI, Kharagpur, Kolkata.

ABOUT THE

TEESSIDE UNIVERSITY

Teesside University is a public university founded in 1930 as Constantine College. Its main campus is in Middlesbrough in the North East of England. It has five schools. The university vision is that "Teesside will be a leading University with an international reputation for academic excellence that provides an outstanding student and learning experience underpinned by research, enterprise and the professions" while the mission is that "Teesside University generates and applies knowledge that contributes to the economic, social and cultural success of students, partners and the communities we serve. Through education enriched by research, innovation, and engagement with business and the professions, we transform lives and economies". The main target groups of Teesside University are students, businesses, researchers and the public stakeholders.

The University has a long history of working with a range of organizations including small businesses, multinational companies, local and national governments, NGOs and charities, based in the UK, Europe and internationally. Teesside University aims to be an international university with a global network of partnerships that attracts high-quality students and staff from across the world. At the core of this ambition is the creation of opportunities for international experience within the curriculum and the promotion of cross-cultural understanding. As a result, Teesside aims to broaden its international activities beyond student recruitment to increase collaborative international partnership working, course development, global social progression and promote greater opportunities for students to travel in the context of their studies.

Currently the University has approximately 2,311 members of staff and 18,377 students, of which 15,830 are studying at undergraduate level and 2,547 at postgraduate. Staff and students across our University community are actively engaged in enriching society and the economy through charitable giving, volunteering, enterprise, and governance and mentoring – and through award-winning programmes of outreach activity and events. The University has an excellent record of accomplishment of widening participation to higher education in a region with high rates of deprivation and low rates of participation (the Tees Valley is the 6th most deprived in the UK). The majority of students attending the University are drawn from local communities such as these and the University has put in place a range of support mechanisms to maximize their chances of success, both in their studies and in their future employment. This support begins before students enter higher education, seeking to raise aspirations from primary school age onwards.

The University has outstanding project management experience acquired through many years of management of numerous local and international projects (see project list below). Specifically, the University is experienced in managing funded projects to successful completion, and currently participates in several Horizon 2020 projects, both as a partner and a lead coordinator. The University has also received funding from the UK Research Councils, Innovate UK (which funds academic-industry collaborations in the UK), the UK and international governments, charities, and directly funded projects and research contracts with businesses.

The Centre for Sustainable Engineering was recently formed during re-structuring of the University in April 2020, and is concerned with carrying out original research and innovation to support the process of designing and operating systems such that they consume resources at a rate that does not compromise the natural environment. The research activities of the center build upon over a decade of research excellence in sustainable engineering areas, and are principally divided into three research groups: Smart Energy and Smart Grid, Construction Innovation and Research, and Hydrogen Engineering and Decarbonization Technologies. The activities carried out within the center are multidisciplinary in nature, and members work closely with other Centres across the University.

Focus areas of research are the use of digitalization, informatics, cybersecurity, automation, energy management, artificial intelligence, distributed control and social science in energy related and construction applications. It is primarily aligned to the Universities' Grand Challenge of Forging a Smarter, Greener Industrial Economy, and secondarily aligned to Shaping the Future of Health, Care & Wellbeing. It is aligned to the following UK Government Industrial Strategy Themes and policy areas: Climate action, clean growth, driving the electric revolution, manufacturing and future materials, prospering from the energy revolution, robots for a safer world, energy from waste, transforming construction, affordable and clean energy, sustainable cities and communities, plastics recycling, circular economy, the hydrogen economy, industrial decarbonization, thermal processes aimed at high efficiency heat utilization, clean water and sanitation, emission management by Carbon Capture, Utilization and Storage.

The centre has worked with a variety of small, medium and large enterprises and partners at local, national and international level. Some recent and ongoing partnerships include: Siemens, TWI, TVCA, IBM France, IBM Israel, Servelect, Quorum Development Ltd., R2M Solutions, Nobatek, Kiwi Power, Innology, Hydrotech-energy, Elmtronics, Octopus energy, Sempcorp, Venator, Innogy, PriVida Limited, Presca, Poseidon, Sabic, DarbyTech, JBA Associates, Micropore, Revamp, BOC, AECOM, Atkins, Ryder Architects, Scott Brothers, KP Snacks, AEC3; arbnco; Norscot Ltd; Nicander Ltd; Mabbett Ltd; Kraken; Yondr

- Data centers; Thinkbriink Ltd; Clicks and Links, Applied Integration;

Teesside University is delivering the ERDF project – Tees Valley Hydrogen Innovation project aiming at supporting SMEs to develop innovative solutions for the hydrogen economy. As part of the project, it is available a hydrogen laboratory accessible to SMEs with the support of academics and technicians. The project is working with a wide range of SMEs in the design of novel solutions, including a catalyst membrane reactor. It has recently partnered with The Welding Institute (TWI) in the creation of two new industrially-focussed sustainable innovation centres, and is closely linked with the activities of the 'Net Zero Teesside' project, which will lead the way for the decarbonisation of the UK. It has links with the Brazilian Synchrotron Light Laboratory, Brazilian Centre for Research in Energy and Materials and Construction Scotland Innovation Centre, and the RENEW European Industrial Decarbonisation network. It has worked with numerous water companies, city councils and energy utilities, for example Yorkshire Water, Northumbria Water, Middlesbrough Town Council and EDF Energy.

Members of the centre have forged many national and international academic links, some recent partnerships on funded projects and collaborative research include: Federal University of Parana, University of Sao Paulo, Edinburgh University, University of Manchester, Newcastle University, Northumbria University, Durham University, University of Belgrade, Uppsala University, University of the Balearic Isles, Vellore Institute of Technology, North China Electric Power University, COMSATS University, Tamil Nadu Agricultural University, Kongunadu Arts and Science College (Autonomous), PSG College of Technology, Coimbatore.

ABOUT THE

TAMIL NADU AGRICULTURAL UNIVERSITY (TNAU)

Tamil Nadu Agricultural University (TNAU), located in Coimbatore, is a premier institution renowned for its contributions to agricultural education, research, and outreach. With a mission to advance science-based agriculture, TNAU supports sustainable farming practices and fosters agri-based entrepreneurship. The university's efforts align with its vision of empowering farmers and agricultural industries to thrive in national and global markets. TNAU has an extensive network of research programs spread across Tamil Nadu, supported by dedicated scientists and teaching faculty. These programs address critical areas such as crop improvement, sustainable land use, climate-resilient agriculture, and technological innovation. By leveraging its resources and expertise, the university has introduced cutting-edge programs, including bioinformatics, agricultural biotechnology, and energy and environmental engineering, catering to the evolving demands of the agricultural sector. Committed to bridging the gap between research and practice, TNAU excels in the transfer of technology through its Krishi Vigyan Kendras (KVKs), community radio, and extension initiatives. The university's endeavours ensure food security, commercialization of agriculture, and enhanced living standards for rural communities. TNAU continues to play a pivotal role in reducing poverty and promoting prosperity through its integrated approach to education, research, and outreach.

ABOUT THE COLLEGE

Agricultural Engineering College and Research Institute (AEC&RI), Coimbatore (an ISO Certified Institution 2018:21001), is one of the constituent colleges of the Tamil Nadu Agricultural University located in Coimbatore, Tamil Nadu. AEC&RI is the first engineering college in South India established during 1972 to offer an Agricultural Engineering degree program. The College offers four-year undergraduate degree programs *viz.,* B.Tech. (Agricultural Engineering), B.Tech. (Food Technology), B.Tech. (Energy and Environmental Engineering), and B.Tech. (Agricultural Information Technology), Master and Doctoral degree programs in Farm Machinery and Power Engineering, Soil and Water Conservation Engineering, Processing and Food Engineering, Renewable Energy Engineering and Statistics. The College imparts quality education through well-trained and specialized teaching faculty. Six Departments under AEC&RI, TNAU, Coimbatore *viz.,*

Farm Machinery and Power Engineering, Food Process Engineering, Renewable Energy Engineering, Soil and Water Conservation Engineering, Centre for Post-Harvest Technology and Physical Sciences and Information Technology.

Also, this institutes having technical clubs for strengthening students' skill sets under School of Finishing and Grooming, AEC-PGSF and to equip inter-personal skills, creating awareness camps, social events through Eco-Club, Mason AGE, Food Tech, The College collaborates with international agencies like Royal Academy of Engineering, UKIERI, CIDA, USAID-HED, FAO, SIDA, IDRC, and ALO and National level funding agencies like ICAR, Ministry of Food Processing, MNRE NCPA, DBT, DST, NASF, NATP, NADP, NICRA, MoE SPARC and private agencies for the research activities.

Forward Messages

Dr. C. A. VASUKI
Secretary and Director
Kongunadu Arts & Science College (Autonomous)
Member - Vice Chancellor Committee
and Syndicate Member,
Bharathiar University, Coimbatore, Tamil Nadu

Message

It is a matter of great pride to note that the institution is organizing the 2nd International conference on "Socioeconomic Impact of Pollution in Water Bodies and Remedial Measures (ICPWRM-2025)" under the Scheme for Promotion of Academic and Research Collaboration (SPARC) of Govt. of India jointly organized by our institution, Teesside University, UK, Tamil Nadu Agricultural University (TNAU), Coimbatore, India in association with Dr M Aruchami Research Foundation, Coimbatore.

The topic of the deliberation is pertinent in the current context where we can safeguard and renovate the water bodies for a sustainable future. Water is the most essential component of the ecosystem and our lives. Rig Veda says flowing water in rivers is life and hence it must not be polluted. Anyone who pollutes the water bodies incur considerable amount of sin. There is a saying which states "Jal hi Jeevan Hai" (water is Life). Water is the elixir of life and essential to human civilization. The world's economy depends greatly on water. Today Virtual water use is also being talked about greatly which influences the country's economy. Water and its conservation have had an inevitably central place in Indian culture and ethos. Water has an important position in our Bharathiya culture where most of our rituals are centred around water. In the present scenario, due to industrialization and excessive use of waters from rivers, these lifelines are in perils. Hence it is quintessential to devise strategies and scientific methods for cleansing and protecting the water bodies so that they sustain life in the future too. I am sure the deliberations that are going to happen in these two days conference will be an amalgamation of ideas, thoughts, and solutions from across the globe to address the pivotal issue of water pollution and the way forward to create a conducive ecosystem for sustained use water.

I congratulate the organizers and wish the conference a grand success.

Dr. V. Geethalakshmi, Ph.D., FAAM, FIMS
Vice-Chancellor
Tamil Nadu Agricultural University, Coimbatore

FOREWORD

Addressing water pollution's socioeconomic consequences is a global priority due to its significant economic and social repercussions, necessitating sustainable remedial measures for water security and resilient communities. The ICPWRM-2025 conference aims to address water pollution's socioeconomic impact through interdisciplinary approaches, promoting innovative mitigation and restoration strategies, and contributing to global sustainable water resource management.

The ICPWRM-2025, is a collaborative endeavour involving Kongunadu Arts and Science College (Autonomous), Coimbatore, India; Teesside University, Middlesbrough, United Kingdom; and Tamil Nadu Agricultural University, Coimbatore, India where experts, researchers, policymakers, and practitioners from various fields to discuss practical solutions to water pollution challenges. The conference will also discuss global trends, innovative technologies, and community-driven water body restoration and pollution management, emphasizing international collaboration and balancing ecological health with socioeconomic needs.

I commend the organizers for their remarkable initiative in hosting this conference and their efforts in publishing the Book of Abstracts. I am confident that the deliberations and insights shared during this event will inspire transformative actions, contributing to a future where clean water resources are preserved and societal well-being is prioritized.

I wish the conference ICPWRM 2025 a great success.

03/01/2025

(V. GEETHALAKSHMI)

Place : Coimbatore
Date : 03.01.2025

Office: +91 422 6611251 Mobile: +91 99944 33479 Email: vctnau@tnau.ac.in

Dr. DAVID IAN BENSON
Associate Professor of
Politics, University of Exeter,
United Kingdom

It gives me great pleasure to welcome everyone to the second SPARC international conference on the Socioeconomic Impact of Pollution in Water Bodies and Remedial Measures (ICPWRM-2025), sponsored by the Ministry of Education, Government of India. Despite increasing government regulation in many countries, water pollution from industrial, domestic and agricultural sources still presents a significant risk to the natural and human environment. Indeed, the United Nations' Sustainable Development Goal 6 specifically targets a reduction in water pollution globally to support international development up to 2030. There is consequently an important role for scientists to play in both assessing the socioeconomic impacts of water pollution and designing innovative technological solutions to remediate its effects.

In this respect, this international conference jointly organized Kongunadu Arts and Science College (Autonomous), Coimbatore, India, Teesside University, Middlesbrough, United Kingdom and Tamil Nadu Agricultural University, Coimbatore, India in association with Dr. M. Aruchami Research Foundation on 6th and 7th January, 2025.This conference will play a critical part in responding to water pollution threats by providing a venue for esteemed researchers to share their knowledge with other academics, policymakers, business leaders and the public. The conference will also help inspire younger scholars to take on the urgent challenge of resolving water pollution issues.

My best wishes for the grant success of this SPARC conference.

Dr. V. SANGEETHA M.Sc., Ph.D.

Principal

Kongunadu Arts & Science College (Autonomous)

Industries such as textile, Paper and fertilizer make a considerable contribution to the GDP and economic growth of many countries globally. They also provide significant employment opportunities to the general public and technical experts. On the other hand, they also bring cause considerable contamination to the local environment, particularly water bodies such as lakes, rivers, ponds and oceans. The effluent from these industries are highly polluted and contains hazardous contaminants composed of acids, alkalis, dyes, pigments and many other ingredients. Waste water from the above kind of industries are often discharged into the aquatic environment directly or indirectly, causing the risk of polluting the ecological environment continuously. Though several remedial methods are currently in practice to deal with the problem of pollution in water bodies, there remains many issues unsolved in terms of their impact on the socio-economic status of common mankind. Improperly treated waste waters discharged from house-hold activities and health care institutions into the common sewage lines also pose a dangerous threat to the life. Several debates, discussions and deliberations are taking place around the world on every day on the issues related to water pollution and its impact on the society.

At this juncture, I am happy to note that the 2nd International Conference on Socio-Economic impact of pollution in water bodies and Remedial Measures (ICPWRM-2025) to be held at KASC during 6th and 7th January 2025. This mega scientific event is jointly organized by KASC, Tesside University, UK and TNAU, Coimbatore, India in Association with Dr. M. Aruchami Research Foundation. I wish the researchers, scientists, participants (through offline/online modes) from several parts of the world to utilize this event as a very important platform to have constructive interactions with the invited speakers so as to enrich your knowledge and expertise. I am of a strong opinion that these two days programme will certainly throw some light on the current developments related to the topic of the conference.

Best Wishes for the success of ICPWRM-2025.

TAMIL NADU AGRICULTURAL UNIVERSITY
Agricultural Engineering College and Research Institute
(ISO 21001:2018 Certified Institute)
Coimbatore - 641 003, Tamil Nadu, India

Dr. A. RAVIRAJ
Dean (Agricultural Engineering)

3.1.2025

FOREWORD

India faces an increasingly urgent need to address the socioeconomic impact of pollution in its water bodies, which serve as lifelines for millions across the country. With over 70% of surface water resources polluted due to industrial, agricultural and domestic activities, the nation confronts significant challenges in balancing development with environmental sustainability. These challenges directly align with the United Nations Sustainable Development Goals (SDGs), particularly Goal 6: Clean Water and Sanitation, Goal 13: Climate Action, and Goal 15: Life on Land. Collaborative efforts to address these issues are essential to achieving sustainable growth and ensuring equitable access to clean water resources.

Water pollution not only poses a threat to ecosystems but also significantly impacts public health, agriculture, and industry, exacerbating socioeconomic disparities. It calls for innovative solutions, such as integrated water resource management, community-led clean-up initiatives, and advanced pollution remediation technologies. These approaches need to be institutionalized to ensure sustainable outcomes. Furthermore, fostering partnerships between academia, industry, and policymakers is critical to translating research into actionable policies that contribute to achieving SDGs.

The 2nd International Conference on Socioeconomic Impact of Pollution in Water bodies and Remedial Measures (ICPWRM-2025), organized as part of the Scheme for Promotion of Academic and Research Collaboration (SPARC), is a testament to the power of collective action. Jointly hosted by Kongunadu Arts and Science College (Autonomous), Coimbatore, India, Teesside University, Middlesbrough, United Kingdom, and Tamil Nadu Agricultural University, Coimbatore, India, in association with the Dr. M. Arucharni Research Foundation, this event unites global expertise to tackle one of the most pressing issues of our time. By fostering dialogue and collaboration, the conference contributes meaningfully to advancing the global sustainability agenda.

This international conference will undoubtedly serve as a valuable resource for academia, researchers, industry, and policymakers, driving forward the agenda of water sustainability and equitable development while contributing to the realization of key SDGs. I extend my sincere appreciation to all the contributors, keynote speakers, and participants whose efforts have made this conference a grand success.

Best Wishes!

3/1/25

Dean (Engg.)

+91-422-6611255 / 253 +91 9489056712 deancaecbe@tnau.ac.in / rraj@tnau.ac.in

Prof. SENTHILARASU SUNDARAM
Teesside University, United Kingdom

It is my pleasure to be part of the "2nd India - UK conference on "Socio Economic Analysis of textile effluent pollution impacts in the Noyyal River and exploration of remediation through algae and Graphene membrane" held on 6th and 7th January 2025 at Kongunadu Arts and Science College (Autonomous), Coimbatore, India. This conference serves as a platform for researchers, practitioners, policymakers, and industry leaders to share their insights, innovations, and progress on critical topics shaping the future of our planet: water pollution, renewable energy deployment, and the circular economy. Our planet is facing unprecedented environmental challenges that demand collective action and innovative solutions. The textile pollution is a key factor for water pollution and also exacerbated by rapid industrialization and urbanization, threatens ecosystems, public health, and access to clean water. Renewable energy deployment has emerged as a cornerstone in our efforts to combat climate change and transition toward sustainable energy systems. Meanwhile, the concept of the circular economy offers a transformative approach to resource utilization, advocating for systems where waste is minimized, and resources are reused and recycled to their fullest potential. I am particularly proud of the diversity and interdisciplinary nature of the discussions and ideas presented during this conference. By fostering collaboration across disciplines and sectors, we aim to drive impactful change and inspire actionable strategies that can be implemented at local, national, and global levels. I extend our deepest gratitude to all participants and organizing committee members whose efforts have been instrumental in making this conference a resounding success. I would like to acknowledge British Council and SPARC, India through UK-India Education and Research Institute (UKIERI) for their funding and initiative to work with Prof. K. Muthukumar, PI of the SPARC Project, Kongunadu Arts and Science College (Autonomous), Coimbatore, India and Prof. R. Mahendiran, Tamil Nadu Agricultural University (TNAU), Coimbatore. I am confident that the knowledge and insights shared here will spark new ideas, forge valuable partnerships, and catalyze further advancements in these vital fields.

Dr. K. MUTHUKUMAR

Organizing Secretary - ICPWRM-2025

Kongunadu Arts & Science College (Autonomous)

Coimbatore, Tamil Nadu

Distinguished Colleagues and Esteemed Guests, Greetings!!

Welcome to the Second International Conference on the "Socioeconomic Impact of Pollution in Water Bodies and Remedial Measures" being held at Kongunadu Arts and Science College (Autonomous), Coimbatore, Tamil Nadu, India.

Building on the success of the inaugural conference, which brought together experts and stakeholders to explore innovative solutions to pollution challenges, this second edition under Ministry of Education (MoE), Government of India, SPARC (Scheme for Promotion of Academic and Research Collaboration) marks another significant step forward. The previous conference and workshop set a strong foundation by fostering insightful discussions and actionable strategies, and this edition aims to build on that momentum. It serves as a critical platform to further address the menace of pollution and propose meaningful, sustainable solutions that resonate with global and local needs.

The growing threat of pollution in water bodies is a global crisis that demands immediate attention and collective action. With water being an essential resource for life, its contamination has profound socioeconomic implications. Communities around the world are grappling with the adverse effects of polluted water on public health, agriculture, fisheries, and overall economic stability. Addressing this challenge requires not only understanding its causes but also implementing sustainable solutions to mitigate its impact. The Second International Conference on Socioeconomic Impact of Pollution in Water Bodies and Remedial Measures builds on the momentum of its inaugural edition, bringing together a diverse group of researchers, policymakers, environmentalists, and industry leaders. This platform enables an interdisciplinary exchange of ideas, research findings, and best practices to combat water pollution effectively. The conference aims to explore the intricate connections between water quality and socioeconomic development while emphasizing the critical need for innovative and inclusive remedial strategies.

This edition highlights advancements in water treatment technologies, regulatory frameworks, and community-driven approaches to water conservation. It also underscores the importance of international cooperation in addressing transboundary water pollution issues, fostering sustainable development, and achieving global water security. As we convene for this important dialogue, I am optimistic that the insights and collaborations forged during this conference will lead to actionable

solutions. By uniting science, policy, and grassroots initiatives, we can chart a path toward cleaner water bodies and healthier ecosystems, ensuring that water remains a source of life and prosperity for generations to come.

From ‘Research to reality’, the synonym for ‘lab to land’, our esteemed founder of our college **Dr. M. Aruchami** Ayya, envisioned a transformative approach wherein scientific advancements are harnessed to address the needs of rural communities. This conference aims to critically explore the profound significance of his vision and its enduring contributions to societal development. Our respected Secretary and Director, **Dr. C. A. Vasuki** stands as a distinguished example of how this vision has been effectively translated into actionable and impactful practices.

Let us approach this conference with a shared sense of responsibility and urgency, reaffirming our commitment to addressing one of the most pressing challenges of our time. I extend my sincere gratitude to all the staff coordinators, research scholars, resource persons, and our college management for their unwavering support, which led to the successful execution of this conference.

Editors

2nd International Conference on
Socioeconomic Impact of Pollution in Water Bodies and Remedial Measures
(ICPWRM-2025)

EDITORS

Dr. MUTHUKUMAR KUPPUSAMY
Kongunadu Arts and Science College Autonomous),
Coimbatore, Tamil Nadu

Dr. K. Muthukumar, is an Assistant Professor in the Department of Tamil at Kongunadu Arts and Science College (Autonomous), Coimbatore, Tamil Nadu, India. He holds a diverse educational background, specializing in Anthropology, Sociology and Modern Literature. He has showcased his expertise through extensive publications in various reputed journals and scholarly presentations in both National and International conferences. Beyond academic engagements, he actively participates in various professional bodies and memberships, promoting Tamil literature and cultural heritage. He has organized and been a resource person for multiple workshops and conferences focusing on sustainable wastewater treatment technologies, highlighting socio-economic and environmental concerns.

Prof. SENTHILARASU SUNDARAM
Teesside University,
United Kingdom (UK)

Dr. Senthilarasu Sundaram, is a Professor in the School of Computing, Engineering and Digital Technologies at Teesside University, Tees Valley, UK. His passion towards energy and sustainability in the energy sector has started during his predoctoral research course (M. Phil in Applied Physics) which leads to Ph. D in organic solar cells materials. He currently leads the sustainable energy material themed research in the Teesside University. Prior to joining in the Teesside, he was an Associate Professor in Electrical and Electronic Engineering and as Lecturer and senior lecturer in the University of Exeter. His key research focus is sustainable energy vectors in through renewable energy especially in solar energy. He is leading an Impact Programme in the "Textile wastewater treatment and remediation using carbon materials" for developing countries to effectively recycle their textile wastewater.

Dr. DHANDAPANI GURUSAMY

Kongunadu Arts and Science College (Autonomous), Coimbatore, Tamil Nadu

Dr. G. Dhandapani, is an Assistant Professor in the Department of Botany at Kongunadu Arts and Science College (Autonomous), Coimbatore, Tamil Nadu, India. He has received his B.Sc. in Botany and M. Sc., in Plant Biotechnology from Bharathidasan University, Tiruchirappalli, B. Ed., in Biological Sciences, from Bharathiar University, Coimbatore. He has done his Ph.D. research at "ICAR-National Institute for Plant Biotechnology (NIPB), PUSA Campus, New Delhi and received his Ph.D. in Plant Biotechnology from Bharathidasan University, Tiruchirappalli. He was worked as a Project Fellow at Centre for Plant Molecular Biology (CPMB), Madurai Kamaraj University, Madurai, followed by Senior Research Fellow and Research Associates at ICAR-National Institute for Plant Biotechnology (NIPB), PUSA Campus, New Delhi, India in various ICAR and DBT funded projects. He has done the Postdoctoral programme at Department of Entomology, University of Kentucky, Lexington, USA.

He has received “Best Scientist Award-2023" from GRABS Educational Charitable Trust, “Young Scientist Leadership Award-2024” from Prosper Foundation & Agri Amigos Private Limited – Academia & Industry Leadership Awards 2024”, “Best Scientist Award-2024” from Asian PGPR Society for Sustainable Agriculture, Alabama, USA and also “Tamil Nadu Endowment Scholarship Award” for his academic excellence in UG and PG programmes. He has vast experience in the field of Plant Tissue Culture & Genetic Transformation, Plant Molecular biology, rDNA technology and Functional genomics for biotic and abiotic stresses. He has received more than 15 NCBI accession, granted with one Indian patent and published 38 highly reputed international research journals. Also, he has published 6 book chapters and presented his research findings in various international and national conference. He has serving as a resource person in the conferences, seminars and workshops. He has serving as an active reviewer in many reputed international scientific research journals and active member in many scientific societies and he has visited USA and Canada.

Dr. VADIVELAN GANESAN
Kongunadu Arts and Science College (Autonomous),
Coimbatore, Tamil Nadu

Dr. G. Vadivelan, is an Assistant Professor in the Department of Chemistry (PG), Kongunadu Arts and Science College, Coimbatore, Tamil Nadu, India. He has more than 14 years of experience as an Assistant Professor in the field of Chemistry. He has worked as a lecturer at Muthayammal College of Arts and Science, Rasipuram, Paavai College of Engineering, Namakkal followed by eight years at the Hindusthan Institute of Technology, Coimbatore. He has done his Ph.D. at Bharathiar University, Coimbatore also M.Phil. (Chemistry) at Sri Ramakrishna Mission Vidyalaya College of Arts & Science, Bharathiar University, Coimbatore. He did his Master's degree at National College, Bharathidasan. University, Trichy, and Bachelor’s degree at Sri Ramakrishna Mission Vidyalaya College of Arts & Science, Bharathiar University, Coimbatore. His areas of specialization include organic synthesis and solid-state chemistry. He has received the Best Paper Award in the SERB-sponsored National Level Conference on Advanced Materials in Waste Management on February 8th, 2019, at the Dr. N.G.P. Institute of Technology, Coimatore-641048, Tamil Nadu. He has worked as an editorial board member in CSIR-sponsored national conference on "Recent Advances in Spectroscopy and Electronics “at Muthayammal College of Arts & Science, Namakkal, on February 5th and 6th, 2010. He has published 11 research papers in reputed international journals and attended ten national and four international conferences.

Conference Brochure

2nd INTERNATIONAL CONFERENCE ON

SOCIOECONOMIC IMPACT OF POLLUTION IN WATER BODIES AND REMEDIAL MEASURES (ICPWRM-2025)

As a Part of

SPARC

Scheme for Promotion of Academic and Research Collaboration (SPARC)
A Government of India initiative

Jointly Organized by

Kongunadu Arts and Science College (Autonomous), Coimbatore, India.
Teesside University, Middlesbrough, United Kingdom.
Tamil Nadu Agricultural University, Coimbatore, India.

In association with

Dr. M. Aruchami Research Foundation

on

06th and 07th January, 2025

Venue

KONGUNADU ARTS AND SCIENCE COLLEGE
(Autonomous)
Re-accredited by NAAC with A+ Grade (4th Cycle)
College of Excellence awarded by UGC
52nd Rank among Colleges in NIRF 2024
Coimbatore – 641 029, Tamil Nadu, India.

ABOUT THE COLLEGE

Kongunadu Arts and Science College, was established in the year 1973. The College has grown magnificently in academic stature with autonomous status having 13 Research Departments, 14 PG Departments and 24 UG Departments. Our College is an institution of high repute recognised at the National Level for its Academic and Research accomplishment.

The University Grants Commission, New Delhi, conferred the Autonomous Status to our College in the academic year 2004 - 05. Recognizing the quality of teaching imparted in this college, the University Grants Commission has awarded the prestigious status of College of Excellence. The College has been Re-accredited by NAAC with A+ Grade in 4th Cycle. In the NIRF Rankings 2024, our college has secured 52nd Rank.

Number of MoU's and Collaborative Research with Eminent Institutions across the globe is increasing every year which stands as proof of our Institution's Research caliber. The Institution's wide commitment to the development of innovative thinking in a culture of collaboration makes the learners an ideal venue for sharing ideas about futuristic research, which connects academics across disciplines and cultures.

ABOUT THE SPARC

The Scheme for Promotion of Academic and Research Collaboration (SPARC) is a Ministry of Human Resource Development initiative that aims to improve the research ecosystem of India's Higher Educational Institutions by facilitating academic and research collaborations between Indian Institutions and the best institutions in the world. This scheme will improve the research ecosystem of India's higher educational institutions by facilitating academic and research collaborations between Indian Institutions (overall top-100 or category-wise top-100 in NIRF) and the best institutions in the world (top-500 overall and top-200 subject-wise institutions listed in QS World University Ranking) from 28 selected nations to jointly solve problems of national and international relevance. As per the criteria mentioned above, 254 top Indian Institutes and 478 top-ranked global Institutes have been already identified.

A set of 5 Thrust Areas (Fundamental Research, Emergent Areas of Impact, Convergence, Action-Oriented Research and Innovation-Driven) and sub-theme areas in each thrust area have been identified for collaboration under SPARC based on emergent relevance and importance for the nation.

This Scheme is expected to have a major impact in providing the best international expertise to address major national problems, expose Indian academicians to the best collaborators abroad, enable international faculty to stay in India for a longer duration, provide Indian students an opportunity to work in the world-class laboratories, to develop strong bilateral relationships in research, and improve the international ranking of Indian Institutes.

Our College being continuously ranked among top 100 colleges in NIRF Rankings every year, SPARC has recognized our Institution by sanctioning a Major Research Project titled 'Socio-economic Analysis of textile effluent pollution impact in Noyyal river and Exploration of Remediation through Algae and Graphene membrane' in collaboration with University of Exeter, United Kingdom. During the first year of this project, PI from India visited University of Exeter, United Kingdom and shared his knowledge. PI and Co-PI from UK visited our Institution and shared their expertise in the International Workshop and International Conference. 128 articles submitted in the conference were published as Proceedings with ISBN.

ABOUT THE CONFERENCE

Water bodies in recent decades have been highly polluted all over the world due to various factors like human influence, modern agronomical practices, industrial wastes etc., In countries like India, overpopulation and hence to cater the needs of the people, high-end technologies are being used which leads to the contamination of water bodies at an alarming level.

In this background, the proposed International Conference will be a platform for sharing knowledge and transferring the technologies developed to overcome the challenges and issues related to the pollution and management of water bodies to researchers, administrators, policymakers, industrialists, and the common public.

Eminent Scientists, experts, and researchers across the globe in the area of management of water bodies are about to participate and deliberate the sessions. In addition, the programme will be more useful in sensitizing young researchers and budding scientists in the area of water pollution and possible eco-friendly control measures.

CALL FOR PAPERS

We welcome the submission of original research papers from academicians, research scholars, and industry professionals in the following themes for **Hybrid Mode**

- Industrial effluent types and composition
- Impact of effluent on yield and quality of crop plants
- Influence of effluent over human society
- Social issues and challenges as influenced by industrial wastes and effluent
- Scientific input in the Bioremediation process
- Technological advancement for remedial measures
- Bioremediation through traditional knowledge and practices
- Culture, heritage and lifestyle changes due to aquatic pollution
- Modelling of water bodies to overcome toxicity
- Role of Nanoscience and Bioinformatics in aquatic pollution control
- Innovative technologies for water recycling and conservation
- Climate change and Water Management
- Impact of Water Pollution in Economic Growth
- Futuristic approach in Water Management to elevate the economy
- Role of AI in preserving Mother Nature
- Data Analysis to predict the hazardous factors that pollute the Water Bodies

Send your abstract to : icpwrm2025@kongunaducollege.ac.in
Registration Link : https://forms.gle/iTPbfYBHbuxTJuC5A

REGISTRATION FEE

For Indian Delegates		For Delegates from Abroad	
UG Students	Rs. 300	Delegates From Abroad	50 USD
PG Students	Rs. 500		
Full Time Research Scholars	Rs. 750		
Part Time Research Scholars / Faculty / Academicians	Rs. 1000		
Mode of Payment (NEFT)			
Account Name	M/S KASC ICPWRM		
Account Number	170701000019227		
Name of the Bank	Indian Overseas Bank		
Name of the Branch	Kavundampalayam (Kongunadu College)		
IFSC Code	IOBA0001707		
MICR Code	641020030		
Branch Code	001707		

IMPORTANT DATES

- Last date for submitting Abstract along with registration : **22.12.2024**
- Last date for submitting Full length Article : **31.12.2024**
- Last date for registration (only participation) : **05.01.2025**
- Conference Dates : **06th & 07th, January 2025**

JOURNAL PUBLICATION

The selected papers will be published in the peer-reviewed UGC CARE / Web of Science / Scopus Indexed Journal post-conference based on the decision of the Journal Editor.

The Publication Fee and the other details related to the Journal will be intimated to the authors. At least one of the authors should have registered and attended the conference.

ORGANIZING COMMITTEE

Chief Patron

Dr. C. A. Vasuki — Secretary and Director

Patron

Dr. V. Sangeetha — Principal

Chair Person

Dr.S. Paulsamy — Convenor, ISCA, Coimbatore Chapter

Organizing Secretaries

Dr. K. Muthukumar
Principal Investigator (India) of SPARC Project,
Assistant Professor of Tamil
Kongunadu Arts and Science College (Autonomous)
Coimbatore, Tamil Nadu, India.

Prof. Senthilarasu Sundaram
Co-Principal Investigator (UK) of SPARC Project
Professor of Sustainable Energy Materials,
Teesside University, Middlesbrough, United Kingdom

Coordinators

Dr. K. Saminathan,
Assistant Professor of Chemistry, KASC

Dr. R. Mahendiran,
Professor of Renewable Energy, TNAU

Dr. G. Dhandapani,
Assistant Professor of Botany, KASC

Dr. M. Venkatachalam,
Assistant Professor of Mathematics, KASC

Dr. R. Sathishkumar
Assistant Professor of Biotechnology, KASC

Dr. G. Vadivelan
Assistant Professor of Chemistry (PG), KASC

Members

Dr. R. Senthilkumar	Librarian (SG)	**Dr. M. Vigneshwaran**	Asst. Prof of Mathematics
Dr. P. Matheswaran	Asst. Prof of Physics	**Dr. S. Raja**	Asst. Prof of Zoology
Dr. S. Sathishkumar	Asst. Prof of Tamil	**Dr. M. Rukmani**	Asst. Prof of Tamil
Dr. K. Kaviyarasu	Asst. Prof of English	**Dr. M. Vivek Prabu**	Asst. Prof of Mathematics
Dr. K. Nirubama	Asst. Prof of Biochemistry	**Dr. M. Santhoshkumar**	Asst. Prof. of Biochemistry
Dr. K. Rekha	Asst. Prof of Botany	**Dr. K. Velmurugan**	Asst. Prof of Zoology
Dr. B. Gokul	Asst. Prof of Physics	**Dr. R. Saravana Moorthy**	HoD of Computer Science (UA)
Dr. G. Youveniya	HoD of English (PG)	**Dr. L. Kathirvelkumaran**	HoD of CS with DA
Dr. J. Anitha	Head (i/c) of Biochemistry	**Mr. N. Senthilkumar**	Asst. Prof of Comp. Technology
Dr. V. Elakkiya	Asst.Prof of Biotechnology	**Dr. T. Kumar**	HoD of Commerce CA

INTERNATIONAL ADVISORY COMMITTEE

Prof. David Ian Benson
Associate Professor of Politics
University of Exeter, United Kingdom.

Prof. Tapas Mallick
Professor of Renewable Energy,
University of Exeter, United Kingdom.

Prof. Kumar Patchigola
Teesside University, United Kingdom

Prof. Smagul Karzhanov
Professor, Department of Physical Issues in Materials Science, IFE, Norway.

Prof. Sudhagar Pitchaimuthu
Associate Professor,
School of Engineering & Physical Sciences,
Heriot-Watt University, United Kingdom.

Prof. Panitat Hasin
Professor Department of Chemistry,
Kasetsart University,
Bangkok, Thailand.

Dr. Shivendra Sahi
Professor, Department of Biology,
Saint Joseph's University (SJU), USA.

Prof. Ismail Naci Cangul
Professor of Mathematics,
Bursa Uludag University, Turkey.

Dr. D. Dafik
Professor of Mathematics,
University of Jember, Indonesia.

Prof. Karthikeyan Subburamu
Professor and Head cum Quality Manager,
Food Quality Testing Laboratory, TNAU, Coimbatore.

Dr. A. Raviraj
Dean (Agricultural Engineering)
Agricultural College and Research Institute TNAU, Coimbatore.

Dr. K. Murugesan
Professor and Head,
Department of Environmental Science,
Periyar University, Salem.

Prof. K. Kumaraswamy
Emeritus Professor, ICSSR-Senior-Fellow
Department of Geography,
Bharthidasan University, Tiruchirappalli.

Dr. Parimelazhagan Thangaraj
Professor and Head, Department of Botany,
Bharathiar University, Coimbatore.

Dr. R.Baskar
Associate Professor, Department of Social Work, Bharathiar University, Coimbatore.

Dr. S. Chandramohan,
Associate Professor,
Department of Physics and Nanotechnology,
SRM Institute of Science and Technology, Chennai.

SPEAKERS

Dr. Senthilarasu Sundaram
Professor of Sustainable Energy Materials, Teesside University, United Kingdom.

Dr. David Ian Benson
Associate Professor of Politics, University of Exeter, United Kingdom.

Prof. TS. Jagadeesh Pasupuleti
Department of Electrical & Electronic Engineering, Universiti Tenaga Nasional (UNITEN) Jalan IKRAM-UNITEN, Malaysia.

Prof. Karthikeyan Subburamu
Professor and Head cum Quality Manager, Food Quality Testing Laboratory, Tamil Nadu Agriculture University, Coimbatore, Tamil Nadu, India.

Prof. K.Srinivas Reddy
V Balaraman Chair Professor, Heat Transfer and Thermal Power Laboratory, Department of Mechanical Engineering, IIT Madras, Chennai, Tamil Nadu, India.

Dr.S. Senthilnathan
Professor, Department of Agriculture Economics, Tamil Nadu Agriculture University, Coimbatore, Tamil Nadu, India.

Dr. Kannan Kandasamy
Professor
Department of Chemical Engineering
Kongu Engineering College (Autonomous), Perundurai, Tamil Nadu, India.

Dr. V TBalamurugan
Professor & Head
Department of Biomedical Engineering
Bannari Amman Institute of Technology (Autonomous), Sathyamangalam, Tamil Nadu, India.

Dr. B.Nalini
Assistant Professor of Physics
Avinashilingam Institute for Home Science and Higher Education for Women, Coimbatore, Tamil Nadu, India.

Dr. David Hughes
Professor and Associate Dean (Research & Innovation),
Centre for Sustainable Engineering,
Teesside University, United Kingdom.

Dr. Sudhagar Pitchaimuthu
Associate Professor,
School of Engineering & Physical Sciences,
Institute of Mechanical, Process & Energy Engineering, Heriot-Watt University, UK.

Prof. Hari Upadhyaya
Professor, Department of Engineering and Design,
London South Bank University, UK.

Prof. K. Kumaraswamy
Emeritus Professor, ICSSR-Senior Fellow
Department of Geography,
School of Earth Sciences, Bharathidasan University, Trichy, Tamil Nadu, India.

Dr F.X. Lovelina Little Flower
Professor and Head
Department of Social Work,
Bharathiar University,
Coimbatore, Tamil Nadu, India.

Dr. D. Ramesh
Professor and Head,
Department of Renewable Energy Engineering,
Tamil Nadu Agriculture University,
Coimbatore, Tamil Nadu, India.

Dr. R. Mahendiran
Professor, Department of Renewable Energy Engineering,
Tamil Nadu Agriculture University,
Coimbatore, Tamil Nadu, India.

Dr P. Karthikeyan
Professor,
Department of Automobile Engineering
PSG College of Technology (Autonomous)
Coimbatore, Tamil Nadu, India.

Dr. M. M. Akbar Ali
Assistant Professor of Mathematics
Government Arts and Science College for Women, Puliyakulam, Coimbatore,
Tamil Nadu, India.

CONTACT DETAILS

Dr. K. Muthukumar
Principal Investigator (India) of SPARC Project
Assistant Professor of Tamil
Kongunadu Arts and Science College (Autonomous)
Coimbatore – 641 029, Tamil Nadu, India.
+91 77080 28564

Dr. G. Dhandapani,
Assistant Professor of Botany
Kongunadu Arts and Science College (Autonomous)
Coimbatore-641 029
Tamil Nadu, India.
+91 95975 10766

Website: https://sites.google.com/kongunaducollege.ac.in/icpwrm-2025

Email: icpwrm2025@kongunaducollege.ac.in

Programme Schedule

2nd International Conference on

Socioeconomic Impact of Pollution in Water Bodies and Remedial Measures (ICPWRM-2025)

As a part of

Scheme for Promotion of Academic and Research Collaboration

(SPARC) – A Government of India initiative

Jointly Organized by

Kongunadu Arts and Science College (Autonomous), Coimbatore,

India Teesside University, Middlesbrough, United Kingdom

Tamil Nadu Agricultural University, Coimbatore, India

In association with

Dr. M. Aruchami Research

Foundation On

6th and 7th January,

2025 PROGRAMME

SCHEDULE

Registration: 12.30 pm onwards

Date: 06.01.2025 Venue: Dr. Marappa G Aruchami Auditorium Time:

2.00pm Invocation	**:**	**Dr. R. Manimegalai**
Welcome Address	**:**	**Dr. V. Sangeetha,** Principal, KASC
Presidential Address	**:**	**Dr. C.A. Vasuki,** Secretary & Director, KASC
Releasing of the Conference Souvenir	**:**	**Dr. C.A. Vasuki,** Secretary & Director, KASC
Felicitation	**:**	**Dr. A. Raviraj** Dean (Agricultural Engineering), Agricultural College and Research Institute, Tamil Nadu Agricultural University, Coimbatore

		Dr. S. Paulsamy Convener, Indian Science Congress Association, Coimbatore Chapter
Special Address	**:**	**Prof. Sundaram Senthilarasu** Professor of Sustainable Energy Materials Teesside University, United Kingdom
Keynote Address 1	**:**	**Dr. David Hughes** Professor and Associate Dean (Research & Innovation), Centre for Sustainable Engineering, Teesside University, United Kingdom
Keynote Address 2	:	**Dr. A. Raviraj** Dean (Agricultural Engineering), Agricultural College and Research Institute, Tamil Nadu Agricultural University, Coimbatore
Vote of Thanks	**:**	**Dr. K. Muthukumar** Organizing Secretary, ICPWRM-2025

Date: 07.01.2025 Venue : Dr. Marappa G Aruchami Auditorium

Session	Resource Persons	Venue	Time
Plenary Session - I	**1) Prof. K. Srinivas Reddy** V Balaraman Chair Professor Heat Transfer and Thermal Power Laboratory, Department of Mechanical Engineering, IIT Madras, Chennai. **2) Dr F.X. Lovelina Little Flower** Professor and Head, Department of Social Work, Bharathiar University, Coimbatore, Tamil Nadu, India **3) Dr. Sujit Sopan Barhate** Senior Chief Engineer and Head EV R&D, CREAT Uno Minda Ltd., Pune, India. **4) Prof. S. Karthikeyan** Professor and Head cum Quality Manager, Tamil Nadu Agricultural University, Coimbatore, Tamil Nadu, India.	**Dr. Marappa G Aruchami Auditorium**	**9.15 am to 11.00 am**
Plenary Session - II	**1) Dr. Sudhagar Pitchaimuthu,** Associate Professor, School of Engineering & Physical Sciences, Institute of Mechanical, Process & Energy Engineering, Heriot-Watt University, UK. **2) Dr P. Karthikeyan** Professor, Department of Automobile Engineering, PSG College of Technology (Autonomous), Coimbatore, Tamil Nadu, India	**Dr. Marappa G Aruchami Auditorium**	**2.00 pm to 3.15 pm**

Date: 07.01.2025 TECHNICAL SESSIONS Time: 11.00 am – 1.15 pm

Section	Resource Persons	Venue
Life Science Stream - I (Botany & Zoology)	**Dr. R. Mahendiran** Professor, Dept. of. Renewable Energy Engineering, Tamil Nadu Agriculture University, Coimbatore, Tamil Nadu, India.	**Conference Hall**
Life Science Stream – II (Biochemistry, Biotechnology, Wildlife Biology & Clinical Nutrition)	**Dr. Suvish** PhD Researcher, Medical Engineering, School of Computing, Engineering & Digital Technologies, Teesside University, Middlesbrough, United Kingdom.	**Biotechnology Lab**
Physics	**1) Dr. Mehrdad Ghamari,** PhD Researcher, Cyber Security and Systems Engineering, School of Computing, Engineering Edinburgh Napier University, Edinburgh, United Kingdom. **2) Dr. B. Nalini** Assistant Professor of Physics Avinashilingam Institute for Home Science and Higher Education for Women, Coimbatore, Tamil Nadu, India.	**G5**
Chemistry	**Dr. Kannan Kandasamy** Professor, Department Chemical Engineering, Kongu Engineering College (Autonomous), Perundurai, Erode, Tamil Nadu, India	**PG Chemistry Lab**

Section	Resource Persons	Venue
Mathematics	**Dr. M. M. Akbar Ali** Assistant Professor of Mathematics, Government Arts and Science College for Women, Puliyakulam, Coimbatore, Tamil Nadu, India	**C19**
Computer Science	**Dr. V. T. Balamurugan** Professor & Head, Department of Biomedical Engineering, Bannari Amman Institute of Technology (Autonomous), Sathyamangalam, Erode, Tamil Nadu, India	**Computer Lab VIII**
Tamil & English	**Mr. K. Kalidasan,** President, Osai (Environmental NGO), Coimbatore, Tamil Nadu, India	**C12**
Commerce & Management	**Dr. S. Senthilnathan** Professor, Department of Agricultural Economics, Tamil Nadu Agricultural University Coimbatore, Tamil Nadu, India	**G4**
CDF & Psychology	**Mr. Ka. Su. Velayudhan,** Journalist and Writer, Coimbatore.	**CDF Lab**
Library & IT	**1) Prof. TS. Jagadeesh Pasupuleti** Department of Electrical & Electronic Engineering, Universiti Tenaga Nasional (UNITEN) Jalan IKRAM-UNITEN, Malaysia. **2) Dr. Mohammad Reza Maghami** Research Associate, University of Johannesburg, South Africa	**Library and Information Centre**

VALEDICTION

Date: 07.01.2025 Venue: Dr. Marappa G Aruchami Auditorium
Time: 3.45 pm Welcome Address
: Dr. G. Dhandapani

Assistant Professor of Botany, KASC

Report and Concluding remarks : **Dr. K. Muthukumar**

Organizing Secretary ICPWRM-2025

Valedictory Address : **Dr. V. Sangeetha**

Principal, KASC

Felicitation : **Dr. D. Ramesh**

Professor & Head

Dept. of. Renewable Energy Engineering, Tamil Nadu Agriculture University, Coimbatore, Tamil Nadu, India.

Award for
Best Oral/Poster Presentation : **Dr. D. Ramesh**

Professor & Head

Dept. of. Renewable Energy Engineering, Tamil Nadu Agriculture University, Coimbatore, Tamil Nadu, India.

&

Dr. V. Sangeetha

Principal, KASC

Vote of Thanks : **Dr. K. Saminathan**

Assistant Professor of Chemistry (UG), KASC

NATIONAL ANTHEM

INDO -UK SYMPOSIUM

INDO-UK SYMPOSIUM

India-UK Symposium on Socio-economic Analysis of textile effluent pollution impact in Noyyal river and Exploration of Remediation through Algae and Graphene membrane

ABOUT SPARC

The Scheme for Promotion of Academic and Research Collaboration (SPARC) is a Ministry of Human Resource Development initiative that aims to improve the research ecosystem of India's Higher Educational Institutions by facilitating academic and research collaborations between Indian Institutions and the best institutions in the world.

This scheme will improve the research ecosystem of India's higher educational institutions by facilitating academic and research collaborations between Indian Institutions (overall top-100 or category-wise top-100 in NIRF) and the best institutions in the world (top-500 overall and top-200 subject-wise institutions listed in QS World University Ranking) from 28 selected nations to jointly solve problems of national and international relevance. As per the criteria mentioned above, 254 top Indian Institutes and 478 top-ranked global Institutes have been already identified.

A set of 5 Thrust Areas (Fundamental Research, Emergent Areas of Impact, Convergence, Action-Oriented Research and Innovation-Driven) and sub-theme areas in each thrust area have been identified for collaboration under SPARC based on emergent relevance and importance for the nation.

This Scheme is expected to have a major impact in providing the best international expertise to address major national problems, expose Indian academicians to the best collaborators abroad, enable international faculty to stay in India for a longer duration, provide Indian students an opportunity to work in the world-class laboratories, to develop strong bilateral relationships in research, and improve the international ranking of Indian Institutes.

Being ranked 52nd in NIRF 2024, our college has been recognized by SPARC by sanctioning a Major Research Project titled 'Socio-economic Analysis of textile effluent pollution impact in Noyyal river and Exploration of Remediation through Algae and Graphene membrane' in collaboration with University of Exeter, United Kingdom.

Symposium Overview

The Noyyal River, a tributary of Kaveri River is originated in Vellingiri hills in the Western Ghats, Tamil Nadu. Untreated industrial wastewater pollution threatens water resources in Kongu region of Tamil Nadu, where the Noyyal River flows through several densely populated urban centers. This region basically surrounded by major textile-oriented industries in Coimbatore and

major global knitwear centre in Tirupur, constituting one-third of apparel exports from India. Small scale dyeing and bleaching industries situated in this area discharge untreated toxic effluents such as dyes, bleaching liquids, directly into the Noyyal River.

Orathupalayam dam, meant to serve as a reservoir for the waters of the Noyyal river, had turned into a cesspool of effluents from textile dyeing units in upstream Tiruppur district within years of its commissioning in 1992. Contamination of water sources therefore significantly constrains the socio-economic development of several million people. In and around Orathupalayam dam, ground water is contaminated because of untreated water stored previously in the dam before 2011. Now the contaminated ground water near Orathupalayam dam still persists and the water is not fit for irrigation purpose. The proposed research therefore aims to assess the socio-economic impact on pollution in Noyyal River Basin and innovative wastewater remediation technologies. For the last five years, six Indo-UK workshops in different part of India were organized by the applicants in analyzing the problems of Noyyal River pollution and possible solution for the Textile dye industrial effluent treatment process using integrated aerobic digestion, algal bioremediation and graphene technology.

The proposed research therefore aims to carryout "**Socio-economic Analysis of textile effluent pollution impact in Noyyal river and Exploration of Remediation through Algae and Graphene membrane"** by the investigators from India and United Kingdom. The Investigators of SPARC Project-P2569 are experienced in conducting novel pollution remediation research in India and the UK, using integrated anaerobic digestion, hydrothermal carbonization and algal bioremediation, which have particular relevance to the treatment of dye effluent. In continuation to the International Workshop organized in the same theme last year, this symposium leads to further discussions and appropriate findings.

SYMPOSIUM PROGRAMME SCHEDULE

Date: 7th January, 2025 Venue: Meeting Hall Time: 11.30 am – 1.30 pm

Chair Person : **Prof. Sundaram Senthilarasu,**

Professor of Sustainable Energy Materials Teesside University, United Kingdom

Moderator : **Dr. K. Muthukumar**,

Principal Investigator, SPARC Project - P2569

Panelists : **Dr. R. Ilangovan**,

Former Vice-Chairman,

Tamil Nadu Water Resources Development Cell, PWD, WRD, Chennai.

Er. Chinnasamy,

Chief Coordinator, Siruthuli, Coimbatore.

Prof. K. Kumaraswamy,

Emeritus Professor, ICSSR-Senior Fellow, Department of Geography, School of Earth Sciences, Bharathidasan University, Tiruchirappalli.

Dr. D. Ramesh,

Professor and Head, Department of Renewable Energy Engineering, Tamil Nadu Agricultural University, Coimbatore.

Dr. V. Bhuvaneshwari,

Co-Principal Investigator, SPARC Project - P2569 Associate Professor of Biotechnology, PSGR Krishnammal College for Women, Coimbatore.

Mr. K. Kalidasan, President, OSAI, Coimbatore.

Mr. Ka. Su. Velayudhan, Journalist and Writer, Coimbatore.

Mr. R. Manikandan, Kovai Kulangal Padhukaapu Amaippu, Coimbatore.

Mr. Noyyal Ramasamy, Farmer, Karur. **Ms. A.V. Sree Lakshmy, Ms. S. L. Vidya**, Research Scholars in Biotechnology, Kongunadu Arts and Science College, Coimbatore.

Abstract for Resource Persons

INTEGRATING PHOTOVOLTAIC SYSTEMS AND PHASE-CHANGE MATERIALS FOR NET-ZERO ENERGY BUILDING DESIGN IN TROPICAL CLIMATES: A CASE STUDY IN CHENNAI

MEHRDAD GHAMARI

Cybersecurity and Systems Engineering, School of Computing, Engineering and the Built Environment, Edinburgh Napier University, Merchiston Campus, Edinburgh EH10 5DT United Kingdom, Mehrdad.ghamari@napier.ac.uk.

SENTHILARASU SUNDARAM

School of Computing, Engineering and Digital Technologies, Teesside University, Tees Valley, Middlesbrough TS1 3BX, United Kingdom, s.sundaram@tees.ac.uk.

ABSTRACT

This study explores an innovative strategy for achieving net-zero energy buildings in Chennai, India, by integrating photovoltaic systems with phase-change materials (PCMs) in solar wall blocks designed for passive cooling applications. Addressing critical environmental challenges posed by the construction industry responsible for 50% of mined material use and 5–12% of global greenhouse gas emissions the research highlights the potential for emission reductions of up to 80% through efficient design strategies.

The experimental setup consists of a residential unit (room, hall, and kitchen) featuring a hybrid cooling system that combines solar wall blocks with a PCM-based Thermal Management System (TMS). This integrated system maintains indoor temperatures between 22°C (295°K) and 24°C (297°K) using active and passive cooling mechanisms, achieving up to 35% improvements in energy efficiency while enhancing temperature and humidity control for superior occupant comfort.

The research employs both experimental and numerical methodologies. Thermal and structural analysis utilizes ANSYS Fluent and APDL to model a multi-layered wall system comprising a 10 cm thick solar blocks wall and a 3 cm PCM layer. Initial conditions are tailored to Chennai's climate, with PCM solidus and liquidus temperatures set at 21°C (294°K) and 24°C (297°K), respectively. Thermal performance is monitored at 5-minute intervals to evaluate solar energy utilization and temperature regulation.

Structural analysis involves Finite Element Analysis (FEA) using SOLID65 elements to macro-model solar blocks under in-plane loading, accounting for their quasi-brittle properties. A nonlinear approach with Newton-Raphson iteration is applied to simulate realistic building conditions, incorporating lateral constraints and pre-compression. Heat load calculations, based on Chennai's

climatic data, reveal that optimizing the PCM melting temperature enhances the thermal performance of the system.

The findings demonstrate that integrating PCMs into solar wall blocks significantly improves energy efficiency and indoor environmental conditions, offering a pathway toward sustainable building design in tropical climates. This approach advances net-zero energy goals by combining renewable energy generation with passive cooling strategies, representing a critical step forward in sustainable architecture tailored to local conditions.

Keywords: Net-Zero Energy Buildings; Passive Cooling Strategies; Sustainable Building Design; Photovoltaic Integration; Phase-Change Materials (PCMs).

RECOVERING GREEN HYDROGEN FROM INDUSTRIAL GREY WATER: POLLUTANTS TO FUEL

SUDHAGAR PITCHAIMUTHU

Research Centre for Carbon Solutions (RCCS), Institute of Mechanicals, Process and Energy Engineering, School of Engineering and Physical Sciences, Heriot-Watt University, Edinburgh, SA14As United Kingdom

Email: S.Pitchaimuthu@hw.ac.uk

ABSTRACT

Green hydrogen generation using semiconductor catalysts and water powered by renewable energy is gaining significant attention in the transition toward a net-zero environment. This talk will explore the development of advanced electrolysis technologies for green hydrogen generation using industrial grey water (distillery waste water, sewage, and food industry wastewater) as a feedstock. Focusing on the transition from laboratory-scale research to prototype development, we will discuss the challenges and breakthroughs in catalyst design, system efficiency, and water purification. A key aspect will be benchmarking catalysts through fundamental electrochemical property investigations, including catalytic activity, stability, and overpotential. These evaluations provide critical insights into optimizing performance for large-scale applications. By leveraging innovative materials and scalable processes, this work aims to demonstrate a viable pathway for industrial applications of hydrogen fuel, aligning with global clean energy and circular water management goals.

Keywords: Hydrogen, Solar, Electrocatalysts, Energy, Industry Wastewater.

TECHNO-ECONOMIC ANALYSIS OF INDIGENOUS SOLAR DESALINATION TECHNOLOGIES FOR SUSTAINABLE POTABLE WATER FROM BRACKISH WATER BODIES

K.S. REDDY

Heat Transfer and Thermal Power Laboratory, Dept. of Mechanical Engineering,
Indian Institute of Technology Madras, Chennai – 600036, India.

ksreddy@iitm.ac.in

ABSTRACT

Water plays an important role in mankind's day to day life activities and most of the regions of the globe are under severe water scarcity. In India, several regions are under severe water stress and deaths are reported every year due to unsafe water consumption. Desalination of sea water is an effective option to satisfy the fresh water demands. Desalination industry is widely expanding in India and its market value wound be around USD1.9 billion in 2019. The desalination is an energy intensive process and it requires at least a ton of oil to produce 20 tons of fresh water. For every one ton of fresh water produced nearly 25.0 kg of CO_2 is emitted to the atmosphere. Solar energy can be used to power desalination technology there by cut off in carbon emission can be achieved. India receives nearly 3.5 to 6.0 kWh/m^2-d of solar radiation which paves the way for setting up solar thermal or PV based desalination units. Solar stills have been widely used to meet the fresh water demands. Solar stills are a sustainable option for remote and rural locations were access to electricity and fresh water is minimal. Cascaded vertical double slope still and Active multi effect evacuated vertical solar still can produce fresh water of around 20 kg/d from saline water of 5.0 wt% salinity which is fairly sufficient for a family of 4 to 5 members. The units can mitigate at least 80 tons of CO_2 emission during their life time of 20 yrs. Cost of distilled water is around 33.0 USD/kL for 12% interest rate and it can be reduced to 19.0 USD/kL for 5% interest rate. The production cost and environmental benefits of these solar desalination units are highly competitive and viable in rural areas.

DEPLOYMENT OF SOLAR ENERGY FOR SUSTAINABLE SOLUTIONS IN THE DYEING INDUSTRY

Dr. R. MAHENDIRAN

Professor, Department of Renewable Energy Engineering,

Agricultural Engineering College and Research Institute, TNAU, Coimbatore.

ABSTRACT

This article will explore the potential benefits of repurposing waste from the dyeing industry as a resource for energy production. By examining the synergies between solar concentrators and the residual chemicals found in dye effluents, the feasibility of this approach and its potential to reduce environmental pollution can be evaluated. Furthermore, we will consider how this solution could play a vital role in the shift toward more sustainable industrial paradigms, ultimately contributing to a greener and more energy-efficient future for the dyeing and textile sectors.

This paper delves deeper into the technology behind solar concentrators, the nature of waste generated by the dyeing industry, and the innovative ways in which these two elements can be effectively combined to address environmental and energy challenges. Through these ways, we will demonstrate how such integrations could help the dyeing industry transition toward a more sustainable and resource-efficient model, benefiting both the environment and society as a whole.

Biological Sciences (BS)

BS-01

MICROBIAL-ASSISTED REMEDIATION TECHNIQUES AND ENGINEERED CONSORTIA FOR SOIL AND WATER RESTORATION

VIMAL P, PUNITHA PRINCY M, SWATHI K

Department of Biochemistry, Dr. N.G.P. Arts and Science College, Coimbatore

ABSTRACT

The accumulation of potentially toxic elements in soil and water, often due to urbanization and industrialization, disrupts microbial functions, nutrient cycling, and plant growth, and can enter the food chain, causing health issues like kidney and liver problems. Bioremediation techniques use microorganisms to degrade, transform, or remove pollutants, particularly heavy metals, from the environment. These methods include biosorption, biotransformation, biomineralization, bioaccumulation, and bioleaching. Bioremediation also involves bioaugmentation, where pollutant-resistant bacteria are added, and biostimulation, which enhances soil quality to support local microbes. Microbial-assisted phytodepuration improves water treatment by integrating plant-based filtration with microbial degradation of pollutants. Mycorrhizoremediation uses plants and mycorrhizal fungi to stabilize or remove heavy metals. Microbial fuel cells (MFCs) use microorganisms to convert organic waste into bioelectric energy, aiding soil and water reclamation. In soil, they degrade pollutants and improve quality, while in water, they treat wastewater and reduce contaminants. MFCs generate electricity, offering a sustainable solution for pollution cleanup and energy production. Metagenomics identifies enzymes and metabolites that detoxify pollutants and heavy metals by analyzing environmental DNA, enabling microorganisms to break down pollutants and rapidly adapt through new metabolic pathways. Genetically engineered microorganisms can be modified to break down contaminants more efficiently using techniques like recombinant DNA technology. Synthetic biology can create microbial consortia for degrading metals in agricultural soils. Metagenomic and metabolic analysis helps identify metal resistance genes, improving microbial strains for better bioremediation.

Keywords: Bioremediation, biosorption, microbial fuel cells, mycorrhizoremediation, Metagenomics

BS-02

SURPRISING HEALTH BENEFITS OF COCONUT SHELL POWDER

S. HARIN K.TAMIZHARASI, S.SELVI

Department of Biochemistry Bharathidasan College of Arts and Science, Erode

ABSTRACT

One of the most important societal concerns of the late 20th century is the concern for sustainable development. This concerns, among other things, the preservation of natural resources and environmental concerns. However, environmental consciousness is currently evident in all spheres of life. The idea of "green buildings" is receiving more and more attention in the construction sector. In the building business, the pursuit of "green" or environmentally friendly materials entails the creation of novel materials, but it may also prompt a reexamination of more conventional ones.

All components of the coconut palm can be used for a variety of purposes, making it a well-known multipurpose plant. In order to lower costs or enhance the mechanical qualities of the composite material, this agricultural waste is used with the presumption that it can replace the current material used in commercial products.

The economic, environmental, and technological advantages of using coconut farm wastes are praised by industrialists in the majority of coconut-producing nations. Agricultural residues can be a source of additional revenue for farmers. The husks, spate, petiole, and leaves are traditionally burned or let to decompose in the field by coconut growers.

However, in addition to earning environmental benefits, farmers can also make extra money by turning farm waste into value-added products. According to studies, burning agricultural waste results in soil erosion, air pollution, and even a decline in However, letting farm wastes rot in the field may increase soil productivity, but the slow rate of decomposition results in piles of agricultural waste that can pose a phytosanitary risk to the coconut plantation because decaying waste provides the perfect habitat for coconut pests like the rhinoceros beetle. The coconut shell powder product finds extensive use in plywood and laminated boardindustry as aphenolic extruder and as a filler in synthetic resin glues, mosquito coils and agarbathis. As an exfoliant, it absorbs a nice amount of water to work into our skin without dissolving. Coconut shell powder is an environmentally friendly alternative to synthetic materials. It’s a renewable resource that can be easily sourced and doesn’t produce harmful byproducts during production.

Keywords: Coconut shell powder, environmental benefits, renewable resource

ESTUARINE WATER HEALTH AND HUMAN RISK ASSESSMENT: A CASE STUDY OF THE VETTAR ESTUARY

[1]*DEEPTHI NANJAPPA, [2]PAVITHRA V KUMAR, [3]MU. RAMKUMAR, [1]KARUPPASAMY BALASUBRAMANI

[1]Department of Geography, Central University of Tamil Nadu, Thiruvarur, Tamil Nadu

[2]Inter-University Accelerator Centre, New Delhi

[3]Department of Geology, Periyar University, Salem, Tamil Nadu

*Corresponding author mail: deepthinanjappa20@gmail.com

ABSTRACT

Estuaries are critical breeding grounds for aquatic fauna, supporting fragile ecosystems and serving as a continuum connecting world rivers to oceans. They have significant characteristics of their own. The Vettar River estuary, influenced by seasonal variations, functions as a tidal inlet during summer and transforms into a river-estuary channel during the northeast monsoon. Trace elements are essential at permissible concentration, and are harmful when their levels exceed thresholds, leading to pollution accumulation and potential distribution to other systems. Continuous or periodic monitoring of trace element concentrations in estuarine water for assessing estuarine health and its stakeholders. This study collected water samples from the Vettar estuary in February, June, and October at three different locations, resulting in 243 samples. The average concentrations of dissolved trace elements in ascending order were Cr > V > Pb > Cd > As > Hg. Data distribution patterns were analysed and represented using plots. To assess human health risks via dermal or ingestion pathways, as well as the estuary's element pollution, Hazard Index (HI) and Heavy Metal Pollution Index (HPI) are calculated, revealing very poor water quality. The findings underscore the need for effective management and mitigation strategies in the estuarine environment.

Keywords: Estuary, Vettar River, Cauvery River, Risk Assessment, Hazard Index, Trace Elements, Human Health, Heavy Metal Pollution

BS-04

WATER QUALITY ASSESSMENT ON THE OUTSKIRTS OF GREATER MUMBAI: CASE OF NAIGAON EAST

AMRITA AGGARWAL

Department of Geography, Nagindas Khandwala College, Mumbai- 400064

Corresponding author mail: amrita@nkc.ac.in

ABSTRACT

Naigaon East, a rapidly urbanizing suburb, grapples with escalating air and water pollution due to industrial expansion, vehicular emissions, construction activities, and inadequate waste management practices. This study **aims** to evaluate the environmental challenges in the region by assessing air and water quality, identifying pollution sources, and exploring health implications for residents. The research employs a descriptive cross-sectional **methodology**, combining primary data collection through surveys and pollutant analysis with secondary data review. Water quality tests show contamination by heavy metals, nitrates, and coliform bacteria, resulting from industrial effluents, agricultural runoff, and insufficient sewage treatment. The **findings** underscore the immediate health risks posed by these pollutants, including gastrointestinal and cardiovascular diseases. Through hypothesis testing, the study confirms that industrial effluents and inadequate sewage treatment significantly contribute to water contamination. **Recommendations** include stricter environmental regulations, the promotion of green technologies, and community engagement initiatives to enhance public awareness. To **conclude** it can be said that this research contributes to understanding the environmental and public health challenges in Naigaon East and offers actionable strategies for policymakers, stakeholders, and residents to mitigate pollution and foster sustainable urban development. The findings highlight the need for integrated approaches to urban planning and environmental management, ensuring a healthier future for the region.

Keywords: water, pollution, effluents, health risks, planning

BS-05

LAKE WATER QUALITY ASSESSMENT AND ASSOCIATED HEALTH PROBLEMS IN GREATER MUMBAI: CASE STUDY OF T WARD

MOUSHUMI DATTA

Department of Geography, Nagindas Khandwala College, Mumbai- 400064.

Corresponding author mail moushumi@nkc.ac.in

ABSTRACT

The assessment conducted in T Ward, Greater Mumbai, involved the analysis of key water quality parameters such as pH, dissolved oxygen, turbidity, and nutrient levels. These parameters are critical indicators of water health and provide insights into the overall ecological condition of the lake. The **objectives** of this study were to identify and quantify pollutants and contaminants present in the lake water, including chemicals, and organic matter, to determine potential health hazards associated with exposure to contaminated lake water and to develop and implement management and remediation plans to improve water quality, reduce contamination levels, and mitigate health risks. A comprehensive assessment was conducted to identify and quantify chemical pollutants and organic matter present and to determine potential health hazards associated with exposure to contaminated lake water. The **methodology** includes a mix of secondary and primary data collection. Secondary data collection involved reviewing the latest updates and articles related to the topic, while primary data was gathered using a structured questionnaire which consisted questions related to feedback from respondents in the lake areas. The **major findings** highlight an urgent need for remediation measures, including improved wastewater treatment facilities, stricter industrial regulations, and community education on safe water practices. Continuous monitoring and public health interventions are crucial to mitigating the identified risks and restoring the lake ecosystem's health in T Ward. The **recommendations** emphasize implementing a comprehensive strategy that includes enhanced monitoring, pollution prevention measures, community education, and infrastructure upgrades to mitigate contaminants and associated health risks in T Ward's lake water. In **conclusion**, the study underscores the significant challenges posed by pollutants and contaminants, ranging from heavy metals and organic pollutants to microbiological hazards. By addressing these issues comprehensively and collaboratively, T Ward can mitigate health risks associated with contaminated water, restore ecological balance, and ensure the sustainable management of its lake resources for future generations.

Keywords: water quality, comprehensive assessment, chemical pollutants, community education, enhanced monitoring.

BS-06

ADSORPTION OF REACTIVE BLUE 19 USING *DICTYOTA BARTAYRESIANA* AND ITS TOXICOLOGICAL EVALUATION

G. V. GEETHAMALA, M. POONKOTHAI

Department of Zoology, Avinashilingam Institute for Home Science and Higher Education for Women, Coimbatore, Tamil Nadu, India, 641043.

Corresponding author mail: 21phzof003@avinuty.ac.in

ABSTRACT

The improper and insufficient treatment of textile dyes is the major contributors to the release of toxic substances into aquatic environment. These pollutants are persistent and bioaccumulative in nature giving rise to significant environmental concerns. To address these issues, environmentalists proposed the utilization of various biologicals for the decolorization of textile dyes from aqueous solutions. Among the biologicals brown seaweeds play a vital role in the decolorization of textile dye due to their binding affinity with the pollutants and can be reused for other applications. The present study investigates the decolorization efficiency of the brown seaweed *Dictyota bartaresiana* for the removal of reactive blue 19 (RB19) from aqueous solutions through batch adsorption experiments. Key process parameters namely dye concentration (10 – 100mg/L) and biosorbent concentration (100 – 900mg/L), pH (2-12) and incubation time (24 – 120 hours) were optimized to enhance decolorization. The process of decolorization was confirmed using UV-Vis spectroscopy which revealed the disappearance of absorption peaks in *D. bartayresiana* treated RB19 dye solution. Toxicity assessments of untreated and *D. bartayresiana*-treated RB19 dye solutions on *Vigna radiata* revealed the non-toxic nature of the treated dye solution. These findings underscore the potential of *D. bartayresiana* as an eco-friendly biosorbent for RB19 decolorization and its safe use in various biological applications.

Keywords: *D. bartayresiana*, Reactive blue 19, Batch adsorption studies, Phytotoxicity

BS-07

KINETIC EVALUATION OF AN UP-FLOW ANAEROBIC SLUDGE BLANKLET (UASB) REACTOR FOR TREATING NATURAL RUBBER PROCESSING WASTEWATER

R. SHREELAVANIYA, G.SARAVANAPRIYA

ICAR Research Centre on Bio-Conversion Technology,
AICRP on Energy in Agriculture and Agro-based Industries,
Sri Parasakthi College for Women, Courtallam – 627 802, Tenkasi District, Tamil Nadu.

ABSTRACT

A pilot scale study on an up-flow anaerobic sludge blanklet reactor (UASB) was set up and operated at different hydraulic retention times (HRTs) such as 5,10,15,20 and 25 hours. The reactor was fed with natural rubber processing wastewater with an initial chemical oxygen demand (COD) concentration of 9820 mg/L. The results wereanalyzed using the Monod model, the Modified Stover-Kincannon model, and the Grau Second-Order Model. All kinetic models were found capable of describing the kinetic behaviour in the UASB reactor with good correlation. The biokinetic constant values, namely the growth yield coefficient (Y) and the endogenous decay coefficient (K_d) were 0.029 mg VSS/mg COD and 0.167 d^{-1}, respectively. The half-saturation constant (K_s) and maximum substrate utilization rate (K) returned values of 83.68 mg/L and 0.3736 d^{-1}, respectively, whereas the maximum specific growth rate of the microorganism (μ_{max}) was 0.010 d^{-1}. The maximum removal rate constants (U_{max}) and saturation value constant (K_B), of the Stover-Kincannon model produced values of 5.49 g/L/d and 5.41 g/L/d, respectively. These models gave high correlation coefficients with the value of R^2 varying from 80–99% and these indicated that these models can be used in designing UASB reactor consequently predicting the behaviour of the reactor. The kinetic coefficients derived from this rubber processing wastewater treatment using UASB reactor with half partially packed with PVC as support media provide good agreement with the Stover-Kincannon and Grau second-order models.

KEYWORDS: Kinetic model; Natural rubber processing wastewater; High rate reactor; Biogas production.

BS-08

IMPACT OF ELECTROCOAGULATION ON OILY BILGE WATER FOR ENHANCED PRODUCTION AND CHARACTERIZATION OF BIOPOLYMER

UMA.V[1], DR. R. GANDHIMATHI[2]

[1]Department of Renewable Energy Engineering, TNAU, Coimbatore, Tamilnadu-641003, India
[2]Department of Civil Engineering, National Institute of Technology, Tiruchirappalli, Tamilnadu - 620015, India
Corresponding author mail: umavemburaj29@gmail.com, rgmathii@nitt.edu

ABSTRACT

The oily bilgewater is a combination of marine water contains various constituent such as cleaning agent, lubrication oil, detergent etc. Different treatment methodologies are available for the removal of the oil impurities. The physicochemical and biological treatment of bilge water includes conventional coagulation, filtration, adsorption, membrane technologies, air striping, wet air oxidation, electrochemical treatment, UASB (Up flow Anaerobic Sludge Blanket Reactor) and hybrid technologies. Each technology has its own merits and demerits for the management of bilge water. But, biological treatment of oily bilge water by using microorganism shows the good oil removal efficiency and simultaneously produces the biopolymer as a byproduct. For this study, two different oil degrading microorganisms were isolated and the characteristics of isolated microorganism were done by the biochemical test. The results of the biochemical test for the microorganism to produce the Polyhydroxyalkanoates. Hence the isolated microorganisms are found to be having the potential of producing polyhydroxyalkanoates. Pretreatment of bilgewater was performed by electrocoagulation process. The COD removal efficiency was found at 78%. During electrocoagulation the pH was varied from 3 to 9 and voltage varied from 2 to 8. Optimized parameters for PHA production were pH 7, mean cell residence time 5 days, and cycle time of 24 hr. The Polyhydroxyalkanoate was produced under optimized condition using pretreated bilge water. Polyhydroxyalkanoate was isolated by using solvent acetone, ethanol, and chloroform and sodium hypochlorite. The residual biomass and PHA accumulation were found as 71mg/L and 36.61% respectively. The FTIR studies indicated the functional group present in the PHA.
The peak at 3683 cm^{-1} represents the alcohol -OH functional group, peak 2983 cm^{-1}represent the alkene -CH functional group, peak 1434 cm^{-1} shows the aliphatic functional group, peak 1724 cm^{-1} carboxyl stretch of ester C=O and peak 1022 cm^{-1} represent alkyl halides -RH functional groups are present in the Polyhydroxyalkanoate.

Keywords: Bilge water, Oil degrading microorganism, Electrocoagulation, SBR for Polyhydroxyalkanoate production, Characterization of Polyhydroxyalkanoate.

BS-09

ROLE OF NANOSCIENCE AND BIOINFORMATICS IN AQUATIC POLLUTION CONTROL

HARINI P H, NIVETHA G, AKASH S, K. RAJATHI

Department of Biochemistry, Dr. N.G.P. Arts and Science College, Coimbatore, Tamil Nadu – 641048, India.
Email address: hariniharipraBu@gmail.com

ABSTRACT

This article reviews the crucial contributions and techniques of nanoscience and bioinformatics in addressing the urgent challenge of aquatic pollution control. As water contamination increasingly threatens ecosystems and human well-being, there is a pressing need for innovative solutions. Nanoscience presents unique approaches for the creation of cutting-edge materials and technologies for the detection, elimination, and remediation of pollutants. Bioinformatics offers robust tools to examine intricate environmental data, forecast pollution trends, and enhance treatment methods. This study investigates the recent progress in nanomaterials for water purification, such as nano adsorbents, nanomembranes, and nano catalysts. It also explores the use of bioinformatics in environmental monitoring, toxicity evaluation, and the formulation of targeted remediation strategies. This study underscores the synergistic relationship between these two fields and illustrates how their combined application can result in more efficient and sustainable aquatic pollution control techniques. Additionally, it addresses the obstacles and future prospects in this interdisciplinary domain, emphasizing the potential of nanoscience and bioinformatics to transform water quality management and environmental protection approaches.

Keywords: Nanoscience, Bioinformatics, Aquatic pollution, Nanomaterials, Environmental monitoring

BS-10

BIOREMEDIATION AND SUSTAINABLE FARMING PRACTICES OF BLACK PEPPER (*Piper nigrum* L.): FINDINGS FROM WAYANAD DISTRICT, KERALA

P. ATHIRA [1], K. THENMOZHI[1*], J. MALAVIKA[1], R. ARUNKUMAR[1], R. INDUMATHI, P. A. AKHILA[2]

[1]PG and Research Department of Botany, Kongunadu Arts and Science College, GN Mills Post, Coimbatore, Tamil Nadu-641 029

[2]Independent, Meppadi, Wayanad District, Kerala-673 577

[*]Corresponding author: Dr. K. Thenmozhi, Assistant Professor and Head, PG and Research Department of Botany, Kongunadu Arts and Science College, GN Mills Post, Coimbatore, Tamil Nadu-641 029; kthenmozhi_bo@kongunaducollege.ac.in

ABSTRACT

Black pepper (*Piper nigrum* L., Piperaceae), the "King of Spices," holds an enormous monetary and cultural prominence in Kerala, chiefly in the Wayanad district. However, black pepper farming faces several challenges, comprising climate change, soil degradation, and pathogenic diseases such as *Phytophthora* foot rot and yellowing of vines. This investigation explores the conventional and progressive farming exercises implemented by farmers of Wayanad, accenting their coalition with bioremediation principles for sustainable agriculture. Data were collected through surveys and interviews with six farmers across diverse regions of Wayanad, along with observations on cultivation strategies. The findings uncover a noteworthy shift from traditional to hybrid pepper varieties, with Panniyur-1 transpiring as the most cultivated variety due to its high yield and disease resistance. Sustainable practices such as mixed cropping, organic fertilizers, nitrogen-fixing plants (*Gliricidia sepium* (Jacq.) Kunth), and modern systems like bush pepper cultivation and the Vietnam model are underlined as applicable strategies to combat antagonistic environmental and economic factors. Despite these advancements, challenges persist, including labour scarcity, fluctuating market prices, and insufficient knowledge of modern bioremediation techniques. This study features the importance of integrating traditional knowledge with modern innovations to enhance black pepper production sustainably. In order to safeguard economic and environmental stability, it additionally encourages farmer education, government assistance and patenting of locally produced pepper varieties. This study complements to global efforts in bioremediation and agricultural robustness by offering a framework for sustainable black pepper cultivation methods.

Keywords: Black pepper; cultivation strategies; Panniyur-1; sustainability; traditional knowledge; Vietnam model

BS-11

SCIENTIFIC INPUT IN THE BIOREMEDIATION PROCESS

BETTY T, MALINI RP, VASINI V, SUMATHI P*

*Corresponding author:

Department of Botany, Kongunadu Arts and Science College (Autonomous), G.N.Mills, Coimbatore. 641029. Tamil Nadu, India.

E-mail address: psumathi_bo@kongunaducollege.ac.in

Mobile : 9865352676.

ABSTRACT

Bioremediation is an environmentally sustainable and cost-effective approach to mitigating pollution using biological agents such as microorganisms, plants, and fungi. This process plays a critical role in managing environmental pollution caused by hazardous materials such as heavy metals, organic pollutants, and hydrocarbons. Scientific input into bioremediation processes has been vital in advancing the understanding of the mechanisms involved, optimizing bioremediation techniques, and overcoming challenges. This paper reviews the scientific principles underpinning bioremediation, its applications, the recent advances in the field, and the challenges that continue to limit its widespread use. The integration of molecular biology, synthetic biology, and microbial consortia offers promising solutions to enhance bioremediation efficacy. The future outlook of bioremediation focuses on advancing these techniques to address complex contamination problems more effectively.

Keywords: Bioremediation, Microorganisms, Biodegradation, Molecular biology.

IMPACT OF COPPER AND ZINC ON GERMINATION, GROWTH, PRODUCTIVITY AND BIOCHEMICAL CHANGES OF GROUNDNUT (ARACHIS HYPOGAEA L.)

MEGHA. C *, RITHIKA. S, AND PARVEEN. M

PG and Research Department of Botany Kongunadu Arts and Science College (Autonomous), Coimbatore District, Tamil Nadu, India

Corresponding Author: parveenm_bo@kongunaducollege.ac.in

ABSTRACT

Environment is the combination of external physical conditions that affect and influence the growth, development and survival of plants and organism. It is the combination of all the condition external to the genome that potentially affects its expression and its structure. Pollution has been continuously exacerbating the environmental deterioration at a global scale. Today the world faces both environmental and developmental crises; both these crises intensify and interact to reinforce one another. Pollution is one of the public environmental crises, economically influencing layman too plants and all other living organisms, they are generally very sensitive to their surrounding environment, climatic, edaphic or biotic environmental conditions due to human activities. Heavy metals are the important environmental pollutants. Metal contamination of the environment results both from natural sources and industrial activities. The term heavy metal refers to any metallic elements that has relatively high density and is toxic or poisonous even at low concentration (Lenntech 2004). Copper and zinc is widely prevalent in our environment and was considered as an essential element for all living organism including plants. The present investigation has been carried out to assess the impact of copper and zinc on germination growth, productivity and biochemical changes of ***Arachis hypogaea*** L. For this purpose five different cultivars were procured and the healthy seeds were collected and grown by irrigating with different concentration of copper, zinc and the combined treatment (Control 0, 5, 10, 20, 25, 50, 100, 200, 250, 500, 1000 (mgl -1). As the result the present study reveals that implication of both metals copper and zinc induced considerable changes in germination growth, productivity, biochemical changes and mineral concentration of ground nut. Both the metals serve as micronutrients, hence at low concentration copper (5mg-1) and zinc (5 and 10 mg-1) induced growth and yield of ground nut. Combined treatment of copper and zinc produced synergistic effect. The result of the study shows among five cultivars TMV-10 cultivar groundnut is a metal tolerant to some extent.

Key words: Biochemical changes, Ground nut (*Arachis hypogaea* L.) Cultivar

BS-13

EVALUATION OF REHABILITATION STRATEGY FOR RESTORING DEGRADED LANDS AFFECTED BY INDUSTRIAL AND ANTHROPOGENIC ACTIVITIES

INDUMATHI R, ARUNKUMAR R, ATHIRA P, MALAVIKA J, THENMOZHI K*

PG and Research Department of Botany, Kongunadu Arts and Science College (Autonomous), Coimbatore-29, India
Correspondence: Dr. K. Thenmozhi, kthenmozhi_bo@kongunaducollege.ac.in

ABSTRACT

Land degradation caused by physical disturbances and industrial activities significantly reduces land capability, disrupts vegetation, and contributes to environmental pollution. Restoring these lands is crucial for ecological balance and sustainable resource management. This study examines the rehabilitation of degraded lands, including mine-leased areas, brickfields, river-eroded regions, and landslide zones, in Coimbatore and Nilgiris districts, focusing on bioremediation and nutrient recovery techniques. Soil analyses of these sites revealed nutrient deficits and, in most cases, alkaline pH, conditions often exacerbated by industrial waste disposal and effluents. A pot culture method was used to evaluate locally available tree species for their tolerance and capacity to restore these degraded ecosystems. Species such as *Delonix regia*, *Samanea saman*, and *Eucalyptus globulus* demonstrated high adaptability to nutrient-poor soils, making them suitable candidates for phytoremediation. Single, dual, and triple amendments were applied to enhance bioremediation efficiency using farmyard manure, rock phosphate, and nitrogen fixers. These treatments significantly promoted seedling establishment and growth, enabling effective reclamation of soils impacted by industrial and anthropogenic activities. The study highlights that species like *Delonix regia* and *Samanea saman* in mine spoils and river-eroded regions, and *Eucalyptus globulus* in landslide areas, are effective for rehabilitating polluted soils while potentially mitigating the impacts of industrial effluents. This research underscores the synergy between bioremediation and ecological restoration, offering scalable solutions for managing industrial waste, restoring degraded lands, and promoting sustainable land use practices.

Keywords: Bioremediation, Land degradation, Nutrient recovery, Ecological restoration

EFFECT OF HEAVY METAL LEAD ON MARINE SEAWEEDS

[1]K. JEBA ANATHI [2]V. SORNALAKSHMI [3]JEEVITHA. M

[1]Deparment of Botany, Sarah Tucker College (Autonomous), Tirunelveli – 627 007

[2]Department of Botany, A.P.C. Mahalaxmi College for Women, Tuticorin-628 002

[3] Assistant professor of Botany Pope's College (Autonomous), Sawyerpuram.

Email: jebajeyakumar18@gmail.com

ABSTRACT

The impact of heavy metal lead on three seaweeds were studied. The effect of different concentration of Lead acetate [1ppm, 2ppm and 5ppm] was studied on the daily growth rate (DGR), total chlorophyll, carotenoids, sugar and protein of *Ulva lactuca, Padina tetrastromatica* and *Gracilaria corticata* cultured in the laboratory. These cultures were incubated at 28 ^{0}C under 16:8 LD cycle of 800 lux light intensity for a period of 21 days. After that they are harvested and analysed for growth and other biochemical parameters using standard procedures. Of the three seaweeds studied, *Ulva lactuca* showed good response to the heavy metal lead. Enhanced growth, pigment and biochemical content was recorded in *Ulva lactuca* cultured in lead treated medium when compared to control.

Keywords: Lead acetate, Seaweeds, DGR, Pigments, Biochemicals

PHYTOREMEDIATION OF HEAVY METALS: A REVIEW ON PLANT-BASED STRATEGIES FOR SOIL DECONTAMINATION

J MALAVIKA [1], P ATHIRA[2], R ARUNKUMAR[3], R INDHUMATHI[4], K THENMOZHI [*]

PG and Research Department of Botany, Kongunadu Arts and Science College (Autonomous)

Coimbatore, Tamil Nadu

Corresponding author: Dr. K. Thenmozhi, Assistant Professor and Head, PG and Research Department of Botany, Kongunadu Arts and Science College, GN Mills Post, Coimbatore, Tamil Nadu - 641 029;
kthenmozhi_bo@kongunaducollege.ac.in

ABSTRACT

Heavy metal pollution in soil is a pervasive environmental problem, posing significant risks to human health and ecosystem function. Phytoremediation using plants to remove or degrade pollutants, has emerged as a promising strategy for decontaminating heavy metal-polluted sites. This review provides a comprehensive overview of plant-based strategies for phytoremediation of heavy metals, including hyperaccumulation, phytostabilization and phytoextraction. Plants such as *Hypericum perforatum*, *Brassica juncea*, and *Thlaspi caerulescens* have been shown to hyperaccumulate heavy metals like lead, cadmium, and zinc. Phytoextraction methods, including chelate-assisted phytoextraction and induced phytoextraction have also been explored in this field incorporating the ability of these plants to accumulate heavy metals due to their high biomass production, unique root absorption systems and ability to absorb and store large amounts of metals. Thus, the review suggests that phytoremediation has the potential to be a cost-effective, sustainable and environmentally friendly approach for decontaminating heavy metal-polluted sites and identifies key areas for further research and development.

Keywords: heavy metals, plant-based strategies, soil decontamination, phytostabilization, phytoextraction, *Hypericum perforatum*, *Brassica juncea*, *Thlaspi caerulescens.*

A COMPREHENSIVE OUTLOOK ON THE CORRELATION BETWEEN TRADITIONAL KNOWLEDGE AND BIOREMEDIATION

S. SABARI VISHNU, K. NITISH, P. ATHIRA, J. MALAVIKA, K. THENMOZHI*

PG and Research Department of Botany, Kongunadu Arts and Science College, GN Mills Post, Coimbatore, Tamil Nadu-641 029

***Corresponding author**: Dr. K. Thenmozhi, Assistant Professor and Head, PG and Research Department of Botany, Kongunadu Arts and Science College, GN Mills Post, Coimbatore, Tamil Nadu-641 029; kthenmozhi_bo@kongunaducollege.ac.in

ABSTRACT

Bioremediation, the process of using living organisms to degrade or detoxify environmental contaminants, has gained significant attention as a sustainable and eco-friendly solution for environmental pollution. While modern biotechnological approaches have made substantial progress in this field, traditional knowledge and practices offer valuable, time-tested methods for managing environmental degradation. Indigenous communities across the world have developed a deep understanding of local ecosystems and have utilized natural organisms, plants, and microbial processes to remediate polluted environments, restore soil fertility, and purify water sources. Traditional practices such as the use of specific plant species for phytoremediation, microbial inoculants for soil restoration, and the application of organic materials for composting and waste treatment have been integral to maintaining ecological balance in many cultures. For example, indigenous knowledge of plant-microbe interactions, the use of bioremediation agents like mycorrhizal fungi, and the practice of applying organic amendments for soil health, are widely documented across diverse regions. These methods not only contribute to pollution control but also emphasize biodiversity conservation, sustainable land management, and the preservation of cultural heritage. Incorporating traditional ecological knowledge with modern scientific techniques offers a holistic approach to addressing pressing environmental challenges. By bridging these two domains, bioremediation strategies can become more effective, adaptable, and culturally relevant. This integration can also empower local communities, fostering environmental stewardship and resilience. However, there is a need for more interdisciplinary research to validate and scale up traditional practices in the context of contemporary environmental issues.

Keywords: Indigenous knowledge; Pollution; Ecosystem conservation; Soil restoration; Biodiversity.

IMPACT OF WATER POLLUTION IN ECONOMIC GROWTH: A CASE STUDY OF CHALIYAR RIVER OF MALAPPURAM DISTRICT, KERALA

SLOWMO MANESH, P. ATHIRA, J. MALAVIKA, K. THENMOZHI*

PG and Research Department of Botany, Kongunadu Arts and Science College, GN Mills Post, Coimbatore, Tamil Nadu-641 029

***Corresponding author:** Dr. K. Thenmozhi, Assistant Professor and Head, PG and Research Department of Botany, Kongunadu Arts and Science College, GN Mills Post, Coimbatore, Tamil Nadu-641 029;
kthenmozhi_bo@kongunaducollege.ac.in

ABSTRACT

Water pollution occurs when harmful substances like chemicals, plastics, and waste end up in our rivers, lakes, and oceans. It affects not just the environment, but also our health, making water unsafe to drink and harming the ecosystem and economy itself. Water pollution caused by pollutants such as chemicals, plastics and sewage threatens human health, disrupts ecosystems and harms the economy. The key pollutants which cause the pollution in water includes physical pollutants like sediments from construction and mining, trash, debris and chemical pollutants like pesticides and herbicides, heavy metals like lead, mercury etc., and radiological pollutants caused from radiological substances of nuclear power plants, medicinal wastes or industrial process can cause water pollution and also through biological pollutants like algal blooms. Pathogens from human and animal waste may also be a reason for water pollution. It causes water-borne diseases, poison aquatic organisms and reduces biodiversity. Preventive measures include wastewater treatment, reduce usage of plastic waste, and awareness campaign to public. Water pollution has a significant negative impact on economic growth in many ways like public health costs, agricultural productivity, water treatment costs, harm to ecosystems. This study investigates the impact of water pollution on economic growth with a focus on the Chaliyar River of Malappuram, Kerala.

Keywords: Economy, ecosystem, Key pollutants, Preventive measures, Water pollution.

BS-18

INTEGRATING NANOSCIENCE AND BIOINFORMATICS FOR AQUATIC POLLUTION CONTROL

VASINI V, BETTY T, MALINI RP, SUMATHI P*

Department of Botany, Kongunadu Arts and Science College (Autonomous), G.N.Mills, Coimbatore. 641029. Tamil Nadu, India.

E-mail address: psumathi_bo@kongunaducollege.ac.in

ABSTRACT

Aquatic ecosystems are increasingly threatened by various forms of pollution, including chemical contaminants, heavy metals, and microplastics, which disrupt biodiversity and degrade water quality. Nanoscience offers innovative solutions for environmental monitoring and pollutant removal, where nanomaterials such as nanomagnets, carbon nanotubes, and nanocomposites show remarkable efficiency in adsorbing, filtering, and degrading pollutants at the molecular level. Additionally, bioinformatics tools provide invaluable insights into the molecular interactions between pollutants and aquatic organisms. By analyzing large datasets of genomic, proteomic, and metabolomic data, bioinformatics can help identify biomarkers for pollution exposure and resistance, as well as in designing strategies for ecosystem recovery. This paper discusses the integration of nanoscience and bioinformatics in combating aquatic pollution, highlighting recent advances in nanomaterial development and the application of computational tools to predict pollutant behavior and environmental impact.

Key Words: Nanoscience, Aquatic ecosystems, Heavy metals, Microplastics, Biomarkers

BS-19

ENVIRONMENTAL IMPACT OF UNTREATED INDUSTRIAL WASTE WATER DISCHARGE

S.N. BALA AJAY RAJ, REKKA RAJA*

Department of Botany, Kongunadu Arts and Science College (Autonomous), Coimbatore – 641 029 Tamil Nadu, India.

*Corresponding Author mail id: rekkar_bo@kongunaducollege.ac.in

ABSTRACT

Industrial effluent is the wastewater produced by industrial activity which contains various organic pollutants such as pesticides, fertilizers, hydrocarbons, phenols plasticizers, biphenyls, detergents, oils, greases, pharmaceuticals, etc. Hence, industrial waste water could affect the quality of water when discharged into rivers and lakes. Both untreated and partially treated waste water contain metals, chemicals and sewage which are directly affected aquatic ecosystem. Over 90% of rivers, still face threats from eutrophication caused by untreated waste water. Nutrient pollution caused by excess nitrogen and phosphorus in water is the number one threat to water quality worldwide and can cause algal blooms, a toxic soup of blue green algae that can be harmful to people and wildlife. Contaminated water can caused 1.8 million deaths in 2015, which are caused by water borne pathogens like bacteria and viruses. Diseases spread by unsafe water include cholera, giardia and typhoid. Chemical pollutants from heavy metals such as arsenic and mercury caused cancer to hormone disruption to altered brain function. Every year, 3.5 million health issues such as skin rashes, pinkeye, respiratory infections and hepatitis from sewage-laden coastal waters. One of the most ways to prevent water contamination is reduce plastic consumption and reuse or recycle plastic and properly dispose of chemical cleaners, oils and non-biodegradable items to keep them from going down the drain.

Key words: Waste water, Eutrophication, Algal blooms and Water borne pathogens

BIOACCUMULATION OF HEAVY METALS IN *METAPENAEUS MONOCEROS* (FABRICIUS-1798) FROM KRISHNANKOTTA (KODUNGALLUR), MOOLAMPILLY (NORTH & SOUTH), VALLARPADAM OF CENTRAL KERALA.

ANUSHA MATHEW, *S RAJESH KUMAR

Department of Zoology, Kongunadu Arts and Science College (Autonomous), G.N. Mills Post, Coimbatore 641029.

*Corresponding author mail: rajeshkumars_zo@kongunaducollege.ac.in

ABSTRACT

Anthropogenic activities led to the contamination of estuaries of Central Kerala to a great extent. Heavy metals disposed to estuaries through industrial discharge, yard runoff, agricultural activities and storm drains shows a bioaccumulation in the tissues of aquatic animals. In the present study *Metapenaeus monoceros*, the speckled shrimp and associated water and sediments were collected from four different sites of Central Kerala Division, to gauge the accumulation of heavy metals. Atomic Absorption Spectrophotometer was performed for the analysis of heavy metals like Pb, Fe, Cd, Cr, Mg and Zn in muscle of tissue in *Metapenaeus monoceros*. The results revealed that the level of heavy metals accumulation in the muscle tissue of *Metapenaeus* follows in descending order of Mg > Zn > Fe > Pb > Cr > Cd during the period from March 2021 to June 2022. The mean cluster of heavy metals in water at all trail places follows in descending order of Mg > Zn > Fe > Pb > Cr > Cd. Elemental analysis of sediment samples revealed that mean value of Mg and Fe were found to be higher. While mean values of Cd and Cr are within the permissible limit. Study indicates the ability of crustaceans to accumulate heavy metals to detectable levels. Knowledge of heavy metals concentration in biota, water samples and sediments are important both with respect to nature management and human consumption of shrimp.

Keywords: *Metapenaeus monoceros*; Heavy metals; Bio accumulation; Krishnankotta; Moolampilly; Vallarpadam

ASSESSMENT OF FISH DIVERSITY IN SELECTED WETLANDS OF VELLORE DISTRICT, TAMIL NADU, INDIA

ANNIE PUSHPA, S. YESUMANIPREETHI, N. *NIRMAL MAGADALENAL

PG and Research Department of Zoology, Voorhees College, Vellore 632 001,

*Corresponding author email: nirmalmagdalene@gmail.com

ABSTRACT

Freshwater ecosystems are vital for biodiversity conservation, as they support a wide variety of species, including numerous fishes that play key roles in maintaining ecosystem balance. Understanding the interactions between water quality, fish diversity, and macrophytes is crucial for sustainable management. This study focuses on the fish diversity in Sathuperi Lake and Katpadi Lake, located in Vellore district, Tamil Nadu, India. A total of 16 fish species and 8 macrophytes were recorded from both lakes. In Sathuperi Lake, 10 fish species and 5 macrophytes were observed, whereas in Katpadi Lake, 8 fish species and 3 macrophytes were recorded. The dominant fish orders identified were *Cypriniformes* and *Perciformes* with 36%, reflecting their adaptive resilience to varying water conditions. The IUCN status of recorded fish species indicated that most are categorized as Least Concern. A few exotic and invasive species recorded in the study areas raises ecological concerns. Among macrophytes, *Ceratophyllum demersum* and *Typha domingensis* were significant as they influence water quality by acting as biofilters, and also provides habitat and food for fishes. Healthy water quality plays a pivotal role in maintaining ecological integrity, as it directly impacts species diversity, growth, and ecosystem balance. Present finding suggests to control the anthropogenic activities and implementation of conservation strategies in the study area to sustain native fish fauna.

Keywords: Fish diversity, macrophytes, water quality, Sathuperi Lake, Katpadi lake, freshwater ecosystem.

BS-22

EVALUATION OF OXIDATIVE DAMAGE CAUSED BY BACTERIA ON LEAVES OF MEDICINAL PLANT MORINGA OLEIFERA

MUSLIHA M C., S BINUKUMARI

Department of Zoology,

Kongunadu Arts and Science College, Coimbatore, 641029

ABSTRACT

Moringa (*Moringa oleifera* Lam) is a type of local medicinal Indian herb which has turn out to be familiar in the tropical and subtropical countries. Just like any other crop, Moringa can affect with various diseases that could reduce yield. Plant diseases are caused by many kinds of pathogens such as fungi, bacteria, nematodes and viruses. The present study examined the effects of bacterial infection on antioxidative enzymes activity in leaves *M.oleifera*. The main objectives are the evaluation of lipid peroxidation and hydrogen peroxide generation and activities of antioxidant enzymes. The oxidative damage of membranes in Moringa cells was accompanied by a decrease in the content of photosynthetic pigments. Bacterial infection lipid peroxidation rate and hydrogen peroxide production. Among the enzymatic antioxidants, activities of superoxide dismutase (SOD), catalase (CAT), glutathione peroxidase (GP_X) and peroxidase (POD) reduced significantly in infected leaves compared with non infected leaves. Furthermore, there was a greater reduction in the level of other biochemical parameters like protein, carbohydrate and amino acid content. The above results clearly stated that the oxidative stress under bacterial infection in *M. oleifera* could damage the cellular metabolism and diminishing the growth rate of the plant.

Key Words: *Moringa oleifera*, Oxidative stress, Lipid peroxidation, Hydrogen peroxide, Enzymatic antioxidants

BS-23

REVALORIZATION OF ECO-EFFICIENT BIOCHAR DERIVED FROM *HYDROCLATHRUS CLATHRATUS* FOR THE ABATEMENT OF REACTIVE BLUE 246 AND ITS TOXICITY ASSESSMENT

[*]R. PAVITHRA, M. POONKOTHAI

Department of Zoology, Avinashilingam Institute for Home Science and Higher Education for Women, Coimbatore, 641043, India

*Corresponding author e-mail: pavithrar0605@gmail.com

ABSTRACT

Water pollution is a significant global issue exacerbated by the advancement of digital civilization and contamination of water occurs when harmful substances are discharged into water bodies, primarily driven by human activities such as industrial processes, agricultural practices and urbanization. Notably, the textile industry plays a major role in this issue, releasing vast quantities of synthetic dyes into waterways during production. The present study investigates the removal of Reactive Blue 246 (RB-246) from aqueous solution using biochar derived from *Hydroclathrus clathratus* (BC-HC). The removal efficiency of RB-246 by BC-HC was studied by varying the operational parameters such as dye concentration (10-100mg/L), BC-HCconcentration (100-500mg/L), pH (2-12), temperature (25-45°C) and incubation time (5-60 minutes) through batch adsorption experiments. UV-Vis, FT-IR and SEM analyses were performed to assess the process of dye decolourisation. Desorption was evaluated using various desorbing agents and adsorption-desorption efficiency was carried out through regeneration studies using dye desorbed BC-HC. The toxicological assessment of untreated and treated dye solutions was assessed using green gram (*Vigna radiata*) and onion bulbs (*Allium cepa*). The results revealed that maximum dye decolourisation (98%) was achieved at optimum conditions at 10mg/L dye concentration amended with 100mg/L of BC-HC, pH 9 at 25°C within 15 minutes. UV-Vis, FT-IR and SEM analyses revealed the interaction between the biosorbent–adsorbate and confirmed the process of decolourisation by BC-HC. Desorption and regeneration studies revealed that 0.1M NaOH proved to be the effective eluting agent, achieving 89% desorption efficiency in the first cycle, while the regenerated BC-HC has dye removal efficiency of 95%, highlighting its potential for reuse. Toxicological assessment on various biological models, revealed the non-toxic nature of the BC-HC treated dye solution, which proves its reusability in other applications. Hence, the present study highlights the potential of BC-HC as an eco-friendly and cost efficient biosorbent for the removal of RB-246 from aqueous solution, with promising applications in wastewater treatment and environmental remediation.

Keywords: *Hydroclathrus clathratus*, Biochar, Reactive Blue 246, Batch adsorption, Cytotoxicity, Phytotoxicity.

BS-24

ASSESSMENT OF NITRATE CONTAMINATION AND ITS ASSOCIATED HEALTH HAZARDS IN THE GROUNDWATER OF DHARAPURAM TALUK, TAMIL NADU

[*]S. SANJUPRIYA, M. POONKOTHAI

Department of Zoology, Avinashilingam Institute for Home Science and Higher Education for Women, Coimbatore, 641 043, India

[*]Corresponding author e-mail: sanjusenthil1214@gmail.com

ABSTRACT

Nitrate contamination in groundwater has become a major environmental pollutant contributing significantly to water quality deterioration. In the present investigation 44 groundwater samples were obtained from Dharapuram taluk, Tiruppur district, Tamil Nadu and a thorough appraisal of its chemistry and implications on human well-being were studied. The levels of Total Dissolved Solids and Electrical conductivity revealed that the groundwater is of high salinity, with significant proportions of samples exceeding WHO standards. The Piper and Gibbs diagrams highlight the water-rock interactions as the primary factors influencing groundwater chemistry, with a shift towards evaporation dominance in certain areas. Statistical analysis shows strong correlations between EC, TDS and major ions like chloride, sodium, magnesium and sulphate, whereas potassium and nitrate exhibit weak correlations. Nitrate contamination, especially in shallow aquifers, was linked to anthropogenic activities like agriculture and waste disposal, posing health risks. The Entropy Water Quality Index (EWQI) classifies groundwater quality, revealing significant areas unsuitable for drinking. Nitrate Pollution Index (NPI) highlights varying levels of contamination, while human health risk assessments show varying hazard indices for different age groups due to nitrate exposure. The findings of the study emphasize the need for targeted management strategies to ensure groundwater quality and mitigate health risks.

Keywords*:* Dharapuram taluk, Groundwater quality, Nitrate contamination, Entropy Water Quality Index, Health risks

MOLECULAR TOOL FOR SEX DETERMINATION OF AVIAN SPECIES

MUHAMMED RASHID C., YASWANTHKUMAR S., *VENKITACHALAM R., BHARATHI P.

Department of Zoology, Kongunadu Arts and Science College (Autonomous), Coimbatore -641029, Tamil Nadu, India.

***Corresponding author:** venkitachalam_zo@kongunaducollege.ac.in

ABSTRACT

The sex determination among bird species is a complex process, involving multiple genetic and hormonal factors. The CHD1 and CHD2 of Chromo Helicase DNA-binding (CHD) genes responsible to find out male and female sex determination of monogamous birds. These genes are located on the Z and W sex chromosomes, these genes are highly conserved and exhibit different intron lengths between the Z (male) and W (female) chromosomes. This differences in genes that allows for molecular sexing by using Polymerase Chain Reaction (PCR) techniques to amplify the CHD genes. The PCR products analyzed via gel electrophoresis to differentiate between male and female birds, as males (ZZ) will show one band and females (ZW) will show two bands. This method is non-invasive, reliable, and can be applied as preferred technique in avian sex determination for conservation, breeding, and ecological studies.

Key words: Sex determination, CHD gene, Sex chromosome, PCR, Gel electrophoresis.

BS-26

FLUOXETINE INDUCES HEMATOLOGY, REDOX HOMEOSTASIS, AND ENZYMOLOGICAL ALTERATIONS EXPOSED TO A FRESHWATER FISH *LABEO*

ROHITA, SUJITHA M

Department of Zoology, Avinashilingam Institute for Home Science and Higher Education for Women Coimbatore - 641 043

ABSTRACT

The ubiquitous occurrence of pharmaceutical contaminants in aquatic environments is attracting a lot of attention. Because of its constant consumption and insufficient removal from wastewater treatment facilities, fluoxetine (FLX), an antidepressant and a type of selective serotonin reuptake inhibitor (SSRI), is frequently detected in aquatic environments. However, FLX can have an impact on aquatic life. Consequently, scientific research has shown an immense interest in analyzing the possible toxicological concerns associated with this drug. Yet, little information is currently available about how FLX alters liver and blood markers. Thus, our present study aims to investigate the long-term toxicity of fluoxetine at three concentrations (1 µg/L, 10 µg/L, and 100 µg/L) exposed to freshwater fish Labeo rohita for 35 days by evaluating hematological indices such as erythrocyte count (RBC), leukocyte count (WBC), hemoglobin concentration (Hb), hematocrit (Hct), mean corpuscular volume (MCV), mean corpuscular hemoglobin (MCH), and mean corpuscular hemoglobin concentration (MCHC), antioxidant activity (superoxide dismutase (SOD), catalase (CAT), glutathione - S - transferases (GST), lipid peroxidation (LPO)), and enzymological analysis (aspartate aminotransferase (AST) and alanine aminotransferase (ALT)), and lactic dehydrogenase (LDH) assays. These biomarkers showed alterations in a time- and dose-dependent manner. After 35 days of exposure to FLX, the blood and liver tissues of *Labeo rohita* exhibited a significant ($P < 0.05$) decrease in the biomarkers RBC, MCHC, SOD, and CAT. On the other hand, WBC, HB, HCT, MCH, MCV, GST, LPO, LDH, AST, and ALT levels were significantly elevated ($P < 0.05$) in *Labeo rohita* blood and liver tissues treated with FLX. In summary, research suggests that aquatic organisms may be susceptible to hazards from antidepressants at lower concentrations.

Keywords – Antidepressant, Fluoxetine, Oxidative stress, Hematology, *Labeo rohita*

BS-27

HAEMATOLOGICAL CHANGES OF NILE TILAPIA TO NOYYAL RIVER POLLUTION TIRUPPUR, TAMIL NADU.

V. VARATHARAJAN[1], J. JAGATHEESWARI[1], Dr. R. KARTHIKEYAN[2]

[1]PG & Research Department of Zoology, Chikkanna Government Arts College, Tiruppur.

[2]Department of Veterinary Physiology and Biochemistry, Veterinary College and Research Institute, Theni.

ABSTRACT

The Noyyal River, a vital freshwater resource flows in the kongu region of Tamil Nadu, India, has experienced severe pollution caused by industrial discharge and urban effluents, posing significant threats to its aquatic ecosystem. Among the aquatic species, Nile tilapia (*Oreochromis niloticus*) is one among the common fresh water fish found in the Noyyal River. This study aimed to investigate the effect of Noyyal river pollution on haematological profile as stress marker in the Nile tilapia to assess the impact of pollution on fish health. Haematological parameters, includes red blood cell (RBC) count, white blood cell (WBC) count, platelet count, haemoglobin concentration, haematocrit (HCT), mean corpuscular volume (MCV), mean corpuscular haemoglobin (MCH), and mean corpuscular haemoglobin concentration (MCHC). These parameters were analysed to evaluate physiological (stress) responses. The alteration of these parameters can be used to assess the ecological risk of aquatic organisms posed by the industrial pollution. The research will establish a link between water quality and fish health, providing crucial data for environmental monitoring and conservation strategies.

BS-28

ISOLATION AND MOLECULAR CHARACTERIZATION OF *Shigella sonnei* FROM FOOT ROT DISEASE INFECTED CATTLE AND EFFICACY OF ANTIBIOTICS

YASWANTHKUMAR. S A, VENKITACHALAM. RA, GANAPATHI. PB, VELUSAMY RC.

[a]Department of Zoology, Kongunadu Arts and Science College, Coimbatore-641029, Tamil Nadu, India.

[b]Bargur Cattle Research Station (TANUVAS), Bargur, Anthiyur Taluk, Erode-638501, Tamil Nadu, India.

[c]Department of Veterinary Parasitology, Veterinary College and Research Institute, Namakkal - 637002., Tamil Nadu, India.

*Corresponding author: yaswanthkumar5671@gmail.com.

ABSTRACT

Foot rot is a bacterial disease commonly caused by *Fusobacterium necrophorum* and *Bacteroides melaninogenicus*. However, a new bacterial strain, *Shigella sonnei*, was detected in the foot rot-infected region of Bargur cattle. Isolated bacterial colonies were further identified using 16S rRNA. *Shigella sonnei* is a gram-negative, rod-shaped bacterium that causes shigellosis and is transmitted through ingestion of contaminated food or water. The presence of *Shigella sonnei* in infected cattle can also cause severe gastrointestinal issues, dehydration, and systemic infections, exacerbating the overall health and productivity of affected animals. Laboratory analysis of antibiotic sensitivity was performed to evaluate the efficacy of generic antibiotics, namely Gentamicin, Ciprofloxacin, and Enrofloxacin, against the isolated *Shigella sonnei* strain. These findings underscore the importance of water quality in cattle health and the potential of waterborne pathogens to exacerbate common bovine diseases.

Keywords: Contaminated water, Foot rot, Isolation and Molecular identification, *Shigella sonnei*, Antibiotic sensitivity test.

BS-29

REVIEW ON VITAL WATER SOURCE CONTAMINANTS OF DIFFERENT FORMS IN TAMIL NADU

BHARGAVI S SRINIVASAN*, SHRINITHI K, MADHUMITHA B

[1] PG and Research Department of Biotechnology, Kongunadu Arts and Science College, Coimbatore -641017

*Corresponding author email: sbhargavi_bt@kongunaducollege.ac.in

ABSTRACT

Water resources are one of the imperative natural resources, it is indispensable for the survival of living organisms. Appropriate safe water is vital to human lives and is required in the quotidian. Water pollution may occur due to natural causes such as mineral silt carried by run-off, organic waste, leeching through soil, thermal pollution, and algal blooms. But polluted water is poisonous to living organisms. A large number of diseases in TamilNadu attributed to the drinking of sewage-mixed water where diseases like polio, cholera, patches, jaundice, fever, etc., are spread through polluted water. Review the latest articles assessing the quality of water for contaminants in TamilNadu. The review articles are distributed into three city zones followed by their locations and randomly selected Samples were analyzed for physiochemical properties. Due to rapid urbanization in India, Chennai's groundwater has been depleted and further exploration could lead to Saltwater ingression. With few parameters' exceptions, most of the quality assessment parameters showed parameters of the accepted zone of Standards except in one zone for exceeded pH. In Erode 9 water samples (GW1-GW9) were collected from Kalingarayan Canal for analysis. APHA method was applied and expressed in terms of water Quality Index (WQI). WQI reflects a low quality of groundwater in sampling stations Kolathupalayam (GW3) and Perumparai (GW6) which is mainly Contaminated with nitrate and the water is found to be very hard. Also observed was Calcium and Magnesium content in water. In Kanyakumari, In villukuri, the Values of Turbidity, Total Hardness, Electrical Conductivity, Total Hardness, Nitrate, Nitrite and sulfate have shown the highest, 6NTU, 740 mg/L, 1112 mics/cm, 312mg/L/,022, 10 and 39mg/L respectively. In Tuticorin, Water quality assessment, in pre- and post-monsoon seasons the Value of TDS (75%), Mg (37.5%), and TH (25%) have exceeded the permissible limits namely 500, 100, and 600 mg/L respectively. That 22.5% and 50.0% of Specimens have excellent water quality during pre- and post-monsoon seasons respectively. This review will demonstrate that in general, the groundwater quality ranges from excellent to good, and low water contaminants and weather pollution globalization have triggered whether it will be for human Consumption.

Keywords: Water contaminants, Tamil Nadu, Groundwater, Water sources, Water borne diseases

BS-30

WATER HYACINTH: THE PROBLEM FACED BY WATER

[*]BHARGAVI S SRINIVASAN*, SUNDAR SRIKAMALI,

JAVVADI HEMAVATHI, DHARSHINI

PG and Research Department of Biotechnology, Kongunadu Arts and Science College, Coimbatore -641029

[*]Corresponding author: sbhargavi_bt@kongunaducollege.ac.in

ABSTRACT

Water pollution is the single most serious problem of today's civilization. The consumption of water has been doubling every twenty years. These two statements rationalize people's distress about which areas of the world will remain without biochemical safe water suitable for drinking and other needs. The plant transfers native vegetation to water bodies due to its rapid growth during the rainy season. Water hyacinth (*Eschhornia crassipes*) is a serious, persistent, aquatic, free-floating, and perennial weed that is native to South America. It is considered the most dangerous aquatic weed in the world because of its very fast growth rate and its adaption to a wide range of nutrient and environmental conditions. It floats on water due to aerenchyma. Its population growth can be doubled within two weeks. Its primary means of reproduction is by way of runners and stolons which eventually form daughter plants. It also produces large quantities of seeds that are viable for up to 30 years. These special reproduction features of the weed created difficulty in the management and control of the weed. Blockage of irrigation, electric power generation, fish production, and waterway transportation are the major economic impacts of the weed. Water hyacinth is very efficient in removing a vast range of pollutants from suspended materials, BOD, nutrients, and organic matter to heavy metals and pathogens. At the same time, *E.crassipes* is one of the most notorious weeds worldwide. People use this weed from infested regions to other regions. Annual and mechanical removal of Water hyacinth in small areas at early times is effective in controlling the weed for a short period. Use of biological control agents: arthropods (neochetina branch), and parasite fungi (*Alterneria alternata*) play a role in controlling the weed. In addition, chemical control with 2,4-D dimethyl amine, glyphosate, and acetic acid is effective in controlling water hyacinth in extreme conditions. Valuable chemicals in water hyacinths such as lignin, cellulose, and hemicellulose can be used as biofuel.

Keywords: Weed, Aerenchyma, Irrigation, Arthropods, Biofuel.

BS-31

STUDIES ON SUSTAINABLE BIOCONVERSION OF TANNERY EFFLUENTS TO BIODIESEL

AAKASH MURUGAIYAN, GAAYATHRI CHANDRASHEKAR, MUTHUSHREE RAVICHANDRAN, NIRUBAMA KUMAR, KIRUPA SANKAR MUTHUVELU[,*]

[1] Department of Biotechnology, Bannari Amman Institute of Technology, Sathyamangalam, Erode 638401, Tamil Nadu, India,

[2] Department of Biochemistry, Kongunadu arts and science College, Coimbatore 641029,

Tamil Nadu, India.

Corresponding author: kirupasankarm@bitsathy.ac.in

ABSTRACT

The disposal of tannery effluent poses a significant environmental challenge due to its high content of toxic pollutants. The main objective is to develop an environmentally friendly and cost-effective approach that industries can readily adopt to mitigate the environmental impact of tannery wastewater. In pursuit of this objective, the research work focuses on harnessing the considerable amount of fats in tannery effluent for biodiesel production. This paper deals with the characterization and pretreatment of tannery industry effluent for producing Biodiesel, a renewable alternative fuel. This research holds immense potential for reducing the destructive impact of tannery effluent on ecosystems and promoting sustainable practices within the leather industry. Biodiesel is produced from tannery effluent through the transesterification process using NaOH as a catalyst. The research work also considers the optimization of process parameters such as reaction temperature, retention time, amount of catalyst, and alcohol-to-oil molar ratio to enhance biodiesel production. The optimized conditions of the transesterification reaction were a reaction temperature of 60 to 65℃, a reaction time of 10 mins, a 15:1 alcohol-to-oil molar ratio, and a 0.9% NaOH catalyst. The research work contributes to the ongoing efforts to mitigate pollution and safeguard our natural resources by offering a comprehensive and innovative solution.

Keywords: Tannery effluent; Biodiesel; Sustainable; Bioconversion; Transesterification

BS-32

THE HIDDEN CRISIS: UNDERSTANDING AQUATIC POLLUTION

ABIRUBA SURESHKUMAR, NAVANIDHAN MUTHAN, DHANYA AYYASAMY AND SHANMUGAPRIYA SAKKARAVARTHY*

PG & Research Department of Biotechnology, Kongunadu Arts and Science College, Coimbatore, Tamil Nadu, India-641029

*Corresponding email: Shanmuga.7@rediffmail.com

ABSTRACT

Water bodies around the world are increasingly threatened by pollution driven by anthropogenic activities, with industrial operations, urbanization, and agricultural practices being major contributors. The presence of toxic chemicals, heavy metals, plastics, and untreated sewage in water sources leads to degradation, ecosystem disruption, wildlife harm, and significant risks to human communities. Factors such as climate, precipitation, soil type, vegetation, geology, ground water, and human activity influence water quality, causing 14,000 daily deaths. However, the most significant threats often come from point-source pollution, particularly from industrial and municipal waste discharges, which are the biggest danger to water bodies. This paper explores the diverse sources of aquatic pollution, with a focus on major chemical contaminants, and examines the wide-ranging ecological, socio- economic consequences. It also underscores the critical need for continuous evaluation and improvement of water resource policies to address the evolving challenges of aquatic pollution. Also, it highlights the importance of stronger regulatory frameworks, the adoption of advanced water management technologies, and increased public awareness in mitigating this growing issue. The restoration of aquatic environment through coordinated efforts by governments, industries, and individuals is crucial for ensuring their long-term sustainability for future generations.

Keywords: Aquatic ecosystem, Chemical, Contaminants, Pathogens, Waste discharge

BS-33

HARNESSING TRADITIONAL KNOWLEDGE FOR ENHANCED BIOREMEDIATION PRACTICES

[*]RAJESH RAJAMANIKKAM[1], R SATHISH KUMAR[2]

[1] PG and Research department of Biotechnology, Kongunadu Arts and Science College, Coimbatore -641029, Tamil Nadu, India.

[*]Corresponding author: rrajeshrrajesh432@gmail.com

ABSTRACT

Bioremediation, the process of using biological agents such as microorganisms and plants to detoxify and restore polluted environments, is gaining global recognition as a sustainable and cost-effective solution to environmental degradation. Traditional knowledge and practices, rooted in indigenous communities and passed down through generations, offer valuable insights and techniques that complement modern bioremediation approaches. This paper explores the integration of traditional knowledge with contemporary bioremediation strategies, focusing on practices such as the use of specific plants for phytoremediation, organic waste management techniques, and microbial applications. Indigenous practices like using aquatic plants for wastewater purification and biochar from natural sources for soil remediation highlight the untapped potential of ancient wisdom in addressing modern ecological challenges. By documenting and analyzing case studies, this work emphasizes the need to preserve traditional knowledge and promote its synergy with scientific advancements to achieve effective, community-driven bioremediation solutions. This integrative approach not only enhances environmental restoration efforts but also fosters the preservation of cultural heritage and promotes sustainable development.

Keywords: Phytoremediation, Indigenous Communities, Biochar, Cultural Preservation, Wastewater Purification.

BS-34

SCIENTIFIC CONTRIBUTIONS TO THE BIOREMEDIATION PROCESS

[*]MANJULA, R. SATHISH KUMAR

PG and Research department of Biotechnology, Kongunadu Arts and Science College, Coimbatore -641029, Tamil Nadu, India.

[*]Corresponding author: manjulamanikandan215@gmail.com

ABSTRACT

Bioremediation is a sustainable and eco-friendly approach to addressing environmental pollution by leveraging biological systems such as microbes, fungi, and plants to degrade and eliminate contaminants. Scientific advancements play a crucial role in enhancing the efficiency, scalability, and safety of bioremediation processes.Key contributions include microbial engineering to develop pollutant-degrading organisms, environmental monitoring for site-specific analysis, and mechanistic studies to elucidate the biochemical pathways underlying contaminant transformation. Advanced omics technologies, including genomics, proteomics, and metabolomics, offer profound insights into microbial activity, pollutant interactions, and ecosystem responses. Optimization strategies, such as bioaugmentation (introducing specialized microbes) and biostimulation (enhancing native microbial activity), further improve degradation efficiency. Laboratory findings are validated through field trials to ensure applicability under real-world conditions, while eco-toxicological assessments confirm the safety of bioremediation techniques for ecosystems. The integration of cutting-edge technologies, such as artificial intelligence and remote sensing, enables better prediction, monitoring, and operational efficiency in bioremediation efforts. These advancements not only optimize degradation processes but also aid in policy formulation and the design of sustainable environmental restoration strategies. This paper underscores the transformative role of scientific inputs in advancing bioremediation, positioning it as a practical, scalable, and environmentally friendly solution to pollution and ecosystem rehabilitation challenges.

Keywords: Bioremediation, Bioaugmentation, Biostimulation, Degradation, Ecosystems

CLIMATE CHANGE AND WATER MANAGEMENT

AJITH V

PG and Research Department of Biotechnology, Kongunadu Arts and Science College, Coimbatore - 641029, Tamil Nadu, India. Email: ajithajith90790@gmail.com

ABSTRACT

Water is considered as the most critical resource for sustainable agricultural development worldwide. Irrigated areas will increase in upcoming years, while fresh water supplies will be diverted from agriculture to meet the increasing demand of domestic use and industry. Furthermore, the efficiency of irrigation is very low, since less than 65 % of the applied water is actually used by the crops. The sustainable use of irrigation water is a priority for agriculture in arid areas. So, under scarcity conditions and climate change considerable effort has been devoted over time to introduce policies aiming to increase water efficiency based on the assertion that more can be achieved with less water through better management. Better management usually refers to improvement of water allocation or irrigation water efficiency. The former is closely related to adequate pricing, while the latter depends on the type of irrigation technology, environmental conditions and the scheduling of water application. Agricultural practices, such as soil management, irrigation and fertilizer application and disease and pest control are related with the sustainable water management in agriculture and protection of the environment. Socio-economic pressures and climate change impose restrictions to water allocated to agriculture. The adoption of sustainable water management in Mediterranean is not only a technological problem but involves many other considerations relative to social behaviour of rural communities, the economic constrains, or the legal and institutional framework that may favour the adoption of some measures and not others. Sustainable water management in agriculture, which has a multi-functional roles, can be achieved by adopting improvements in irrigation application, soil and plant practices, water pricing, reuse of treated wastewater, farmers' participation in water management and capacity building.

Keywords: Irrigation, Water efficiency, Water reuse, Innovation, Capacity building.

GREEN SYNTHESIS OF SILVER NANOPARTICLES FOR LEATHER INDUSTRY WASTEWATER REMEDIATION- A REVIEW

RAMASAMY GUNAMATHI, RAMASAMY AMSAVENI*

Department of Biotechnology, Karpagam Academy of Higher Education,

Coimbatore, 641021, Tamil Nadu, India

*Corresponding author: amsabiotech@gmail.com

ABSTRACT

The green synthesis of silver nanoparticles (AgNPs) will play a crucial role in addressing the environmental challenges posed by wastewater from the leather industry. Leather processing will continue to generate significant amounts of contaminated wastewater, which contains toxic chemicals such as dyes, heavy metals, and other pollutants. The green synthesis of AgNPs using plant extracts will offer an eco-friendly and sustainable solution for wastewater treatment. These nanoparticles will exhibit strong antibacterial and catalytic properties, enabling them to effectively degrade and remove contaminants from leather industry wastewater. Advanced characterization techniques, including UV-Vis spectroscopy, scanning electron microscopy (SEM), and X-ray diffraction (XRD), will be employed to confirm the size, shape, and structural integrity of the nanoparticles. It is expected that the green-synthesized AgNPs will become an efficient tool for wastewater decolorization and detoxification, contributing to the reduction of environmental pollution in the leather industry.

Keywords: Green synthesis, silver nanoparticles, leather industry, plant extracts, environmental remediation

BS-37

A REVIEW OF THE WORK OF PLANKTON ALGAE IN REDUCING WATER POLLUTION

[*]BHARGAVI S SRINIVASAN, DHARSHINIC, MUTHU MEENAKSHI K, HEMAVARNA S

PG and Research Department of Biotechnology, Kongunadu Arts and Science College, Coimbatore -641029

[*]Corresponding Author: sbhargavi_bt@kongunaducollege.ac.in

ABSTRACT

Ponds contain beneficial algae that naturally control water pollution, but these algae are now being affected by the increasing existence of artificial light near ponds and lakes. This growing presence of artificial light near water bodies is waning water pollution, harming aquatic life and algae growth. Algae convert water and CO_2 to sugar through the process of photosynthesis. Planktonic algae help reduce Pollution by absorbing excess nutrients and heavy metals and also produce oxygen. Artificial light is like a double-edged sword for planktonic algae both helping and hindering their growth and productivity, beneficial algae are struggling due to disrupted day-night cycles from artificial light exposure. However excessive growth can have negative consequences for aquatic ecosystems. Furthermore, maintaining certain algae growth in ponds is crucial for ecosystem balance and water quality. Continuous artificial lighting harms planktonic algae and damages their natural rhythms, Photosynthesis, and growth rate. current studies have primarily focused on the effects of artificial lights on aquatic ecosystems or the role of planktonic algae in pollution mitigation. Artificial light with high intensity around the ponds at night producing more heat can simulate excessive algae growth due to the availability of Light for photosynthesis, while this doesn't directly harm fish, it can reduce water quality and oxygen levels, which can negatively impact fish health. To mitigate these effects and preserve water quality, maintaining moderate light intensity is beneficial for promoting algae growth in ponds. By examining the physiological and ecological response of planktonic algae to artificial lighting, this study will provide valuable insight into the development of innovative sustainable solutions for maintaining a healthy aquatic ecosystem and ensuring the long-term quality of our water resources. The findings of this research will have significant implications for the conservation and management of aquatic ecosystems.

Keywords Plankton algae, Artificial light, Light pollution in water bodies, Aquatic ecosystem.

BS-38

INTEGRATING NANOSCIENCE AND BIOINFORMATICS FOR AQUATIC POLLUTION CONTROL

DHIVAKARAN P[1] AND R.SATHISH KUMAR[2]

PG and Research department of Biotechnology, Kongunadu Arts and Science College, Coimbatore -641029, Tamil Nadu, India.

ABSTRACT

Aquatic ecosystems are increasingly threatened by industrial pollutants, including organic compounds, heavy metals, and persistent toxins, which often render traditional remediation methods ineffective or environmentally harmful. This paper explores the role of nanoscience and bioinformatics in addressing aquatic pollution, offering innovative and efficient solutions for water purification. Nanotechnology leverages the unique properties of nanomaterials, such as high surface area, reactivity, and customizable attributes, to enable efficient removal and degradation of pollutants. Applications include nano-adsorbents, nanocatalysts, and nanocomposites that significantly enhance pollutant removal and water quality restoration. While nanotechnology presents immense potential, challenges such as environmental persistence, toxicity, and high production costs require scalable, eco-friendly, and biodegradable solutions. Future directions emphasize integrating nanotechnology into large-scale, sustainable water treatment systems. Bioinformatics complements these efforts by employing computational tools to manage and analyze biological and genetic data related to wastewater treatment. High-throughput sequencing and bioinformatics techniques enable the identification and optimization of microbial communities and pathways for bioremediation. This multidisciplinary approach enhances our ability to tackle complex pollution scenarios and improves the design of effective treatment strategies. By combining the transformative capabilities of nanoscience and bioinformatics, this study highlights a synergistic framework for addressing aquatic pollution. The integration of advanced materials and computational tools offers a pathway to sustainable water management, safeguarding aquatic ecosystems and promoting environmental health.

Keywords: Nanotechnology, Bioinformatics, Pollution Control, Industrial Pollutants, Water Purification.

THE ERODING TIDES OF TRADITION: A REVIEW ON AQUATIC POLLUTION'S DEVASTATING IMPACT ON CULTURE, HERITAGE, AND LIFESTYLE

JAGAN, S., AGASTHIYA, SIVARANJINI A*

Department of Biotechnology, Sri Ramakrishna College of arts & science (Autonomous), Coimbatore-641006, Tamil Nadu, India

Corresponding author: drsivararanjini2525@gmail.com

ABSTRACT

Aquatic pollution poses a significant threat to the world's cultural heritage, traditional livelihoods, and community lifestyles, with approximately 80% of the world's wastewater released into the environment without adequate treatment, leading to the degradation of 40% of the world's rivers, lakes, and wetlands (WWF, 2020). The degradation of aquatic ecosystems disrupts the delicate balance between human societies and their environment, eroding the cultural fabric of communities reliant on these ecosystems. This has resulted in the loss of traditional fishing livelihoods for 12% of the global population (FAO, 2020), and the destruction of 50% of the world's coral reefs, impacting the cultural heritage and tourism industries (IPCC, 2019). Furthermore, 20% of the world's population relies on contaminated water sources, leading to significant health and economic impacts (WHO, 2019). In India alone, aquatic pollution has affected the livelihoods of over 10 million people, with an estimated financial loss of $1.3 billion annually (CSE, 2018). The loss of aquatic biodiversity and ecosystem services undermines communities' economic, social, and spiritual well-being, forcing them to abandon ancestral ways of life. This paper examines the far-reaching consequences of aquatic pollution on culture, heritage, and lifestyle, highlighting the urgent need for concerted efforts to mitigate these impacts and preserve the world's precious cultural heritage.

Keywords: *Ecosystem, Cultural heritage, Aquatic Pollution, Degradation.*

BS-40

IMPACT OF WATER POLLUTION IN ECONOMIC GROWTH

BHARGAVI S SRINIVASAN, KAVIYARASI K

PG and Research Department of Biotechnology,

Kongunadu Arts and Science College, Coimbatore 641017, Tamil Nadu, India.

Corresponding author: sbhargavi_bt@kongunaducollege.ac.in

ABSTRACT

Water pollution in India has been posing a serious threat to the health of its economy and society. Recent research suggests that in a developing country like India, pollution upstream could cut economic growth in downstream regions by nearly a half percentage point. Impacts can be found in the health sector, where, labour productivity can be affected, in agriculture, where the quality and quantity of food produced can be reduced, and in tourism, real estate, aquaculture/fisheries and other sectors which rely on environmental quality and ecosystem services. So waste water management plays an major role in preventing water pollution. Recently emerging process of waste water management is by biological way. Currently, 44% of all wastewater on Earth returns to the environment untreated. This means that human waste, household sewerage, and sometimes toxic and even medical waste are released directly into the planet's ecosystems. Pollution and the economy seem to have been inextricably linked throughout human history. The Central Pollution Control Board (CPCB), the Central Ground Water Board (CGWB), the Central Statistical Organisation (CSO) and several other institutions now provide nationwide data about water quality, industrial activity, etc… This review work gives opinions and suggestions to explain the experimental results by applying the standard concepts and outlines a brief guide line for the assessment of water pollution.

KEYWORDS: Water pollution, Impact, Information boards

BS-41

REVIEW ON WATER CONSERVATION PROJECTS UNDERTAKEN IN TAMILNADU

BHARGAVI S SRINIVASAN*, KEERTHI P, SWETHA V

PG and Research Department of Biotechnology,
Kongunadu Arts and Science College, Coimbatore 641017, Tamil Nadu, India.

*Corresponding author: sbhargavi_bt@kongunaducollege.ac.in

ABSTRACT

Water is a basic necessity for all telluric forms of life. 70% of the earth is water, and the proportion of fresh water is only 2.53%. Tamil Nadu has only 3% of India's water resources but is one of the country's leading agricultural producers. The state heavily depends on monsoon rains and is prone to drought. Various organizations have been working on rejuvenating ancient systems of water harvesting as an alternative to "mega-projects" like dams. This would recharge the groundwater level beneath and also relatively protect it from contamination by human and animal waste. It gives people control over their local water resources ensures that mismanagement and over-exploitation of these resources are reduced. The harvested water will safeguard the area during the monsoon failure and hot summer. There are 17 river basins in the state and Cauvery is in the major basin, 13 basins are medium and 3 are minor river basins. In Tamil Nadu's hot climate, rapid urbanization and water pollution are putting enormous pressure on the quantity and quality of surface and groundwater. Water conservation is the key element of any strategy that aims to improve the traditional water storage system. History tells us that both floods and droughts were regular occurrences in our state. The availability of water differs from place to place due to variations in seasonal and annual precipitation. The scarcity of water is mainly caused by overpopulation, increasing demand for food and cash crops, urbanization and rising standard of living water conservation includes all the policies, strategies, and activities to sustainably manage the natural resources of fresh water to protect the hydrosphere and to meet the current and future human demand on water. Population, household size, and growth all affect the amount of water we use. Factors such as climate change have increased pressure on natural water resources, especially in Tamil Nadu.

Keywords: Tamil Nadu water sources, Drought, Conservation projects, Water conservation, Policies

BS-42

INFLUENCE OF EFFLUENT OVER HUMAN SOCIETY

MOHANAPRABHA.G

PG and Research Department of Biotechnology, Kongunadu Arts and Science College, Coimbatore - 641029, Tamil Nadu, India. Email: mohanaprabha115@gmail.com

ABSTRACT

Air pollution constitutes a major threat to human well-being and societal progress. Its detrimental impacts are multifaceted. Exposure to polluted air significantly increases the risk of respiratory illnesses, cardiovascular diseases, and other health complications, particularly among vulnerable populations. The economic burden of air pollution is substantial, encompassing increased healthcare costs, reduced productivity, and environmental damage. Furthermore, air pollution exacerbates social inequalities, disproportionately affecting marginalized communities and contributing to disparities in health outcomes. The environmental consequences of air pollution, including climate change, further amplify these societal impacts. Addressing this critical challenge requires a multifaceted approach, encompassing stringent emission controls, technological advancements in clean energy, and robust policy interventions that prioritize environmental justice and promote sustainable practices. Mitigating air pollution is not only essential for environmental protection but also for ensuring a healthier, more equitable, and prosperous future for all.

Keywords: Air pollution, Human health, Economic impact, Societal implications, Environmental justice.

BS-43

SOCIOECONOMIC IMPACT OF POLLUTION IN WATER BODIES AND REMEDIAL MEASURES

PAULINA S

Department of Biotechnology, Sri Ramakrishna College of Arts and Science (Autonomous)
Coimbatore-641006, Tamil Nadu

ABSTRACT

Water is a prime natural resource. It is basic need for all living organisms and without water it is impossible for us to survive. Water Pollution possess a significant threat to global health, ecosystem and economics. Human activities like industrialization, agriculture, urbanization release the toxic chemicals which pollutes the water bodies. Industrial waste plays a major role in polluting the water bodies. the dissolved and suspended particles from various industries releases the waste products during manufacture. Hence the treatment of waste water is necessary. Ion exchange methods, electrochemical deposition, sustainable agriculture, agronomical practice are the few methods for treating wastewater and avoiding the usage of plastics, fertilizers, pesticides and creating awareness to the public are the steps that has to be taken in order to Protect the Environment

KEY WORDS: Importance of water, Human activities, Causes of Pollution, Treatment, Prevention, Conclusion

BS-44

SOCIO ECONOMIC IMPACT OF POLLUTION IN WATER BODIES & REMEDIAL MEASURE

PREETHI K A,

Department of Biotechnology, Sri Ramakrishna College of Arts and Science (Autonomous)
Coimbatore-641006, Tamil Nadu

ABSTRACT

Water is the most essential component of our planet, covering 70% of surface. It is the source of life, & without it our existence would be impossible. The increasing levels of water pollution pose a significant threat to future. Humans and other organisms can get affected by disease such as Hepatitis and Typhoid by consuming contaminated water and food. Excess of fluoride in drinking water causes Flurosis. In many poor nations, outbreak of water borne diseases and epidemics are a result of Contaminated water and poor or absence of water treatment. Water pollution is a pressing issue that requires immediate attention. By understanding the causes and effects of water pollution, we can take steps to reduce it. Implementing effective e wastewater treatment, promoting sustainable agriculture, reducing plastic usage, and educating Communities are crucial steps towards a cleaner and healthier future. Together, we can protect our planet's most precious resource - WATER

Keywords: Water saving remedies, Destructs humankind, Effects on earth, Source of pollution, Prevention, Conclusion

BS-45

MODELLING OF WATER BODIES TO OVERCOME TOXICITY: A REVIEW ON AQUATIC POLLUTION' S DEVASTING IMPACT ON CULTUR, HERITAGE, LIFESTYLE

R ISVARYA SRIVATS DHIVYA DHARSHINI K, *SIVARANJINI A

Department of Biotechnology, Sri Ramakrishna College of Arts and Science (Autonomous)
Coimbatore-641006, Tamil Nadu

*Corresponding author: drsivaranjini2525@gmail.com

ABSTRACT

The increasing toxicity in water bodies due to anthropogenic activities, industrial discharges, agricultural runoff and improper waste management poses a significant threat to ecosystems and human health. Modelling water bodies to address toxicity is a critical approach that integrates advanced computational techniques, hydrodynamic simulations and geochemical analysis. This study focuses on the development and application of models to understand Spatial and temporal distribution of pollutants, predict their impact, and propose effective remediation strategies by incorporating parameters like Pollutant transport mechanisms, Biodegradation rates and ecological interactions, these models help identify hotspots of contamination and evaluate mitigation measures like Bioremediation, constructed wetlands, and chemical treatments. The research aims to provide a robust framework for water quality management ensuring sustainability and safety of aquatic ecosystems.

BS-46

DEVELOPMENT OF COW DUNG BASED NATURAL ABSORBENT FOR HEAVYMETAL REMOVAL FROMWASTE WATER

S. PREETHI, R. SHIVA, V. ELAKKIYA*

PG and Research Department of Biotechnology, Kongunadu Arts and Science College, G.N. Mills, Coimbatore – 641029.

E-mail: velakkiya_bt@kongunaducollege.ac.in

ABSTRACT

The presence of heavy metals in wastewater poses a significant environmental and health challenge due to their toxicity, persistence, and bioaccumulation potential. Heavy metal contamination of soil is an alarming environmental dilemma all over the world. With increasing industrialization, timely development of low-cost and eco-friendly remedial techniques for heavy metal-contaminated soil is needed. Phytoremediation is an emerging technique to remove heavy metals from contaminated soil for environmental sustainability. Cow dung, an abundant and inexpensive agricultural byproduct, has shown as a natural adsorbent for removing heavy metals from wastewater. This study explores the potential of cow dung to clean wastewater by investigating its physicochemical properties, adsorption capacity, and efficacy in removing metals such as lead (Pb), cadmium (Cd), chromium (Cr), and arsenic (As). This explicit investigation aims to explore a green and clean alternative for the waste water treatment employing a natural biosorbent: Dry cow dung powder (DCP). Cow dung is a high organic content, porous structure, and presence of functional groups like hydroxyl, carboxyl, and phenolic compounds enhance its ability to bind and sequester heavy metals. In this research, raw and treated cow dung were tested in batch adsorption experiments under varying conditions of pH, contact time, and metal concentration. Results indicated that cow dung efficiently adsorbed heavy metals under optimal conditions. The adsorption process will be characterized by isothermal and kinetic models, showing alignment with Langmuir and pseudo-second-order kinetics, respectively. Cow dung also demonstrated potential for regeneration and reuse in successive adsorption cycles, making it a sustainable option for wastewater treatment. This study underscores the viability of cow dung as an eco-friendly, low-cost adsorbent for heavy metal remediation in wastewater, offering a sustainable solution to mitigate environmental pollution.

Key words: Cow dung, waste water, heavy metal, absorption, removal

BS-47

PHYTOREMEDIATION POTENTIAL OF *CENTELLA ASIATICA*: A NATURAL SOLUTION FOR REDUCING TOXICITY IN WATER

SAINITHI. S, SHILPA. J

Department of Biotechnology, PSGR Krishnammal College for women, Peelamedu, Coimbatore – 641004

ABSTRACT

Sodium arsenate is a significant environmental pollutant, poses serious risks to human health. Skin cancer and chronic arsenic poisoning are associated with long exposure to inorganic arsenic in drinking water concentrations of more than 50g/l (Nicomel et al., 2016). According to the World Health Organisation (WHO) and the United States Department of Health and Human Services (HHS), the allowed exposure limit for inorganic arsenic should not exceed 10 micrograms ppb in drinking water. Phytoremediation is a process that can reduce the toxicity of arsenic in water, it is a sustainable and eco-friendly method for mitigating environmental pollution, has gained attention for its effectiveness in addressing water contamination. Hence, this study investigates the phytoremediation potential of *C. asiatica*, focusing on its ability to mitigate waterborne pollutants. It focuses on the effectiveness of a methanolic extract of *Centella asiatica* against sodium arsenate-induced hepatotoxicity in Danio rerio (Zebrafish). Phytochemicals and bioactive compounds in *C.asiatica* extract can be studied using standard procedure and GC-MS analysis. The extract has antioxidant and antibacterial properties. The plant extract, in particular, can demonstrate the efficiency by alleviating the effects of arsenate in the liver of zebrafish (both pre-and post-treatment). The methanolic extract of *C.asiatica* shows a considerable lowering effect on sodium arsenate-induced hepatocyte damage in zebrafish. As a result, the inhibitory action of *Centella asiatica* methanolic extract may be investigated to create effective candidates to fight arsenate toxicity. The findings indicate that *C. asiatica* significantly reduces pollutant concentrations in water, alleviating acute and chronic toxicity risks. This underscores its potential as a valuable therapeutic and environmental resource. The study highlights the critical role of *C. asiatica* in enhancing water safety and promoting environmental health.

Keywords: *Centella asiatica*, Phytoremediation properties, Zebra fish, Hepatocyte, phytochemicals, Bioactive compounds

BS-48

SCIENTIFIC ADVANCEMENTS IN BIOREMEDIATION: THE ROLE OF PHYCOREMEDIATION

SANDHIYA SANTHOSH KUMAR[1] R.SATHISH KUMAR[2]

PG and Research department of Biotechnology, Kongunadu Arts and Science College, Coimbatore -641029, Tamil Nadu, India.

Corresponding author: sandhiyasandhiya1001@gmail.com

ABSTRACT

Water, air, and soil are the essential resources that sustain life on Earth, with water being fundamental as the medium for life's origin. However, water pollution has emerged as a severe global issue, affecting both developed and developing nations to varying extents. In countries with rapidly growing populations, such as India, pollution is an inevitable challenge. Conventional water treatment methods, while effective, are often costly and generate unwanted by-products, highlighting the need for sustainable alternatives. Phycoremediation, a biological process utilizing algae, has shown promise as an efficient and cost-effective method for addressing water pollution. Both microalgae and macroalgae play pivotal roles in detoxifying contaminated water while serving as carbon sinks, making them valuable tools in environmental restoration. This method offers numerous advantages over traditional biological treatments like the activated sludge process and biofilm techniques, including lower energy consumption and enhanced sustainability. The potential of phycoremediation lies in its ability to improve water quality while contributing to broader environmental goals, such as carbon sequestration and ecosystem health. As global efforts focus on sustainable resource management, phycoremediation emerges as an innovative solution that aligns with these objectives. By adopting this approach, water resource management can become more effective and environmentally friendly, addressing one of humanity's most pressing challenges.

Keywords: Phycoremediation, Water Pollution, Sustainability, Algae, Environmental Management

BS-49

THE IMPACT OF AQUATIC POLLUTION ON CULTURE, HERITAGE, AND LIFESTYLE

SATHYASREE K

PG and Research Department of Biotechnology, Kongunadu Arts and Science College, Coimbatore - 641029, Tamil Nadu, India.
Corresponding author: sathyasreekandasamy@gmail.com

ABSTRACT

Aquatic pollution has become a major worldwide issue that affects not only ecosystems but also human societies that have a strong connection to water. This study looks at the various ways that aquatic pollution affects heritage, culture, and way of life. Water-related cultural practices and rituals, including religious ceremonies, community meetings, and traditional fishing techniques, are becoming more and more disrupted as rivers, lakes, and oceans become contaminated. Degradation threatens the historical and aesthetic significance of heritage sites close to bodies of water. Changes in lifestyle are also influenced by aquatic pollution, especially for communities whose livelihoods depend on water resources. Health hazards, contaminated drinking water, and declining fish populations compel communities to change their ways, embrace new technologies, or relocate to safer locations. The loss of customary ties to water bodies undermines cultural identity and communal harmony, with equally severe psychological and social repercussions. Despite these obstacles, creative solutions are being developed to combat aquatic pollution and restore ecosystems by fusing traditional knowledge with contemporary conservation techniques. In order to protect not only the environment but also the cultural and historical heritage entwined with water bodies, this abstract emphasizes how urgent it is to address aquatic pollution. Preserving these priceless facets of human civilization requires a multidisciplinary strategy that includes scientific intervention, community involvement, and policy reform. This study promotes a comprehensive approach to environmental conservation by highlighting the complex relationship between aquatic pollution and social change.

Keywords: Aquatic pollution, Culture, Heritage, Water bodies, Sustainable practices, Environmental degradation

BS-50

INFLUENCE OF EFFLUENT OVER HUMAN SOCIETY

SUPRIEYA.G

PG and Research Department of Biotechnology, Kongunadu Arts and Science College, Coimbatore - 641029, Tamil Nadu, India.
Corresponding author: suprieyaganesan@gmail.com

ABSTRACT

The liquid waste released from different home, agricultural, and industrial sources is known as effluent, and it has a significant and complex impact on human society. Numerous contaminants, such as heavy metals, organic compounds, pathogens, and nutrients, are carried by this discharge and have a substantial effect on environmental quality, human health, and socioeconomic development. Aquatic ecosystems are upset by wastewater pollution of water bodies, which results in eutrophication, oxygen depletion, and biodiversity loss. Drinking water supplies are at risk due to groundwater pollution, which also raises the possibility of waterborne illnesses and presents long-term health issues. Environmental deterioration and problems with food security might result from agricultural output being hampered by soil contamination from effluent discharge. Numerous negative health consequences, such as neurological abnormalities, respiratory issues, skin conditions, and gastrointestinal infections, can result from exposure to effluent-contaminated water. Chronic health problems and an increased risk of cancer can result from prolonged exposure to heavy metals and other harmful elements in wastewater. The effects of wastewater contamination on society and the economy can be profound. Furthermore, there may be significant social costs connected to community dislocation, environmental degradation, and health effects. A major problem for human society is wastewater discharge, which has an effect on socioeconomic growth, human well-being, and environmental health. A multifaceted strategy including regulatory changes, technology developments, and a dedication to sustainable practices is needed to address this problem. We can preserve the environment, protect human health, and guarantee a sustainable future for everybody by managing wastewater well. In order to lessen these difficulties and advance a sustainable future, it highlights the necessity of efficient effluent control techniques.

Keywords: Effluent, Wastewater, Water, Pollution, Environmental, Impact, Human, Health, Socioeconomic, Impact, Contaminants.

BS-51

INDUSTRIAL EFFLUENT: A THREAT TO DRINKING WATER AND HUMAN HEALTH

SWASTIKA.S

PG and Research Department of Biotechnology, Kongunadu Arts and Science College, Coimbatore - 641029, Tamil Nadu, India.

Corresponding author: swastikasivakumar@gmail.com

ABSTRACT

Industrial effluents, containing a diverse array of pollutants such as heavy metals, organic compounds, and pathogens, pose a significant threat to human health. These pollutants can leach into soil and groundwater, contaminating crucial drinking water sources. Ingestion of contaminated water can lead to a range of adverse health effects, including gastrointestinal illnesses, neurological disorders, reproductive issues, and an increased risk of cancer. Heavy metals like lead and arsenic can accumulate in the body, causing severe damage to vital organs. Organic pollutants, such as pesticides and industrial chemicals, can disrupt endocrine function and impair immune systems. Furthermore, the presence of pathogens in contaminated water can lead to outbreaks of waterborne diseases, such as cholera and typhoid.

Keywords: Industrial effluent, Water pollution, Drinking water contamination, Human health, Heavy metals, Organic pollutants, Pathogens.

BS-52

ROLE OF AI IN PRESERVING MOTHER NATURE

VISHAL VELLAISAMY AND R SATHISH KUMAR,

PG and Research department of Biotechnology, Kongunadu Arts and Science College, Coimbatore -641029, Tamil Nadu, India.

ABSTRACT

Artificial Intelligence (AI) has emerged as a transformative tool in addressing the environmental challenges posed by climate change, biodiversity loss, and resource depletion. This research explores the role of AI in preserving Mother Nature through innovative solutions in environmental monitoring, conservation, and sustainability. AI-driven technologies enable precise data analysis, predictive modeling, and optimization across various sectors, including climate change mitigation, biodiversity conservation, sustainable agriculture, waste management, and energy efficiency. By leveraging machine learning, deep learning, and IoT, AI enhances our ability to monitor ecosystems, predict environmental trends, and make data-driven decisions that minimize human impact on the planet. This paper highlights the potential of AI in promoting a sustainable future by reducing carbon footprints, optimizing resource use, and fostering global environmental protection efforts. We also examine the challenges and ethical considerations associated with deploying AI technologies in environmental contexts. The findings emphasize that AI, when effectively integrated into environmental strategies, can significantly contribute to preserving natural ecosystems and ensuring the well-being of future generations.

Keywords: Artificial Intelligence, Environmental Conservation, Climate Change Mitigation, Biodiversity Protection, Sustainable Agriculture, Waste Management, Energy Efficiency, Predictive Modeling, Eco-sustainability, Environmental Monitoring.

BS-53

IMPACT OF EFFLUENTS ON HUMAN SOCIETY

VISHNU PRIYA, BALASUBRAMANIAN, R.SATHISH KUMAR

PG and Research department of Biotechnology, Kongunadu Arts and Science College, Coimbatore -641029, Tamil Nadu, India.

Corresponding author: vishnupriyabalas2004@gmail.com

ABSTRACT

Effluents, discharged as waste products from industrial, agricultural, and municipal activities, significantly threaten human society due to their harmful components, including toxic chemicals, heavy metals, and pathogens. These pollutants adversely affect human health, leading to infections, chronic diseases, and environmental degradation. Traditional treatment methods, such as the activated sludge process, electro-Fenton process, and filtration, are widely employed to address effluent contamination. While effective to some extent, these methods often face challenges, including high operational costs, limited efficiency in degrading complex pollutants, and the risk of generating secondary contaminants. A sustainable and promising alternative involves the use of diatoms, specifically the Navicula species. These photosynthetic microalgae are among the most abundant microorganisms on Earth and can be cultivated efficiently and on a large scale. Diatoms possess unique capabilities for absorbing and neutralizing toxic substances, making them an eco-friendly solution for wastewater treatment. By incorporating diatom-based methods, toxic components in effluents can be significantly reduced, thus minimizing their impact on human health and the environment. This paper highlights the urgent need to address effluent contamination and emphasizes the potential of diatoms as a green technology for sustainable effluent management. The study advocates for further exploration of diatom-based approaches to complement existing methods, ensuring the well-being of human society and the protection of natural ecosystems.

KEYWORDS: Effluents, Heavy Metals, Pollutants, Microalgae, Toxic Substances

BS-54

WATER CONTAMINATION IN TAMILNADU DUE TO INDUSTRIAL POLLUTION

BHARGAVI S SRINIVASAN*, DHURGA P, SABARIESHA BS, JAYASUDHA A

PG and Research Department of Biotechnology,
Kongunadu Arts and Science College, Coimbatore 641017, Tamil Nadu, India.
*Correspondence: sbhargavi_bt@kongunaducollege.ac.in

ABSTRACT

Industrial Pollution: In Tamil Nādu there are more than 3000 industrial units which have been classified under the highly polluting or "red" category. The total effluent generated is about 6 lakh liters per day of which more than 5 lakh litre (85 per cent) is generated by large industries. About 400 units discharge directly into rivers. Of particular concern are the tanneries which are located in Vellore, Kancheepuram, Dindigul and Erode districts. The effluents have caused serious problems in the Palar basin. Similarly, there are a large number of textile bleaching and dyeing units in Tiruppur, Erode, and Karur, which have contaminated the Noyyal, Amaravathy and other water bodies. There are five main industrial complexes in Tami Nadu: Manali/Ennore, Ranipet, Cuddalore, Mettur and Tuticorin which have chemical, petro-chemical and other industries. The Kalingarayan canal is crossing the major textile town Erode which is abundantly occupied by textile units. Major streams carrying the untreated / semi treated industrial effluents are mixed into the canal. However, the gradual introduction of a large number of new chemical compounds and the technologies has resulted in a much higher number of contaminants today. The impact of water pollution in the Noyyal river basin in Coimbatore, Erode and Karur district lead to Health problems such as skin allergy, respiratory infections, general allergy, gastritis and ulcers were the common diagnosis by the medical team. The Tamil Nadu Pollution Control Board has reported high pollution levels in these industrial areas, with the SIPCOT Industrial Complex in Cuddalore having a high Comprehensive Environmental Pollution Index (CEPI) score. This pollution has severe impacts on surface water bodies, affecting both human health and the environment. Studies have shown that industrial wastewater disposal from tanneries and dyeing industries has contaminated groundwater and surface water bodies in Tamil Nadu. To address these issues, it is essential to implement effective pollution control measures, including treatment of industrial effluents and proper disposal of waste. The government and industries must work together to adopt sustainable practices and reduce pollution levels in Tamil Nadu's water bodies.

Keywords: River Pollution, Industrial effluents, TNPCB, Tanneries and Dyeing industries

BS-55

IMPACT OF WATER POLLUTION ON WATER-BORNE DISEASES AND ECONOMIC GROWTH

***DHARMA MUTHU MEENAKSHI. MR,**

Department of Clinical Nutrition, Kongunadu Arts and Science College, Coimbatore.

*Corresponding author: dharmamuthumeenakshi_cn@kongunaducollege.ac.in

ABSTRACT

The relationship between water pollution and economic growth holds great significance for sustainable development. Rapid industrialization in emerging countries has contributed to economic development, but it has also resulted in significant losses to overall economic well-being due to air and water pollution. Water pollution is a major concern since it affects a wide range of economic activity. It has increased the hazards to rivers, ecosystem services, and sustainable development and has become an important element in determining human survival and socioeconomic growth. Higher rates of waterborne illnesses are seen on the Indian subcontinent due to deteriorating public drinking water distribution network, an increase in unregulated private water systems and ineffective systems for monitoring waterborne illnesses. The expense of water treatment typically increases in tandem with the effectiveness of the protection.

The World Health Organization estimates that 88% of that burden is attributable to unsafe water supply, sanitation and hygiene. Water contamination often occurs due to inadequate and incompetent management of resources as well as the inflow of sewage into the source. In addition, water-borne diseases affect education and result in loss of working days. It is estimated that over 37.7 million Indians suffer from waterborne illnesses each year; 73 million working days are missed as a result of waterborne illnesses and 1.5 million children are thought to die from diarrhoea alone. The government has undertaken various programs since independence to provide safe drinking water to rural people. The Department of Drinking Water and Sanitation has received a budgetary allocation of Rs. 77,390 crores for the year 2024-2025 on providing safe drinking water. Poor water quality spreads disease, causes death and hampers socio-economic progress. The annual economic loss is estimated at Rs.112 crores. The Government of India estimates that the yearly cost of health care is Rs. 6,700 crores or around Rs. 60 per person. This demonstrates how declining water quality can lead to water scarcity by reducing the amount of water available for ecological and human usage. Life cannot last more than a few days without water and disease spreads when people do not have access to sufficient water supplies.

BS-56

EFFECTS OF EFFLUENT ON AGRICULTURAL PLANT NUTRIENT COMPOSITION, YIELD AND QUALITY

M. PUSHPA DEVI

Department of Clinical Nutrition, Kongunadu Arts and Science College, Coimbatore - 641 029, Tamil Nadu

Corresponding author: mpushpadevi_nd@kongunaducollege.ac.in

ABSTRACT

Water is an essential component of life, but it is a susceptible and finite resource that has qualitative vulnerability and quantitative limitations. Around 60% of the world's population might face water scarcity by 2025.Drought and water scarcity are two of the most difficult problems in the globe. Around the world, freshwater resources are scarce for agricultural systems. The necessity to increase food grain production from finite natural resources stems to the rapidly increasing demands of the population. Using wastewater for crop irrigation has some benefits, including supplying organic matter and vital nutrients, conserving water and fertilisers, and lowering water contamination. In addition to these advantages, using wastewater for crop irrigation has a number of disadvantages.

Using effluent water for irrigation can have a variety of effects, such as changing the soil's physical, chemical, and microbiological composition. It first impacts soil fertility and productivity, after which it may seriously endanger the health of people and the environment. Both kinds of consequences should be avoided by sustainable wastewater reuse in agriculture, necessitating an integrated and comprehensive risk assessment. Zinc, chromium, copper, cadmium, nickel, lead, mercury, and parasitic worms are among the potentially toxic elements (PTEs) found in wastewater that pose serious dangers to both human health and the environment. Soil hardening and contamination of shallow groundwater can also result from the use of untreated wastewater for crop irrigation. However, the presence of potentially hazardous substances (PTEs) is the primary issue with wastewater agricultural irrigation. Food safety is impacted when wastewater irrigation causes PTEs to accumulate in the soil and crops, contaminating the soil. The sustainable production potential of agricultural crops has thus been emphasized to researchers and policymakers. Another difficult aspect is that freshwater bodies are getting smaller over time, which further restricts crop productivity. Permissible quality parameters for various wastewater types and critical thresholds for various pollutants are sadly either non-existent or inadequately addressed. Water and industrial effluent of marginal quality used in crop cultivation should be treated before being applied to the crop field. Therefore, in the changing world, it is essential to safely reuse wastewater for food production in order to meet the demands of the world's expanding population across the globe in the changing scenario of climate.

Keywords: Contamination, Microbiological, Food Safety, Crop Cultivation.

BS-57

FLUOXETINE INDUCES HEMATOLOGY, REDOX HOMEOSTASIS, AND ENZYMOLOGICAL ALTERATIONS EXPOSED TO A FRESHWATER FISH *LABEO ROHITA*

M SUJITHA, K MANIMEGALAI

[1]Department of Zoology, School of Biosciences, Avinashilingam Institute for Home Science and Higher Education for Women, Coimbatore, Tamil Nadu, India

Corresponding author: manimegalai_zoo@avinuty.ac.in

ABSTRACT

The ubiquitous occurrence of pharmaceutical contaminants in aquatic environments is attracting a lot of attention. Because of its constant consumption and insufficient removal from wastewater treatment facilities, fluoxetine (FLX), an antidepressant and a type of selective serotonin reuptake inhibitor (SSRI), is frequently detected in aquatic environments. However, FLX can have an impact on aquatic life. Consequently, scientific research has shown an immense interest in analyzing the possible toxicological concerns associated with this drug. Yet, little information is currently available about how FLX alters liver and blood markers. Thus, our present study aims to investigate the long-term toxicity of fluoxetine at three concentrations (1 µg/L, 10 µg/L, and 100 µg/L) exposed to freshwater fish Labeo rohita for 35 days by evaluating hematological indices such as erythrocyte count (RBC), leukocyte count (WBC), hemoglobin concentration (Hb), hematocrit (Hct), mean corpuscular volume (MCV), mean corpuscular hemoglobin (MCH), and mean corpuscular hemoglobin concentration (MCHC), antioxidant activity (superoxide dismutase (SOD), catalase (CAT), glutathione - S - transferases (GST), lipid peroxidation (LPO)), and enzymological analysis (aspartate aminotransferase (AST) and alanine aminotransferase (ALT)), and lactic dehydrogenase (LDH) assays. These biomarkers showed alterations in a time- and dose-dependent manner. After 35 days of exposure to FLX, the blood and liver tissues of *Labeo rohita* exhibited a significant ($P < 0.05$) decrease in the biomarkers RBC, MCHC, SOD, and CAT. On the other hand, WBC, HB, HCT, MCH, MCV, GST, LPO, LDH, AST, and ALT levels were significantly elevated ($P < 0.05$) in *Labeo rohita* blood and liver tissues treated with FLX. In summary, research suggests that aquatic organisms may be susceptible to hazards from antidepressants at lower concentrations.

Keywords – Antidepressant, Fluoxetine, Oxidative stress, Hematology, *Labeo rohita*

BS-58

ISOLATION, BIOCHEMICAL CHARACTERIZATION AND PRODUCTION OF FEW BIO-ENZYMES WITH INDUSTRIAL APPLICATIONS FROM MARINE BACTERIA

VARADA. M., BHAVANA. B, *VELMURUGAN. K

Department of Zoology, Kongunadu Arts and Science College (Autonomous),
G.N. Mills Post, Coimbatore- 641029, Tamil Nadu, India.

*Corresponding author: kvelmurugan_zo@kongunaducollege.ac.in

ABSTRACT

Enzymes are biological substances that act as catalysts and have the ability to carry out a large number of chemical reactions. Commercially available enzymes are not economically comparable with naturally synthesized enzymes. Many Enzymes are commercially exploited in various industries. Various industrially important microbial enzymes include, Amylase, Asparaginase, Aspartase, Cellulases, Chitinases, isomerase, oxidase, Lactases, Laccases, Lipases, Pectinases, Acylase, Phytases. Proteases are one of the most important enzymes that hydrolyze proteins which accounts for nearly 60% of the total enzyme sale. Due to their immense physiological importance and wide applications, investigations about protease have become a central issue in enzymology. Bacteria are the most dominant group of protease producers with the genus Bacillus being the most prominent source (Mienda *et al.,* 2014). Industrial enzyme market is an oligopoly with few strong players, and amylases are one among them. Amylases are glycosidase which catalyze the hydrolysis of glycosidic linkage in starch to generate smaller sugars useful to bioindustry. In Biotechnology, amylases are the most important enzymes used. Microbial production of amylase is more beneficial than other sources because it is economical. The microbial amylases could be potentially useful in various pharmaceutical, fine-chemical industries, paper industries etc., (Sundarapandiyan *et al.,* 2017). Industries are still searching for new microbial strains with desired aspects in order to produce various industrial enzymes to fulfil the current enzymes demand (Niyonzima, 2019).

The present study used to find out the optimum culture conditions and parameters to purify the protease and amylase enzyme from marine source of *Pseudomonas aeruginosa* and *Bacillus subtilis* species respectively in a short duration also cost effectively. Furthermore, the findings of this study suggested the utilization of marine bacterial sources in industrial applications.Our research findings provide opportunities for the effective use of marine resources in enzyme production by optimizing these ideal conditions, which has great promise for industrial and Biotechnological applications. This study reveals that proteases produced by *Pseudomonas aeruginosa* and amylases produced by *Bacillus subtilis*, isolated from marine samples, possess the ability to decolorize azo dyes and clarify raw fruit juices with high starch content. The protease from *Pseudomonas aeruginosa* and the amylase from *Bacillus subtilis* may serve as ideal enzymes for eco-friendly textile and food processing applications.

BS-59

ECO-FRIENDLY SYNTHESIS OF *POLINATHES TUBEROSA* FLOWER MEDIATED NANOPARTICLES FOR ADVANCED WASTEWATER TREATMENT: A SUSTAINABLE APPROACH FOR ENVIRONMENTAL REMEDIATION

SELVAKUMARI PALANI, *RAJKUBERAN CHANDRASEKARAN

Department of Biotechnology, Karpagam Academy of Higher Education, Coimbatore

*Corresponding author: kuberan87@gmail.com

ABSTRACT

The green synthesis of copper oxide nanoparticles (CuO-NPs) using *Polinathes tuberosa* flower extract offers an eco-friendly and cost-effective method for nanoparticle production, particularly for wastewater treatment applications. This process utilizes the natural reducing and stabilizing properties of phytochemicals such as flavonoids and polyphenols found in *Polianthes tuberosa*, facilitating the formation of CuO-NPs without toxic chemicals. Characterization techniques, including powder X-ray diffraction (P-XRD), ultraviolet-visible (UV-Vis) spectroscopy, Fourier transform infrared (FTIR) spectroscopy, and field emission scanning electron microscopy (FESEM), confirm the successful synthesis of CuO-NPs with desirable structural and morphological properties. The synthesized nanoparticles exhibit significant antibacterial activity against common pathogens, including *Escherichia coli* and *Salmonella typhi*, making them suitable for medical applications. Furthermore, CuO-NPs demonstrate excellent potential in wastewater treatment by effectively removing contaminants and pollutants, such as organic dyes, due to their high surface area and reactivity. The dual role of *Polianthes tuberosa* extract as both a reducing agent and stabilizer enhances the stability and functionality of the nanoparticles, highlighting their multifunctional potential for sustainable environmental applications. Overall, the green synthesis of CuO-NPs from *Polianthes tuberosa* flower extract exemplifies a sustainable approach to nanoparticle production and offers a viable solution for addressing water pollution challenges.

Key Words; *Polianthes tuberosa,* CuO-NPs, wastewater treatment, *Escherichia coli*, *Salmonella typhi,*

BS-60

PHYTOREMEDIATION OF HEAVY METALS IN THE NOYYAL RIVER BASIN

GIREESH KUMAR P B AND SUSHMITHA R

Department of Energy and Environmental Engineering, Tamil Nadu Agriculture University Coimbatore-6410 003, Tamil Nadu

ABSTRACT

The Noyyal River basin faces severe heavy metal contamination, primarily from textile industry effluents containing dyes, salts, and other chemicals. This leads to elevated levels of cadmium, chromium, lead, copper and zinc in water and sediments. Domestic sewage and agricultural runoff further exacerbate the issue. This paper explores the potential of phytoremediation using bio-energy crops like Jatropha, Eucalyptus, and Populus to reduce heavy metal concentrations in the basin's soils. This dual benefit approach offers both soil remediation and sustainable source of bio fuel for industries. Further research is required to select crops specific to each heavy metal for extracting it at an optimal rate. This approach incentivizes farmers to remediate contaminated land while generating income, promoting sustainable agriculture and environmental restoration

Keywords: Phytoremediation, Heavy Metal Extraction, Bio-Energy Crops, Sustainable Agriculture, Environmental Restoration.

BS-61

SEED PRIMING WITH WOOD ASH-DERIVED NANO-SILICA IMPROVES MAIZE TOLERANCE TO CHROMIUM STRESS

[*]R. RAVEENA[A], S.K. RAJKISHORE[B*], R. SUNITHA[C], M. MAHESWARI[A], PON. SATHYAMOORTHY[D], A. BHARANI[A], V. PREMALATHA[A], K. ROHINIDEVI[A],

[a]Department of Environmental Sciences, AC&RI, TNAU, Coimbatore – 641003
[b]Department of Renewable Energy Engineering, AEC&RI, TNAU, Coimbatore- 641003
[c]Controllerate of Examination, TNAU, Coimbatore – 641003
[d]Agro Climate Research Centre, AC&RI, TNAU, Coimbatore -641003

[*]Corresponding author: ravi13raveena@gmail.com

ABSTRACT

With a projected global population exceeding 9.8 billion by 2050, significant food production increases are crucial. However, chromium contamination in agricultural soils, affecting nearly 9% of arable land globally, poses a major threat to food security. Chromium (Cr) is a well-documented culprit, reducing germination rates, hindering plant growth, and decreasing yields. This not only jeopardizes food security but also impedes progress towards achieving Sustainable Development Goal 2 (Zero Hunger). Wood ash, a historical silicon (Si) source for agriculture, holds promise for generating silicon nanoparticles (nano-Si) with unique properties. This study investigated the potential of wood ash-derived nano-Si as a seed priming agent to alleviate Cr stress in maize. Maize seeds were primed with varying nano-Si concentrations and germinated under controlled conditions. The results were promising. Compared to the control group, nano-Si priming significantly increased germination rate and seedling vigor, measured by root and shoot length. Notably, microwave plasma atomic emission spectroscopy (MP-AES) analysis revealed a substantial reduction in Cr accumulation within the nano-Si primed seeds.

These findings suggest that nano-Si acts as a protective agent for maize seedlings against Cr (VI) toxicity, with an optimal concentration of 200 ppm. Nano-Si priming has the potential to be a valuable strategy for improving maize yield and quality in Cr-contaminated soils. The exact mechanisms behind this improvement likely involve reduced Cr(VI)-induced oxidative stress, enhanced nutrient uptake, improved water use efficiency, and stimulation of antioxidant enzyme activity.

Keywords: Wood ash, Nano-silica, Chromium stress, Seed priming, Maize

BS-62

THE ROLE OF INDUSTRIAL WASTE IN SHAPING COMMUNITY HEALTH AND WELLBEING

HARINEE NANDAKUMAR,

Department of Clinical Nutrition, Kongunadu Arts and Science College (Autonomous), Coimbatore – 641029. Tamil Nadu, India.

E-mail: nharinee_nd@kongunaducollege.ac.in

ABSTRACT

Industrialization and urbanization are key drivers of economic growth and human well-being. However, they pose significant threats to the environment and community health. Industrial waste, generated by activities such as manufacturing, mining, and construction, includes solid, liquid, and gaseous pollutants. In developing and underdeveloped countries, untreated industrial waste, agricultural runoff, and municipal wastewater contaminate water sources, posing a serious risk to human health. As a result, one of the biggest problems now is finding clean water. The textile industry, in particular, generates large amounts of dye wastewater, which is highly toxic and carcinogenic. Poor water quality has been linked to 50% of child mortality and 80% of diseases worldwide, according to the World Health Organization (WHO). Numerous health problems, including cancer, skin disorders, malnourishment, and gastrointestinal illnesses were caused by water pollution. In India alone, approximately 1.7 million tonnes of wastewater are produced daily. According to statistics, 78% of this effluent is dumped into rivers, lakes, and groundwater without any treatment. As a result, an estimated 37.7 million people in India experience illnesses related to contaminated water each year. The lack of sufficient wastewater treatment and disposal facilities amplifies the problem, with only 30% of urban wastewater being treated before disposal. Rivers, wells, and groundwater are sources of freshwater that are depleting. The health impacts of industrial water pollution are far-reaching and devastating. Untreated water often contains harmful bacteria and other microorganisms, including algae, fungi, and protozoa. Increased urbanization, driven by industrialization, adversely affects waterways by raising levels of trace metals, particularly heavy metals. Dangerous chemical components can accumulate in soil and sediments of water bodies when released into the environment. Respiratory problems, brain damage, and even cancer can result from exposure to poisons such as arsenic, cadmium, and chromium. To mitigate the health impacts of industrial water pollution, it is essential to strengthen wastewater treatment and disposal infrastructure, promote sustainable industrial practices, and raise awareness about the importance of environmental protection and community health.

BS-63

IoT-ENABLED SYSTEMS FOR MONITORING AND REDUCING ENVIRONMENTAL POLLUTION FROM TEXTILE EFFLUENT

ITHANYA E, MOHANAPRIYA S, LALITHA G

Department of Biochemistry, Dr. N.G.P. Arts and Science College, Coimbatore 641035

ABSTRACT

Our study investigates the impact of soil parameters on textile effluent using IoT method, based on the actual state of the agricultural system, sensor technologies and wireless network integration have been examined and analyzed. Which includes pH, EC, TDS, macronutrients, and NPK. Based on the research region's soil sample, it can be concluded that the location has a basic pH value of 9.5, an estimated 1.38-dS/m EC, and a TDS of 3023.65 mg/L. The bulk density of soil is estimated to be 0.75 g/cc, which is close to its average value. The nitrogen, phosphorus, and potassium contents were discovered to be 2430.4, 182.5, and 754.7 Kg/ha, respectively. The calcium and magnesium concentrations are 18.2 and 10.1, respectively, and the organic carbon concentration is estimated to be 5.57, which is higher. It can be improved for future development for plantation on dye effluent soil. Keywords: Soil analysis, Electrical Conductivity, TDS, Bulk density, IoT method.

Keywords: Soil analysis, Electrical Conductivity, TDS, Bulk density, IoT method

BS-64

PROBIOTICS IN AQUACULTURE: A SUSTAINABLE STRATEGY FOR ENHANCING FISH HEALTH AND ECOSYSTEM RESILIENCE

ADITYA ISWARAN, SELVARAJU RAJA[#]

Department of Zoology, Kongunadu Arts and Science College, Coimbatore-641029, Tamil Nadu.
[#]**Corresponding Author**: rajaselvaraju12@kongunaducollege.ac.in

ABSTRACT

Aquaculture has an important role in the provision of fish meals to meet the ever-increasing global fish demand but the sustainability of the sector is under threat from disease outbreaks, environmental degradation and over reliance on antibiotics. Probiotics, which are the microorganisms with potential benefits have been identified to be a solution to these problems. These microorganisms increase the rate of fish growth, their ability to fight diseases and disease resistance as well as decrease the negative effects of aquaculture on the environment such as water pollution and accumulation of wastes. Including probiotics into the aquaculture management systems is capable of enhancing the biological degradation of organic matter and bacterial pathogens therefore enhancing the quality of aquatic environment. Probiotics also help in reducing the usage of antibiotics thereby decreasing the chances of antimicrobial resistance which is a major concern worldwide. In addition, they also enhance the survival rates of fish and hence the overall productivity which is vital for the economic viability of aquaculture. This study also highlights the multi-facets advantages of using probiotics in aquaculture system and the possibilities of solving some socioeconomic and ecological problems. Thereby, the probiotics have the potential to change the course of the aquaculture industry and support the sustainable development of this sector while reducing the negative impact on the environment. To this end, probiotics have been identified as key inputs that can help the industry to balance between the need to produce more fish products and the need to safeguard the environment.

Keywords: Aquaculture, Probiotics, Sustainability, Fish Demand, Disease Resistance, Environmental Degradation, Antibiotics, Productivity

BS-65

BIOGENIC SYNTHESIS OF SILVER NANOPARTICLES FROM *SEMECARPUS ANACARDIUM* LEAF EXTRACT: EVALUATION OF THEIR ANTIMICROBIAL ACTIVITY FOR USE IN WATER PURIFICATION AND HAND WASH APPLICATIONS

ARDHRA GOPAN, NIVEDHITHA VINODAND D. PRADEEPA

Department of Biochemistry, Dr. N.G.P. Arts and Science College, Coimbatore – 641 048, Tamil Nadu

[#]Corresponding author: pradeepa@drngpasc.ac.in

ABSTRACT

Nanoparticles represent a burgeoning area of research due to their unique properties and extensive biological applications. This study focuses on the eco-friendly synthesis of silver nanoparticles using leaf extracts of *Semecarpus anacardium*, commonly known as Bhilwa or marking nut. Known for its rich phytochemical profile, including flavonoids, phenolic compounds, and vitamins, the plant has been widely recognized for its medicinal properties, including antibacterial, anti-inflammatory, and antioxidant activities. The primary objective is to develop cost-effective and environmentally friendly methods for synthesizing silver nanoparticles and evaluate their potential applications as antimicrobial agents in hand wash and water purification systems. The process involves the phytochemical analysis of *S. anacardium* leaf extracts, green synthesis of silver nanoparticles, and their characterization using UV, FTIR, XRD, and SEM-EDAX techniques. Antimicrobial efficacy is tested against bacterial cultures isolated from household and toilet environments. Additionally, filter paper impregnated with synthesized nanoparticles is tested for water purification, showcasing its effectiveness in microbial reduction. The hand wash formulation, enriched with nanoparticles, eliminates the need for chemical stabilizers and emulsifiers, providing a natural, non-toxic alternative to commercial products. This study demonstrates the dual application of *S. anacardium*-mediated silver nanoparticles in health and hygiene. The nanoparticle-integrated hand wash offers a sustainable solution for reducing pathogen transmission, while the water purification method ensures safe drinking water at low cost, addressing critical public health challenges. This research highlights the potential of biogenic nanoparticles as versatile antimicrobial agents for real-life applications.

Keywords: Silver Nanoparticles, Biogenic Synthesis, *Semecarpus anacardium*, Antimicrobial Activity, Water Purification

BS-66

THE EFFICACY OF VEGETABLE WASTE AS A NATURAL COAGULANT FOR WATER PURIFICATION AND TO ANALYZE THE QUALITY OF THE FILTERED WATER FOR ITS POTABILITY AND POTENTIAL ENVIRONMENTAL BENEFITS

T. INDHUMATHI, AKSHAYA. R, SWETHA. G

Department of Biochemistry, Dr N.G.P. Arts and Science College, Dr N.G.P. Nagar, Kalapatti Road, Coimbatore - 641048, Tamil Nadu.

ABSTRACT

Water is the essence of life, and its importance is universally recognized. It is an indispensable resource for various daily activities, including cooking, laundry, and dishwashing. However, despite this collective awareness, the issue of water pollution remains a pressing concern. The quality of water is paramount for the public health. The access for good quality of water remains as a critical issue. The varying concentration of the specific parameters which were considered for healthy drinking water should meet with the standardized acceptable limit. The samples were collected in different zones, and were taken to the laboratory immediately to conduct the tests. Around 8 parameters such as the dissolved oxygen, calcium, total hardness, turbidity, pH, chloride, alkalinity and fluoride were considered for the testing of the water samples. A proper management and maintenance of water is very pivotal for maintaining its quality Prolong storage of water shall also increase the biological as well as the physical water quality parameters. Given the rising levels of water pollution and the associated risk of waterborne diseases, ensuring safe drinking water is a necessity, not a choice. This remarkable molecule acts as a universal solvent, enabling it to dissolve a wide range of substances and play a pivotal role in various biological and chemical processes.

BS-67

IMPACT OF WATER POLLUTION IN ECONOMIC GROWTH

[#]MIRUTHIKHA BALAMURUGAN, R. SATHISH KUMAR

PG and Research Department of Biotechnology, Kongunadu Arts and Science College, Coimbatore – 641029, Tamil Nadu, India.

[#]Corresponding author email ID: miruthumiruthikha@gmail.com

ABSTRACT

Water pollution significantly affects economic growth by impairing public health, reducing agricultural productivity, and damaging ecosystems. Contaminated water sources lead to increased healthcare costs, decreased labor productivity, and lower life expectancy, which hinder human capital development. Additionally, water pollution disrupts industries reliant on clean water, such as agriculture, fisheries, and tourism, leading to financial losses and reduced trade opportunities. The economic consequences are particularly severe in developing countries, where infrastructure and regulatory measures may be inadequate. Addressing water pollution through effective policies, improved waste management, and sustainable water usage practices can mitigate its negative impact and foster long-term economic growth. This paper explores the direct and indirect pathways through which water pollution constrains economic development and offers strategies for minimizing its adverse effects.

Keywords: Expectancy, Inadequate, Constrains

BS-68

EXPLORING THE POTENTIALITIES OF *ANACARDIUM OCCIDENTALE* IN NANOTECH: TREATING WASTEWATER CONTAMINATED WITH PFOA

NAVANIDHAN MUTHAN, SHANMUGAPRIYA SAKKARAVARTHY, ABIRUBA SURESHKUMAR, DHANYA AYYASAMY

PG & Research Department of Biotechnology, Kongunadu Arts and Science College, Coimbatore – 641029, Tamil Nadu

ABSTRACT

Anacardium occidentale extracts, found in Nigeria, are used for treating various diseases. Testing confirmed the presence of protein and amino acid components in the leaf extracts, confirming their medicinal properties. Protein extraction was successfully achieved from the leaf extract, with a substantial protein content verified using the Lowry testing method. The synthesized AuNPs from the protein extract demonstrated promising results in antimicrobial tests against *E. coli*, *Bacillus*, and *S. aureus*, as well as antifungal activity against *Aspergillus* and *C. albicans*. To effectively purify contaminated water, gold nanoparticles (Au NPs) were incorporated onto filter paper (FP), creating an innovative Au NP-FP membrane. Perfluorooctanoic acid (PFOA), a well-studied per- and polyfluoroalkyl substance (PFOS), has been classified as a human carcinogen by the International Agency for Research on Cancer (IARC) due to sufficient evidence of cancer. Elevated levels of PFAS and PFOS in the water supply have been linked to a higher risk of testicular cancer in individuals. This specialized filter membrane is designed to extract PFOAs from wastewater through the formation of gold amalgams, leveraging the distinctive flow characteristics of filter paper for optimal performance. The primary objective of this research is to remove PFOA concentrations from contaminated water, rendering it safe for drinking. In this endeavor, gold nanoparticles were synthesized using extracts from *Anacardium occidentale*. These gold nanoparticles (Au NPs) were then integrated into filter paper, creating an Au NP-FP membrane. This innovative membrane showcased exceptional effectiveness in eliminating PFOAs from wastewater, utilizing the unique flow properties of the filter paper to achieve outstanding results.

Keywords: AuNP (Gold Nanoparticles), Anacardium occidentale, Cancer, Perfluorooctanoic acid (PFOA), per- and polyfluoroalkyl substance (PFOS).

Physical Science (PS)

SYNTHESIS OF MgZnFe2O4 BY SOL-GEL AUTO-COMBUSTION METHOD

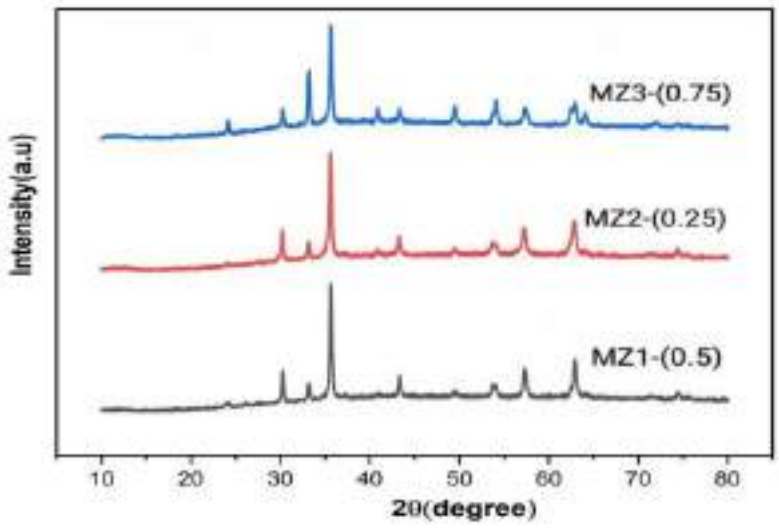
MUKESH E A, AKSHAYA.R, *GOKUL.B, MATHESWARAN.P

Department of Physics, Kongunadu Arts and Science College, Coimbatore-641029, Tamil Nadu, India.

*Corresponding author: gokulbangaru@gmail.com

ABSTRACT

Magnesium ferrite ($MgFe_2O_4$) is a widely studied spinel ferrite material due to its excellent magnetic and electrical properties, making it suitable for various applications such as sensors, catalysts, and electromagnetic devices. In this study, zinc-doped magnesium ferrite was synthesized using the sol-gel auto-combustion method, a cost effective and efficient process for producing fine, homogeneous powders. The structural and morphological properties of the synthesized samples were analyzed using X-ray diffraction (XRD), field emission scanning electron microscopy (FESEM), and cyclic voltammetry (CV). XRD results confirmed the formation of a single-phase spinel structure, with lattice parameters. FESEM images revealed uniform particle distribution with nanometer-sized grains. CV analysis demonstrated improved electrochemical properties with Zn doping, highlighting its potential for energy storage applications. This study showcases that Zn doping effectively modifies the structural and electrochemical properties of $MgFe_2O_4$, expanding its suitability for advanced technological applications. The XRD pattern of MgZnFe2O4 for three different ratios is shown in the below graph.



PS-02

STUDY OF STRUCTURAL AND CHARACTERIZATION OF ND DOPED V_2O_5 NANO PARTICLES

SYED RIFAYATH. S, ANU KALIANI A, NAGA SUNDAR S

Department of Physics, Kongunadu Arts and Science College (Autonomous), Coimbatore, Tamil Nadu, India, 641-029.

ABSTRACT

People need high-performance energy storage devices, due to current world excessive reliance on portable electronic gadgets. A high-performance bi symmetric pseudocapacitive device with Neodymium doped vanadium pentoxide (Nd doped V2O5) electrode was built. The structural and topographical properties are determined by XRD, SEM and the chemical bonds are determined by the Fourier Transform Infrared (FTIR) spectroscopy. XRD shows an orthorhombic structure and the average crystalline sizes of pure and Nd doped V2O5 nanoparticles were found to be in the range of 71.25-89.63 nm. Rod shaped images were seen in the SEM images of pure and Nd doped V2O5 nanoparticles. FTIR shows the chemical bonding and forms the successful doping of Nd with V2O5 nanoparticles. These results confirm that Nd doped V2O5 nanoparticles can be used for Pseudocapacitive applications.

PS-03

DEVELOPMENT OF EXCHANGED COUPLED PERMANENT MAGNETS BY PHYSICAL MIXING

AKSHAYA. R, KARTHIKEYAN. K, *GOKUL. B, MATHESWARAN. P

Department of Physics, Kongunadu Arts and Science College, Coimbatore-641029, Tamil Nadu, India.

***Corresponding author:** gokulbangaru@gmail.com

ABSTRACT

Exchanged Coupled magnets are a type of permanent magnetic material. In which, they contain two magnetic phases ie., Hard magnetic phase and Soft magnetic phase. The purpose of exchanging both hard and soft magnetic is to get High Coercivity in hard magnetic phase and maximum saturation in soft magnetic phase to achieve permanent magnet with maximum energy product. Here, the Exchange coupling interaction between strontium ferrite ($SrFe_{12}O_{19}$) and Iron Cobalt (FeCo) is synthesized by sol-gel autocombustion and Solvothermal method separately. The synthezied powders were mixed physically for 4 different ratios. After that mixed nanopowders were characterized by X-Ray Diffraction (XRD), Field Emission Scanning Electron Microscope (FESEM), Vibrating Sample Magnetometer (VSM). The XRD pattern shows the presence of both hard and soft magnetic phase confirms the formation of $SrFe_{12}O_{19}$/FeCo nanocomposite. The FESEM images get forms flower like structure and slightly agglomerated. The magnetic property of the nanocomposite in hystersis loop shows highest magnetization saturation 62 emu/g with coercivity 1738.4 Oe.

Keywords: Permanent Magnets, Exchanged-coupled, Sol-gel autocombustion, Solvothermal, Physical Mixing.

PS-04

MAGNETIC PROPERTY OF STRONTIUM FERRITE/MANGANESE FERRITE BY SOL-GEL AUTOCOMBUSTION METHOD

BALALOGESH. K, AKSHAYA. R, GOKUL. B, MATHESWARAN. P

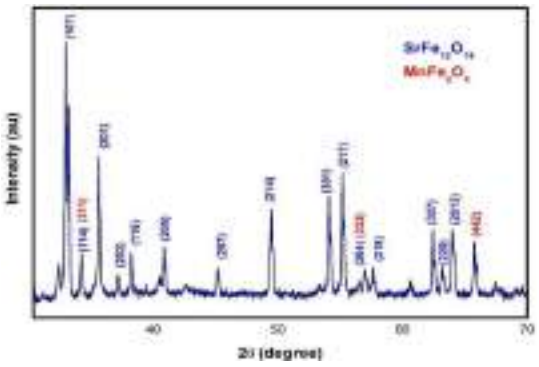
Department of Physics, Kongunadu Arts and Science College, Coimbatore-641029, Tamil Nadu, India.

*Corresponding author**:** gokulbangaru@gmail.com

ABSTRACT

Magnetic nanocomposites are material combination with a large field of applications. In nanocomposites exchange coupling of hard and soft magnets provides a pathway to get increased energy product BH (max). The maximum energy product provides highly efficient permanent magnets. In this study, Magnetic nanocomposite of MnFe2O4 (Soft) and SrFe12O19 (hard) powders were prepared in three different ratios by Sol-Gel autocombustion method. The samples were prepared and annealed at 900˚c for 2hrs. The prepared nanopowders were characterized by X-Ray Diffraction (XRD), Field Emission Scanning Electron Microscope (FESEM), Vibrating Sample Magnetometer (VSM). The XRD pattern shows the presence of both hard and soft magnetic phase confirms the formation of SrFe12O19/MnFe2O4 nanocomposite. The average crystallite size of SrFe12O19/MnFe2O4 is 32nm. The magnetic property of the nanocomposite in hystersis loop shows magnetization saturation 7.1 emu/g with coercivity 5895.4 Oe. Because of minimum exchange coupling, the magnetization saturation is very low which is shown in the figure.

Keywords: Permanent Magnets, Exchanged-coupled, Sol-gel autocombustion, Ferrites.



PS-05

OBSERVATION OF THRESHOLD VOLTAGE IN THERMALLY ASSISTED QUATERNARY METAL CHALCOGENIDES SE-TE-SN-AG THIN FILM'S SELECTOR CELL DEVICES

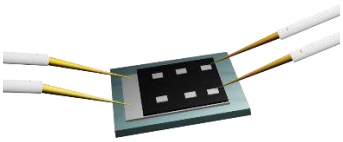
KARTHIKEYAN KANDHASAMY, *MATHESWARAN PALANISAMY, AKSHAYA RAMACHANDRAN, GOKUL BANGARU, N. SENTHIL KUMAR

Thin film and nanotechnology laboratory, Department of Physics, Kongunadu Arts and Science College, Coimbatore-641029, Tamil Nadu, India

*Corresponding Author: mathesphy@gmail.com

ABSTRACT

Researchers are concentrating on the development of non-volatile and neuromorphic computing technologies in order to address the exponentially growing need for data processing and storage driven by technology. For such revolutionary computational memory requirements, the main contenders for phase-change memory materials are metal chalcogenide materials. The Se-Te-Sn-Ag (STSA) material, which is a quaternary metal chalcogenide, can exist in two phases: crystalline and amorphous. Its phase transition temperature and mature crystallization kinetics are both high and low, respectively. There has been a long-standing discussion about the physical genesis of the ovonic threshold switching mechanism in phase change memory (PCM), which is still not entirely resolved. We investigate phase change ovonic threshold switching in the current work using a manufactured two-terminal selector device at various temperatures. Ag/STSA/Ag structure exhibits a temperature-dependent decrease in threshold voltage. In this work, we also noticed and examined the contact minimization and volume minimizing of the selector cell effect, which are important factors in the technological revolution related to the scalability of the switching device. The thermal model carrier exchanges correlate well with these experimental data.



Schematic illustration of selector device electrical measurement

PS-06

INVESTIGATION ON THE EFFECTIVENESS OF $MGWO_4$ NANOPARTICLES FOR WASTE WATER TREATMENT

G. RAMITHA, N. NARESHKUMAR, V.D. NITHYA*

Department of Physics, Kongunadu Arts and Science College, G.N. Mills (Post), Coimbatore - 641 029, Tamil Nadu, India

*Corresponding Author: vdnithya_ph@kongunaducollege.ac.in

ABSTRACT

Photocatalysis is a promising technology employed for the degradation of various pollutants present in the waste water. Magnesium tungstate ($MgWO_4$) is a promising material for photocatalytic applications due to its unique physicochemical properties, such as a high surface area, narrow bandgap, and excellent stability. The photocatalytic activity of $MgWO_4$ is primarily determined by its ability to absorb light and generate electron-hole pairs that can effectively degrade organic pollutants and purify water under UV or visible light. For this, $MgWO_4$ nanoparticles have been synthesized by simple and cost-effective co-precipitation method. The synthesized material was characterized using various techniques such as X-ray diffraction (XRD), Fourier Transform Infrared spectroscopy (FTIR) and Field Emission Scanning Electron Microscopy (FE-SEM). The formation of highly crystalline orthorhombic phase of $MgWO_4$ particles was confirmed from XRD. The presence of possible functional groups in $MgWO_4$ was analyzed using FTIR. The synthesized materials were nanometre in size range observed from FESEM images. The application of $MgWO_4$ nanoparticles as an eco-friendly photocatalyst for environmental remediation is in progress.

PS-07

PROOF OF EHRENFEST THEOREM FOR DETERMINING MOMENTUM OF A PARTICLE

A. ANDREW, P. HARI HARAN, K. KARUPPUSWAMY*

Department of physics, Kongunadu Arts and Science College, G.N Mills (Post),

Coimbatore- 641029, Tamil Nadu, India

*Corresponding Author: karuppuswamyk@kongunaducollege.ac.in

ABSTRACT

Ehrenfest theorem is a theorem which acts as bridge between classical and quantum worlds. In quantum mechanics we determine the particle motion in wave function, quantum mechanics deals with mathematical rigorous derivation and equations. Evolution of position, momentum and energy which expressed in Ehrenfest theorem with the base of classical mechanics operators. Expectation values, quantum commutators, quantum operators are used to express momentum. By applying the operators, quantum Commutators and Expectation value it expresses the momentum of particle precisely. It also relates the momentum expressed in classical mechanics by probability conditions in theorem. Thus, Ehrenfest theorem acts as bridge between classical and quantum mechanics. By using this Ehrenfest theorem the particle's momentum is measured. The result obtained from the theorem clearly concludes that the expectation value of the commutators and operator are efficient in calculating the momentum of the particle.

POWER GENERATION FROM PIEZOELECTRIC TYRES

V. GOWTHAMRAJ, Y. AJMAL, N. SENTHIL KUMAR*

Department of Physics, Kongunadu Arts and Science College, G.N Mills (Post),

Coimbatore- 641029, Tamil Nadu, India.

**Corresponding Author: senthilkumarn@kongunaducollege.ac.in.

ABSTRACT

The piezoelectric effect enables the conversion of mechanical energy, resulting from the contact between a vehicle's wheel and the road, into electrical energy. The objective of this present work is to enhance electricity generation in an environmentally friendly manner. By utilizing technological advancements, it becomes possible to convert wasted vibrational / mechanical energy from the vehicle's tire into electrical energy, leading to both cost-effectiveness and environmental sustainability. To achieve this, piezoelectric patches are strategically positioned within the wheel rim. When these patches come into contact with the road and are subjected to the weight of the vehicle, electricity is generated. In our work, we will employ polyurethane foam to safeguard the piezoelectric patches, which will be situated inside the bicycle's tire. This setup aims to generate sufficient energy to charge a battery. Consequently, the electrical energy stored in the wheels will be transformed into light energy through the utilization of the piezoelectric patches. The produced vibrational mechanical energy is stored in battery and utilized in operation of running electrical vehicles.

PS-09

DESIGN OF SMART HELMET FOR ACCIDENT PREVENTION AND ALCOHOLIC DETECTION

A. MONISHA PRAISY, S. SOWNDHARIYA, B. CHANDAR SHEKAR*

Department of Physics, Kongunadu Arts and Science College, G.N. Mills (post), Coimbatore – 641029, Tamil Nadu, India.

***Corresponding Author**: bchandarsekar_ph@kongunaducollege.ac.in

ABSTRACT

Drunk driving has a major issue on society, causing social and economic impacts, and affecting the well-being of individuals and communities. To prevent this series issue, we propose a Smart Helmet for Accident Prevention and Alcoholic Detection which automatically checks whether the person is wearing the helmet and has non- alcoholic breath while driving. Here we have a transmitter at the helmet and the receiver at the bike. There is a switch used to ensure the wearing of helmet on the head. The ON condition of the switch ensures the placing of the helmet in proper manner. An alcohol sensor is placed near to the mouth of the driver in the helmet to detect the presence of alcohol. The data to be transferred is coded with RF encoder and transmitted through radio frequency transmitter. The RF receiver at the bike receives the data and decodes it through RF decoder. The engine should not ON if any of the two conditions is violated. This idea may lead to reduce the accident caused by drunk and drive.

Chemical Science (CHS)

CHS-01

SYNTHESIS AND CHARACTERIZATION OF CHROMIUM OXIDE NANOPARTICLES FROM SINGLE SOURCE PRECURSOR

FAYAS ABDULLAH PS, DHAYANAND MK, MUHAMMED SUFAIL CA, Dr. KALPANADEVI K*

*PG & Research Department of Chemistry, Kongunadu Arts and Science College, Coimbatore

ABSTRACT

Chromium oxide nanoparticles have been synthesized from the thermal decomposition of the single source precursor, which has been obtained from the stoichiometric proportions of chromium nitrate, cinnamic acid and hydrazine hydrate. The bluish polycrystalline particles of the synthesized precursor have been characterized by elemental analysis, IR spectroscopy and TG/DSC. From the IR spectral details, it is evident that cinnamic acid and hydrazine coordinate with Cr respectively, in a monodentate fashion and in a bidentate bridging nature. The thermal decomposition studies indicated the formation of Cr_2O_3 as the final decomposition product. SEM images display the rod-like morphology of the Cr_2O_3 particles. The crystallite size of the formed Cr_2O_3 particles is found to be in 19 nm, as confirmed by XRD. HRTEM analysis also confirm the presence of around 19 nanometer-sized particles. The photodyedegradation ability of the material indicate their potential activity towards the dyes present in the effluents under investigation viz. Methyl orange and Congo red.

Keywords: Cinnamic acid, Hydrazine hydrate, TG/DSC, SEM, XRD, HRTEM

CHS-02

ENHANCED DEGRADATION OF ORGANIC DYES IN WASTEWATER USING A RECYCLABLE CUO DISPERSED REDUCED GRAPHENE OXIDE NANOCOMPOSITE

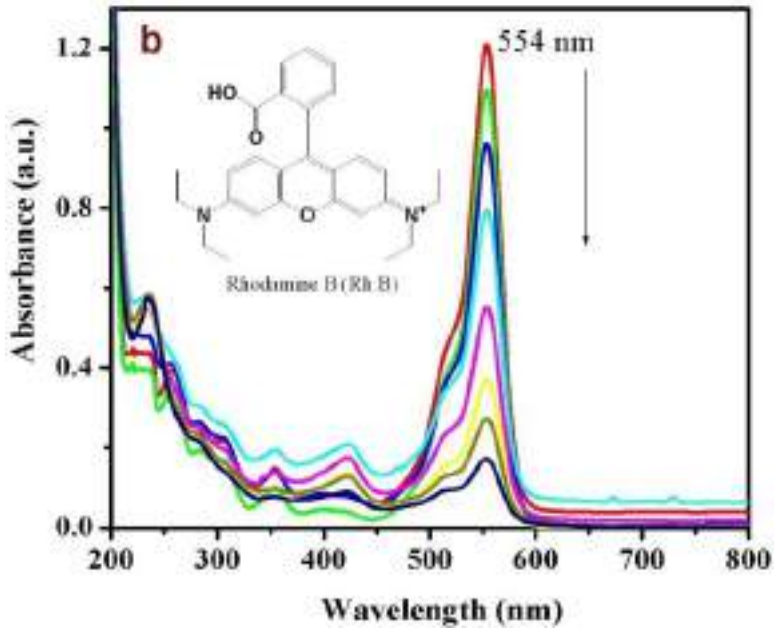
N. SRIHARISHMITA, R. AKSHITHA, M. P. PACHAMUTHU*, C. MANIVANNAN

Division of Chemistry, SRM Institute of Science and Technology Tiruchirappalli 621105, Tamil Nadu, India

*Corresponding author: pachachem@gmail.com

ABSTRACT

The environmental threats posed by industrial dye effluents and organic pollutants necessitate the development and application of efficient catalytic route for their remediation. In the present work, the synthesis of copper oxide on reduced graphene oxide (CuO@rGO) nanocomposite is reported, involving the hybrid structure. The CuOs decorated rGO nanocomposite was characterised by XRD, FTIR, FESEM, EDAX, XPS and TEM techniques. The catalytic performance of the nanocatalyst was studied through the reduction of effluent dye molecules rhodamine B (RhB), 4-Nitrophenol and Congo red (CR) in the presence of $NaBH_4$, respectively. The progress of reductive dye degradation was monitored via UV-Vis spectrophotometry. The kinetic data was analysed and apparent rate constants were determined for the respective dyes. Such prolific nanocomposite catalysts could be employed as an alternative to toxic dye and organic component degradation in environmental treatment.



Keywords: CuO/rGO, Nanocomposite, Chemometrics, Dye reduction

CHS-03

SORPTION STUDIES OF SAGO WASTE ACTIVATED CARBON ON METANIL YELLOW DYE

P. A. PERIASAMY[A] AND G. VADIVELAN[B]

[a]Department of Chemistry, Dr. Mahalingam College of Engineering & Technology, Pollachi, Tamil Nadu, India.

[b]PG & Research Department of Chemistry, Kongunadu Arts and Science College, Coimbatore, Tamil Nadu, India

ABSTRACT

Sago waste activated carbon proves to be a promising adsorbent for the removal of acid dyes from aqueous solutions and effluents. The physico-chemical properties of the prepared activated carbon (SAC) were investigated. Further, scanning electron microscope (SEM) study was carried out for both unloaded & loaded sorbent. The adsorption and kinetic analysis of Metanil Yellow dye (MY) with SAC was done employing batch equilibrium method. Effects of pH, adsorbent dosage, initial dye concentration and carbon particle size on the sorption process were studied. The conditions optimum for maximum dye removal is pH 3, particle size 125-240 μm and adsorbent dosage 0.35g. The kinetic modeling was done by applying Elovich, first order, Pseudo second order and Intraparticle diffusion models to the experimental data. The isothermal studies showed that the MY adsorption onto SAC was spontaneous and endothermic. The equilibrium data were analyzed using Temkin, Langmuir and Freundlich isotherm models. The slope and intercept of the linear plots facilitated the calculation of thermodynamic parameters ΔG°, ΔH° and ΔS°.

CHS-04

IMPROVED ANTIBACTERIAL ACTIVITY OF SNO_2 : ZNO NANOCOMPOSITE AGAINST WATERBORNE MICROBES

N.S. HARINI[A], M. P. PACHAMUTHU[A]*, K. NIRUBAMA[B]

[a]Division of Chemistry, SRM Institute of Science and Technology Tiruchirappalli 621105, Tamil Nadu, India

[b]Department of Biochemistry, Kongunadu Arts and Science College, Coimbatore, Tamil Nadu-641029, India

ABSTRACT

The presence of *E. coli* and *Bacillus subtilis* in polluted water can indicate the presence of other harmful bacteria, viruses, and parasites, potentially causing illnesses such as diarrhea, urinary tract infections, and skin and eye infections. Reactive oxygen species (ROS) generated from metal oxides have been shown to damage microbial DNA, interfere with protein function, and disrupt cell membranes. In this work, a tin oxide and zinc oxide nanocomposite (SnO_2:ZnO) was synthesized and characterized using XRD, FTIR, FESEM, EDAX, and TEM. The prepared nanocomposites exhibited greater visible light activity against *B. subtilis* and *E. coli.* Antibacterial testing of the nanocomposite against both *Escherichia coli* and *Bacillus subtilis* demonstrated its potential as an antimicrobial agent. The minimum inhibitory concentration (MIC) of the nanocomposite was found to be 3 μg/mL against *E. coli* and 2 μg/mL against *B. subtilis*. These results indicate that the combination of SnO_2 with ZnO nanoparticles enhances antibacterial activity.

CHS-05

SYNTHESIS, CHARACTERIZATION OF CTAB ASSISTED NICO2O4 NANOCOMPOSITE FOR PHOTOCATALYTIC DEGRADATION OF MALACHITE GREEN AND ELECTROCHEMICAL GLUCOSE SENSOR APPLICATIONS

A. NIVETHA[A*], C. SAKTHIVEL[B], J. HEMALATHA[C], C. SENTHAMIL[C], I. PRABHA[C*]

[a]PG & Research Department of Chemistry, Kongunadu Arts and Science College, Coimbatore-641029, India

[b]Laboratory of Functional Molecules and Materials, School of Physics and Optoelectronic Engineering, Shandong University of Technology, Zibo, 255000, PR China

[c]Department of Chemistry, Bharathiar University, Coimbatore 641 046, India

ABSTRACT

The CTAB supported $NiCo_2O_4$ was synthesized by simple co-precipitation method for photo-electrocatalyst. The optical and structural properties of the nanocomposite were confirmed by UV-Vis, TEM analysis and the functional group present in the composite was confirmed by FT-IR study. The formation of the nanocomposite and the cubic spinel phase, crystallite size was determined using XRD analysis. The band gap value was determined to be 2.15 eV which confirmed the semiconductor nature of $NiCo_2O_4$. The formation of metal oxide bond was verified by the peak 667 cm^{-1}. The average crystallite size was calculated by using Debye Scherrer equation. The elements present in the nanocomposite were confirmed by the EDAX analysis. The photocatalytic degradation efficiency was achieved up to approximately 97% against malachite green at 10 ppm concentration of dye, 50 mg catalyst weight and pH - 9. The synthesized nanocomposite was evaluated for the detection of glucose at different concentration. The CTAB supported $NiCo_2O_4$ was act as a potent oxidant for the photo-electrochemical reactions.

Keywords: Morphology; Glucose Detection; Malachite Green; Oxidant; Photo-electrochemical reaction

CHS-06

PREPARATION OF NANOCOMPOSITE FOR ENVIRONMENTAL REMEDIATION PURPOSES

KANNAN SELVARAJ

PG & Research Department of Chemistry, Kongunadu Arts and Science College, Coimbatore-641029, India

ABSTRACT

Nanoparticles had their footprints in several fields of science, food, paints, semiconductors, cosmetics and in drug delivery applications. In our work, nanomaterials were prepared by chemical reduction method. Citrus Limon supported Fe_3O_4 @Ni-Co Bimetallic Nanocomposite was prepared while the crystalline nature of the material is to be confirmed by XRD analysis and the morphological nature by SEM and TEM analysis. The size of the nanocomposite was found to be 18-20 nm. The elemental confirmation was made with the help of XPS analysis and the FT-IR analysis confirms the functional group present on the as-prepared nanocomposite. Nanocomposite were synthesized through an eco-friendly in-situ green synthesis method. This process involves employing supporting agent which plays capping agent role for nanoparticles during the preparation of the NC. The as-prepared nanocomposite was tested for photocatalytic application and is an eco-friendly method for the treatment of pollutant water (organic waste dyes). The degradation of the pollutant water was confirmed by the decrease in the intensity of color and also by spectrophotometrically. It is one of the promising tools for the degradation of toxic substances from the wastewater.

Keywords: Nanocomposite, Water treatment, Capping agent, Green synthesis.

CHS-07

GROWTH STUDIES OF EPHIPERUM AURUM UNDER PHYTORMEDIATION OF TANNERY EFFLUENT

JAWAHAR VENKATESAN, KANNAN KANDHASAMY

Department of Chemical Engineering, Kongu Engineering College, Perundurai-636060

Corresponding author Email: kannank@kongu.ac.in

ABSTRACT

The tannery effluent mostly consists of the heavy metals used for the tanning process, with effluent chromium sulfate having a hexavalent nature that is carcinogenic to the environment. The treatment of the heavy metal's electro flocculation, advanced oxidation process, and membranes have high costs. Phytoremediation is an efficient way of treating effluent at an economical cost with natural aquatic weeds. The aquatic weed has the natural potential to absorb chromium and convert it into food nutrients for the plant and release ions to the environment. The subsequential bio-reactor is a model of the continuous treatment of the reactor with the suitable aquatic weeds of *Ephiperum aurum*. The *Ephiperum aurum* is a family of araceae it has growth up to 4 centimeters. The subsequential bioreactor had the variables of flow rate and retention time for the continuous system of treatment. The plant *Ephiperum aurum* is used for high absorption of chromium heavy metal which has the efficiency of the removal of heavy metal up to 80%. The study of the plant absorbing the synthetic effluent and plant growth. The XRD analysis studies the adaptability of the plant and the study of effective growth over the flow rate of the system of *Ephiperum aurum*.

Keywords: Phytoremediation, *Ephiperum aurem*, *Saccharum spontanuem*, Bio-Reactor

CHS-08

SYNTHESIS, CHARACTERIZATION AND ANTIBACTERIAL STUDIES OF AMINOGUANIDIUM COBALT (II)- AND NICKEL(II) p-TOLUENESULFONATE HYDRATES

[*]A. PUSHPAVENI[a], N. ANGAMUTHU[ab], S. PACKIARAJ[c]

[a]Department of Chemistry (PG), Kongunadu arts and science college, Coimbatore-641029, India.

[b]Department of Chemistry, Dr. R. K. Shanmugham College of Arts and Science, Coimbatore - 606213.

[c]Department of Chemistry, Sri Krishna college of Engineering and Technology, Coimbatore-641 008, India.

[*]Corresponding author: pushpa.or.veni@gmail.com

ABSTRACT

The new bis aminoguanidinium cobalt (II)- and nickel (II) bis-aqua tetra p-toluenesulfonate hydrates have been prepared in aqueous medium with appropriate experimental condition. The prepared complex was characterized by IR spectral studies and the simultaneous TG-DTA technique. Physico-chemical studies reveals the compositions of the new compound as **$(AgunH)_2[M(PTS)_4(H_2O)_2]2H_2O$,where M=Co/Ni.** The IR spectral studies of the complexes display OH stretching frequency in the region of 3325cm^{-1} revealing the presence of water molecule. Further, the asymmetric and symmetric stretching frequencies of the sulphonate anions appear around 1350 cm^{-1} and 1180 cm^{-1}. The N-H and N-N stretching frequencies of hydrazine in aminoguanidine moiety has been observed around the region of 3200 and 1118 cm^{-1} confirming the presence of aminoguanidinium cation. From thermal analysis, the low and high temperature decomposition in TG indicates that the presence of water molecules in lattice and coordinated position. The anhydrous metal complex undergoes decomposition in the temperature range of 200-400^oC to form the intermediate as (Agun) $[M(PTS)_2]$. Further, the aminoguanidinium metal sulphonate decomposes at the to give metal sulphate as the end residue. In all these observations the proposed structure of the complexes shows six coordinated distorted octahedral geometry. Antibacterial studies show that aminoguanidium cobalt (II) bisaqua tetra-p-tolunesulphonate hydrates having more antibacterial activity than nickel (II) bisaquatetrap-tolune sulphonate hydrates.

CHS-09

LEVERAGING ARTIFICIAL INTELLIGENCE TO ADDRESS TOXICITY IN WATER BODIES

M.THOLKAPPIYAN, S. PRAVINKUMAR, D. SUBIESWAR, M. RUBAN RAJ, S. PRAVEN, SAMINATHAN. K*

Department of Chemistry, Kongunadu Arts and Science College, Coimbatore- 641 029 Tamil Nadu. *

Corresponding author: ksaminath@gmail.com

ABSTRACT

Water pollution poses a significant threat to ecosystems, public health, and sustainable development. The accumulation of toxic substances such as heavy metals, organic pollutants, and microplastics in water bodies necessitates innovative solutions for monitoring, prediction, and mitigation. Artificial Intelligence (AI) offers a transformative approach to address these challenges by integrating advanced data analytics, machine learning (ML), and real-time monitoring systems.

AI-driven water quality management involves the use of sensors, remote sensing technologies, and data integration platforms to continuously monitor physical, chemical, and biological parameters of water bodies. Machine learning models can process vast datasets, identify pollution patterns, and predict toxicity levels with high accuracy. These predictions enable timely interventions, minimizing the impact of toxic events on aquatic ecosystems and human populations. AI also aids in optimizing remediation strategies. Through simulations and optimization algorithms, AI can identify the most effective and cost-efficient methods to remove pollutants, such as bioremediation, chemical neutralization, or advanced filtration techniques. Furthermore, AI-powered decision-support systems facilitate policymakers and stakeholders in implementing sustainable practices for water resource management. Incorporating AI into water quality research offers additional benefits, such as early detection of contamination, enhanced understanding of pollutant sources, and fostering collaboration across scientific disciplines. Challenges remain, including the need for robust data collection, algorithm transparency, and equitable access to AI tools, particularly in developing regions. This abstract highlights the transformative potential of AI in overcoming toxicity in water bodies. By leveraging advanced technologies, we can ensure cleaner water resources, protect biodiversity, and promote a healthier environment for future generations.

CHS-10

GREEN-SYNTHESIZED CUO NANOPARTICLES USING *BAUHINIA RACEMOSA LAM.* LEAVES EXTRACT AND THEIR PHOTOCATALYTIC APPLICATIONS

ANANTHIKA VIJAYALAKSHMI PARAMESWARAN, MARIAPPAN ANUSUYA, ARUMUGHAM NAGAVENI, ESWARAN JAYANTHI*

Department of Chemistry, Kongunadu Arts and Science College, Coimbatore, 641029, Tamil Nadu, India

Post Graduate Department of Chemistry, Nallamuthu Gounder Mahalingam College, Pollachi, 642001, Tamil Nadu, India

*Corresponding author: ejayanthi@kogunaducollege.ac.in

ABSTRACT

In the present investigation, a sustainable approach to the fabrication of CuO nanoparticles (NPs) was done by employing the *Bauhinia racemosa* (BR) Lam. leaves extract as a stabilizing and capping agent. The fabrication of CuONPs was immediately verified by a change in the color of the Cu solution from blue to dark grey. Characterizations of the CuO and was done to attribute the physical and chemical characteristics of the NPs employing Fourier Transform Infrared (FT-IR), X-ray Diffraction (XRD), UV–Vis Diffuse Reflectance Spectroscopy (UV–Vis DRS), Photoluminescence (PL), Scanning Electron Microscopy (SEM) and Energy Dispersive X-ray analysis (EDX). The acquired CuO NPs demonstrated a substantial crystallinity, smaller crystallite size of ~10.87 nm, and were implemented as an effective photocatalyst for the wastewater treatment, as examined by UV − vis spectrophotometric study and confirmed by a hypochromic shift. It is surmised that CuO NPs is an effectively used adsorbent for the mitigation of various pollutants from the aqueous environment.

INDUSTRIAL EFFLUENTS: TYPES, HAZARDS, AND SUSTAINABLE MANAGEMENT PRACTICES

P. MOHAN, M. GOPI PRIYAN, HARISH L, PRANESH N, EZHIL C, R. MANIMEKALAI

Department of Chemistry, Kongunadu Arts and Science College, G. N. Mills Post, Coimbatore- 641 029

Corresponding author: rmanimekalai@kongunaducollege.ac.in

ABSTRACT

Industrial effluents are liquid waste discharges generated during industrial processes. They are a major source of environmental pollution, with their composition and impact varying significantly based on the type of industry and production processes involved. Effluents may contain a diverse range of pollutants, including organic and inorganic substances, heavy metals, oils, greases, suspended solids, and thermal discharges. Common industries contributing to effluent generation include textiles, chemicals, pharmaceuticals, food processing, paper and pulp, and metal manufacturing.

The composition of industrial effluents is complex and often hazardous. Organic pollutants, such as dyes, surfactants, and biodegradable substances, can lead to oxygen depletion in water bodies. Inorganic components like salts and acids may alter the pH of receiving waters, while heavy metals such as lead, cadmium, and mercury pose severe risks to aquatic ecosystems and human health due to their toxicity and persistence. Oils and greases can form a film on water surfaces, disrupting oxygen transfer and harming aquatic organisms. Additionally, thermal discharges from industries such as power plants can increase water temperatures, adversely affecting aquatic biodiversity.

This study provides a detailed analysis of the types and composition of industrial effluents and their environmental and health implications. It also emphasizes the significance of adopting effective effluent treatment methods, including physical, chemical, and biological processes, to mitigate contamination. By adhering to environmental regulations and promoting sustainable practices, industries can minimize the adverse effects of effluent discharge, protecting ecosystems and ensuring public safety. This abstract underscore the need for stringent monitoring, technological advancements, and stakeholder collaboration in managing industrial effluents for a sustainable future.

Keywords: Industrial effluents, pollutants, heavy metals, environmental impact, wastewater treatment, sustainable practices, ecosystem protection, water pollution.

CHS-12

THE IMPACT OF WATER POLLUTION ON ECONOMIC GROWTH

GOPI PRIYAN M, KARTHICK RAJA T, SANTHOSH V, V SANGEETHA*

Department of Chemistry, Kongunadu Arts and Science College, G.N. Mills Post, Coimbatore- 641 029.

*Corresponding author: vsangeetha_ch@kongunaducollege.ac.in

ABSTRACT

Water pollution significantly hampers economic growth, especially in regions with severe contamination, due to its multifaceted impact on various sectors and populations. Contaminated water sources lead to the spread of waterborne diseases such as cholera, dysentery, and typhoid fever, escalating healthcare costs for individuals and governments as substantial resources are diverted to treat illnesses and implement preventive measures, thus straining public health systems. Polluted water used for irrigation negatively affects crop yields, reducing agricultural output, while contaminants like heavy metals and pesticides impair soil fertility and plant health, which also introduces toxins into the food chain, posing health risks to consumers and reducing marketability. Additionally, livestock consuming contaminated water suffer from various health issues, leading to decreased productivity and increased veterinary costs, further impacting the economic stability of farmers.

Pollutants entering water bodies disrupt aquatic ecosystems, leading to biodiversity loss and significantly affecting the fishing industry, which many communities rely on for their livelihoods. Degraded water quality also deters tourists, negatively impacting the tourism industry and reducing revenue from water-related recreational activities; this is particularly detrimental to destinations known for their natural beauty and pristine waters. Exposure to polluted water adversely affects human health, particularly among children, leading to stunted growth, cognitive impairments, and reduced productivity and earning potential in adulthood. Frequent illnesses among workers due to poor water quality lead to absenteeism and decreased efficiency, overall lowering economic productivity. The combined effects of health issues, reduced agricultural productivity, and ecosystem damage increase poverty levels in affected regions, disproportionately impacting poor communities that lack access to clean water and adequate healthcare, further entrenching socio-economic disparities.

In extreme cases, severe water pollution leads to the displacement of communities, as people migrate in search of cleaner water sources, disrupting social and economic structures and leading to challenges in integrating into new areas. Addressing water pollution is critical for sustainable economic growth; implementing comprehensive environmental policies, accurate monitoring, effective enforcement, and substantial investment in water treatment infrastructure are essential. Clean water is not only a fundamental human right but also a cornerstone for economic development and well-being. Prioritizing water quality ensures a healthier population, robust agricultural output, thriving ecosystems, and overall economic resilience, while public awareness and community involvement in water conservation and pollution prevention efforts play crucial roles in achieving long-term sustainability.

Keywords: Economic Growth, Healthcare Costs, Ecosystem Damage, Productivity, Environmental Policies.

CHS-13

CLIMATE CHANGE AND WATER MANAGEMENT

DHINAKARAN. T, PRAGADEESH. M, SANGEETHA. V*

Department of Chemistry, Kongunadu Arts and Science College, G. N. Mills Post, Coimbatore- 641 029

*Corresponding author email: vsangeetha_ch@kongunaducollege.ac.in

ABSTRACT

Climate change poses significant challenges to global water resources, affecting their availability, quality, and distribution. Rising temperatures, erratic precipitation patterns, and frequent extreme weather events such as droughts, floods, and melting glaciers disrupt natural water cycles and strain existing water management systems. These impacts exacerbate water scarcity, threatening agriculture, industry, ecosystems, and human consumption, especially in vulnerable regions. The decline in water quality and uneven distribution of resources further amplify risks to public health and economic stability.

This paper examines the complex relationship between climate change and water management, emphasizing the importance of adaptive strategies. Sustainable practices such as rainwater harvesting, wastewater recycling, and efficient irrigation systems are vital to optimizing water use. Advanced technologies, including smart water management systems and climate-resilient infrastructure like dams and flood control systems, play a crucial role in mitigating water-related challenges. Furthermore, integrating traditional knowledge with modern science can strengthen community-based water resource management.

The study also highlights the critical role of policy frameworks and international collaboration in addressing water insecurity. Cross-border water governance, participatory decision-making, and investments in research and development are key to ensuring equitable access to water resources. By aligning water management practices with climate adaptation goals, stakeholders can promote sustainable development and resilience in a warming world.

Ultimately, this paper advocates for a holistic, multi-stakeholder approach that leverages innovative solutions, integrates policies, and fosters local and global collaboration. Such efforts are essential to ensure long-term water security and protect livelihoods and ecosystems against the growing threats posed by climate change.

Keywords: Climate change, Water management, Water scarcity, Sustainable practices, Resilient infrastructure.

MICROWAVE ASSISTED ORGANIC REACTIONS IN 1-HYDROXY CARBAZOLE-2-CARBALDEHYDE

[1]RAMYA[*] V, [2]SANGEETHA V

[1]PG And Research Department of Chemistry, Kongunadu Arts and Science College, Coimbatore-641029, Tamil Nadu.

[2]Department of Chemistry (UG), Kongunadu Arts and Science College, Coimbatore - 641029, Tamil Nadu.

[*]Corresponding author: ramyababu82@gmail.com

ABSTRACT

Microwave assisted organic synthesis (MAOS) has emerged as a new "lead" in organic synthesis. The technique offers simple, clean, fast, efficient, and economic for the synthesis of a large number of organic molecules. Conventional method of organic synthesis usually needs longer heating time, tedious apparatus setup, which result in higher cost of process and the excessive use of solvents/ reagents lead to environmental pollution. A review of the literature reveals that MAOS has advantage over conventional heating because of its shorter reaction times and formation of cleaner products. The focus of this paper is to summaries some microwave assisted organic reaction employed for the synthesis of variety of hetero annulated cyclopent[*b*]indole and carbazole derivatives with high yield. In this work we tried to prepare some furocarbazole, thiazepinocarbazole and quinolinocarbazole by microwave assisted method by using 1-hydroxycarbazole-2-carbaldehyde. Where 1-hydroxy carbazole-2-carbaldehyde were irradiated with o-aminothiophenol, phenylacetic acid and choloroacetone to give corresponding thiazepino, acetyloxy and acetylfurocarbazole respectively. The synthesized products were purified by column chromatography and analyzed by spectral techniques viz., IR, ^{1}H NMR and mass spectroscopy.

Keywords: Microwave assisted Conventional method, Carbazole, Furocarbazole, Thiazepinocarbazole and Quinolinocarbazole.

Computer Science

CS-01

TECHNOLOGICAL INNOVATIONS AS REMEDIAL MEASURES FOR MITIGATING THE SOCIOECONOMIC IMPACT OF WATER POLLUTION

[*1]R. SARAVANAMOORTHY, [2]S. ANGEL

[1]Department of Computer Science (SF), Kongunadu Arts and Science College, Coimbatore, Tamil Nadu, India

[2]Department of Computer Science with Cyber Security, PSGR Krishnammal, College for Women (KCW), Coimbatore, Tamil Nadu, India

[*]Corresponding author: headuacs@kongunaducollege.ac.in; angels@psgrkcw.ac.in

ABSTRACT

Technological developments are changing environmental management by providing creative ways to lessen the negative socioeconomic effects of water contamination. Water sources, which are essential to maintaining ecosystems and human livelihoods, are increasingly threatened by urban garbage, agricultural runoff, and industrial discharge. These contaminants have an adverse effect on public health, disturb aquatic ecosystems, and put a burden on local economies. In order to address water contamination and its socioeconomic effects, this research investigates the incorporation of cutting-edge technologies as corrective methods. Real-time pollution identification and damage assessment are made possible by emerging technologies like IoT-enabled sensors, satellite-based water quality monitoring, and AI-driven predictive models.

Sustainable approaches to pollutant removal are provided by bio-remediation methods that make use of filtration systems based on nanotechnology and genetically modified microorganisms. Additionally, blockchain-based water resource management reduces conflict and promotes community trust by guaranteeing openness and fair access in water-sharing agreements. Stakeholders may turn pollution issues into chances for increased economic activity, better public health, and environmental restoration by implementing these innovative solutions. The study highlights how crucial it is for governments, businesses, and academic institutions to work together to advance technology-driven policies for pollution prevention and water conservation. The importance of technology in protecting water resources and promoting sustainable socioeconomic development is highlighted by this multidisciplinary approach.

Keywords: Socioeconomic Impacts, IoT in Water Quality, AI-Driven Predictive Models, Bio-remediation Technologies, Blockchain for Water Management.

CS-02

A MULTIMASTER DATA COMMUNICATION PROTOCOL FOR LOW-COST INDUSTRIAL CONTROL NETWORKS

N. DEEPA

Department of Computer Science, Kongunadu Arts and Science College, Coimbatore – 641 029.

E-Mail: ndeepa_it@kongunaducollege.ac.in

ABSTRACT

The contribution presents a distributed data communication protocol and its implementation on a low-cost industrial control network. It is based on the criteria that a distributed control system for real-time applications has to fulfil: higher efficiency, robustness, flexibility, resilience to failures, and portability, at lower costs. From this perspective, several distributed control systems with different logical and physical architecture have been considered, together with their benefits and drawbacks. The hardware and software issues of the vertical and the horizontal structure of these control systems were also analysed, and the most appropriate one was chosen. It supports a multi master, distributed communication protocol, which avoids deadlocks, generates the master at the network start-up, regenerates the master in case of master loss, and maintain the consistency of a distributed database over the network.

Keywords: Distributed control systems, Low-cost industrial network, Data communication, Multimaster protocol, Microcontroller-based systems.

CS-03

A REVIEW ON INTERNET OF THINGS STOCHASTICS

A. IMMACULATE

Department of Computer science, Kongunadu Arts and Science College, Coimbatore – 641 029.
Email: immaculatea_ca@kongunaducollege.ac.in

ABSTRACT

Today's world is developed in Science and Technology. The Internet of Things (IoT) has emerged as one of the most vital technologies of the 21st century. The IoT is swiftly evolving and progressing across innumerable divisions, from healthcare and industrial invention to home appliances. Technological innovations have boosted this growth, turning concepts that impressed like science fiction couple of decades ago corresponding to smart cities into reality. IoT facilitates communication between processes, people, and things. With the advent of lower-cost computing, cloud technology, analytics, mobile techniques, and big data, physical objects can now share and collect information with minimal human intervention. The Internet of things encompasses electronics, communication, and computer science engineering concepts that enable users to access and control functions remotely in the real world. The goal of IoT is to connect virtually everything to the Internet. Over the past decade, this field has experienced significant growth, with more devices now connected to the web. Recent advancements in various technologies have made it practical and widespread. The general Internet of Things Statistics reveal by 2022, the number of Internet of Things devices in-house is predicted to reach 50 billion, by 2025, almost 40% of the Internet of Things is estimated to be deployed in the Asia-Pacific region, by 2025, the Internet of Things is projected to create USD 4-USD 11 trillion in worldwide economic value and by 2024, the worldwide Internet of Things connections industry is predicted to rise to USD 8.9 billion. In 2024 IoT stands as a pivotal year in the IoT Evolution, marked by the synergistic fusion of AI and emerging technologies. This fusion not only significantly enhances the capabilities and robustness of IoT systems but also ensures their security and reliability. It heralds a new era in the IoT landscape, one that promises a more secure, efficient, and intelligent digital ecosystem

Keywords: Internet of things, Evolution, Robust, Secure digital ecosystem.

CS-04

DATA ACCESS AND REPLICATION STRATEGIES FOR DYNAMIC DATA GRIDS

N. PAVIYASRE, M. JULIET MONALISA ESTHER

Department of Computer Science, Kongunadu Arts and Science College, Coimbatore – 641 029

Email.paviyasren_cs@kongunaducollege.ac.in; mjulietmonalisaesther_cs@kongunaducollege.ac.in

ABSTRACT

"Grid" computing is emerging as an extremely important field, distinguished from conventional dis tributed computing by its focus on large-scale resource sharing, innovative applications, and high-performance orientation. Grid technology facilitates data sharing across many organizations in different geographical locations. Data Grid applications need to manage and process a large amount of data distributed across multiple grid nodes and stored in heterogeneous databases. Data replication is an excellent technique to move and cache data close to users. Replication reduces access latency and bandwidth consumption. It also facilitates load balancing and improves reliability by creating multiple data copies. In most existing and deployed grid systems however, control of resources is centralized and usually handled by system administrator. Such configurations hinder dynamic and scalable expansion of the grid infrastructure and resources. The main aim of this approach is to create and locate dynamic data replicated at various sites based on the utility function and Best Client approach. Before placing a replica at a site, we calculate an expected utility for each site by considering current network load and user requests.

Keywords: Grid, Data Replication, Best Client, Utility, Replica Placement.

CS-05

ARTIFICIAL INTELLIGENCE FOR SUSTAINABLE ECOSYSTEMS TO TACKLING WATER POLLUTION AND SOCIOECONOMIC IMPACTS

S. VELMURUGAN, L. KATHIRVELKUMARAN

Department of Computer Science with Data Analytics, Kongunadu Arts and Science College, Coimbatore-641 029, Tamil Nadu, India

E-mail: svelmurugan_cs@kongunaducollege.ac.in; kathirvelkumaranl_ca@kongunaducollege.ac.in

ABSTRACT

Water bodies are vital for sustaining life on Earth, yet pollution caused by human activities poses significant risks to ecosystems, public health, and economic stability. In order to address water pollution, this article looks at how Artificial Intelligence (AI) can be used to monitor, analyze, and suggest sustainable solutions. Predictive analytics and machine learning are two examples of AI technologies that provide creative ways to monitor water quality in real time. AI systems can follow pollution patterns, identify contaminants early, and predict future problems with water quality by using sensors, remote sensing, and IoT networks. This allows for proactive management. These features enable the creation of focused cleanup plans and the more effective identification of pollution hotspots. AI also helps with water purification and usage optimization. It may evaluate intricate data from multiple sources to boost water conservation initiatives, decrease waste, and improve water distribution systems, especially in urban and agricultural environments. Transparency and accountability in water management procedures can be further improved by combining AI with other technologies, such as blockchain. Notwithstanding its promise, ethical issues like data privacy, justice, and openness need to be considered to guarantee that AI solutions are accessible and equitable. In the end, AI can play a big role in sustainable water management, protecting water supplies for coming generations.

Keywords: Predictive analytics, Sustainable solutions, Water pollution, Water quality monitoring, and Artificial intelligence (AI).

CS-06

ACHROMATIC NUMBER OF KNODEL GRAPH AND SUBDIVISION-VERTEX CORONA GRAPH

N. NITHYA DEVI [A], D. VIJAYALAKSHMI

[a]Department of Physical Sciences and Information Technology, Tamil Nadu Agricultural University Coimbatore-641003. Tamil Nadu, India.

[b]Department of Mathematics, Kongunadu Arts and Science College, Coimbatore - 641 029, Tamil Nadu, India.

Corresponding author: nitiviji@gmail.com, vijikasc@gmail.com

ABSTRACT

An achromatic coloring of an undirected simple graph is a vertex coloring such that no two adjacent vertices receive the same color and each pair of colors appears at least once. The aim of this paper is to cover the central graph of Knodel graph and subdivision-vertex corona of any two graphs. Here we obtained the achromatic number for central graph of Knodel graph and subdivision-vertex corona graph of Cp with Kq, Wp with Kq, Pp with Kq and Sn and Kn.

CS-07

ADVANCED SENSOR MONITORING SYSTEM FOR THE PROTECTION OF WATER SUPPLY

[*]KAVIYA M P, ASRIN NIRSHATH A

Department of Information Technology, Kongunadu Arts and Science College, Coimbatore – 641029, Tamil Nadu

[*]Corresponding author: kaviyapasupathy40@gmail.com; nirshath12345@gmail.com

ABSTRACT

Water pollution is a pervasive global issue with profound socioeconomic implications, impacting public health, economic development, and environmental justice. This research explores the complex interplay between water quality and societal well-being, highlighting how water pollution affects human health, hinders economic growth, and exacerbates existing inequalities. This emphasizes the urgent need for effective mitigation strategies and sustainable water management practices. A key solution is the water monitoring system, which offers real-time tracking of water quality and quantity across various applications, such as drinking water treatment, waste water management, and environmental monitoring. Utilizing advanced sensors and communication technologies, the system collects data on parameters like pH, temperature, turbidity, and bacterial contamination, presenting it through an intuitive interface. This proposal enables early detection of water quality issues, allowing prompt corrective actions to reduce the risk of waterborne diseases and environmental pollution. This proposal supports real-time water usage monitoring, helping utilities and industries optimize consumption and minimize waste.

Keywords: Real-time monitoring, Advanced sensors, Data analysis, User-friendly interface, Alert and notification system.

CS-08

ASSESSING THE SOCIOECONOMIC CONSEQUENCES OF WATER POLLUTION AND EFFECTIVE REMEDIAL STRATEGIES

M. DHIVYA

Department of Computer Science, Kongunadu Arts and Science College, Coimbatore – 641 029, Tamil Nadu.

ABSTRACT

Environment pollution is the growing issue of all developed countries. Because of urbanization and industrialization natural resources were overexploited, which causes environmental problems. This paper discusses about the definitions about pollution, types of pollutants, pollution, socioeconomic impacts of pollution on Human health, on Environment, economic growth and development and particularly discusses about the water pollution and its ill effects and its remedy.

Keywords: Environment Pollution, Pollutant, Heavy metals, Primary pollutant, Secondary Pollutant, Policy and Governance

Humanity and Social Sciences

HSS-01

A STUDY ON CAUSES AND CONSEQUENCES OF WATER POLLUTION IN TIRUPUR DISTRICT

S. NAVEDITHA, T. R. NANDHINI, T. KUMAR*

Department of Commerce, Kongunadu Arts and Science College (Autonomous), Coimbatore, Tamil Nadu

*Corresponding author: kumart_cm@kongunaducollege.ac.in

ABSTRACT

The expansion of the industrial sector is a double-edged sword that promotes economic development and at the same time leads to environmental degradation. Despite the textile and apparel industry's significant contribution to the nation's gross domestic product and exports, it cannot escape the environmental costs it brings. Notably, the dyeing process in this industry results in the release of pollutants such as metals, salts and dyes into the wastewater, with a significant portion of the salts ending up in the wastewater. This discharge of untreated wastewater contributes to water pollution, mainly by introducing organic pollutants such as dyes and heavy metal ions. In the light of these concerns, a study was undertaken to investigate the main causes of water pollution in Tirupur district. Through this investigation, key factors emerged, including the dumping and mixing of industrial waste into water bodies, underground pumping of industrial waste through boreholes, mixing of domestic waste into water bodies, dumping of industrial waste onto agricultural land and the introduction of dyeing industrial waste into water bodies with insufficient treatment or without modification. These identified factors serve as major contributors to both water and land pollution in the region and highlight the urgent need for sustainable industrial practices that balance economic growth and environmental protection. Water bodies in Tirupur district are our study area for water pollutant analysis due to increase in population and industrial development. It is very important to measure the concentration of heavy metals in water bodies because many heavy metals are toxic to humans. Areas of surface water are extracted using the normalized difference water index. The UFCLS (Unsupervised Fully Constrained Least Squares) method is used to estimate element concentrations. A total of seventeen toxic elements are quantified by this process. Finally, four pollution levels were also classified based on the use of the Spectral Angular

HSS-02

ROLE OF AI IN PRESERVING MOTHER NATURE

S. NAVEDITHA, S. K. ARUNKUMAR*

Department of Commerce, Kongunadu Arts and Science College (Autonomous), Coimbatore, Tamil Nadu.

*Corresponding author: kumart_cm@kongunaducollege.ac.in

ABSTRACT

Language Technology (LT) is one of the most effective media for preserving the culture and heritage of a language community. A challenging task is how culture and heritage can be preserved through language technologies by applying some artificial intelligence (AI) techniques in the sense of machine learning (ML) and deep learning (DL). Artificial intelligence techniques are being used everywhere today to develop various tools and models for the restoration and preservation of culture and heritage. This process has certain advantages and disadvantages as it seeks to optimize the preservation and promotion of culture and heritage that are being restored in digital form through AI. Some areas have already been done in this area and some are under development. The main role of AI technicians in language technology is the development of various systems and tools for working with data with a more accurate and secure interface. Language technology is useful and effective in various fields such as optical character recognition (image processing), word processing and speech processing, which are basically used to store all types of data and information in the form of image, text and audio signals. Although LT is considered a part of information technology (IT), it is a vast field in its own right, as it combines both linguistics and computer science. Some of the LT methods described here can serve to protect history and heritage and can process millions of historical documents, images, landscapes, monuments and more to build a large-scale digital historical archive. The field of information technology is growing very fast to restore the whole world in terms of cultural heritage and artificial intelligence is playing an active role in this mission to make changes in all fields. This means that in the coming years, new technologies, algorithms and mathematical models will be designed and adopted to revitalize all research and application areas in the protection of our culture, tradition and art.

Keywords: Artificial intelligence (AI), Preserving mother nature, culture, tradition and art, AI technicians.

HSS-03

ARTIFICIAL INTELLIGENCE FOR ENHANCING BUSINESS: MARKETING ADVANTAGES ACROSS CONSUMER SEGMENTS, LOCATIONS, AND PRODUCT CATEGORIES FOR ENVIRONMENTAL SUSTAINABILITY.

***A. REVATHY, M. NISHANTH**

Department of Commerce with Computer Applications, Kongunadu Arts and Science College (Autonomous), Coimbatore, Tamil Nadu.

ABSTRACT

Industries are developing AI-enhanced products like robots that can address environmental issues by interacting with their environment on their own such as tracking invasive species, eliminating waste/pollutants and many more and learning on their own, which leads to better environmental performance characteristics. These independent environmental benefits of products are not the same as traditional, static environmental benefits that come from design choices and pre-purchase procedures. Nevertheless, there is still a dearth of information in the literature regarding how to leverage these independent environmental advantages to draw in new clients. Therefore, this study investigates how these environmental benefits affect a consumer's purchase intent and how it varies among consumer types, locations, and products, all while drawing on signaling theory with the advanced technology enabled Artificial Intelligence. For products aimed at adults rather than children, the impact of independent environmental advantages is greater for women than for men. For products aimed at youngsters rather than adults, for customers with a greater need for cognition, and in areas where environmental well-being is seen as being higher, the influence of static environmental benefits is greater for males than for women. Comparing to a traditional product, an ecologically conscious product makes a less significant contribution to environmental issues. The environmentally friendly features of its materials, production, distribution, disposal/recycling, or product usefulness are the causes of this discrepancy. A product that is environmentally sustainable causes fewer environmental issues than a conventional product. The research attempt has been taken to study the AI for enhancing product Sustainability in marketing aspects.

Keywords: Artificial Intelligence, Sustainability, Marketing, Consumer, Environment

HSS-04

SOCIAL ISSUES AND CHALLENGES AS INFLUENCED BY INDUSTRIAL WASTES AND EFFLUENT

L. BEAUTLYNA, S. BAVADHARANI

Department of Commerce with Computer Applications, Kongunadu Arts and Science College (Autonomous), Coimbatore, Tamil Nadu.

ABSTRACT

This paper offers a systematic literature review (SLR) of industrial wastewater management research conducted in the last ten years, looking at the factors that have facilitated, hindered, and dominated the field. Handling industrial wastewater, which comes from manufacturing, energy production, and other industrial operations, is crucial because of its potential to affect the environment and public health. The study is to identify gaps, describe potential directions for future research, and understand the current status of industrial wastewater management. By searching the Scopus database, the SLR approach produces a starting pool of 253 articles. After refinement using a search code, 101 articles remain, after which 79 are reduced by abstract screening, and ultimately, 66 carefully selected papers remain for in-depth full-text analysis.

The findings highlight the importance of technology advancement, legal frameworks, and environmental considerations as the cornerstones of efficient wastewater treatment. Significant obstacles still remain, nevertheless, such as poor infrastructure, a lack of resources, and the requirement for stakeholder cooperation. The study emphasizes new research areas, such as cutting-edge technologies like bioremediation and nanotechnology, as well as the critical role that circular economy concepts play in wastewater treatment. The SLR provides a comprehensive overview of modern industrial wastewater treatment, highlighting the necessity of a comprehensive strategy that incorporates sustainability, technology, and regulatory considerations. Interestingly, the study proposes multidisciplinary research and increased stakeholder involvement by highlighting gaps and potential for further investigation. Policymakers, practitioners, and researchers can benefit from the study's insights, which enable them to successfully handle the obstacles and seize opportunities in industrial wastewater management.

Keywords: SLR (Systematic Literature Review), Industrial, Wastewater, Resource

HSS-05

ADVANCING GREEN TECHNOLOGY FOR POLLUTION MITIGATION: INNOVATIONS, CHALLENGES, AND SUSTAINABLE SOLUTIONS

M. BAMA, M. GAYATHRI

Department of Commerce with Computer Applications, Kongunadu Arts and Science College (Autonomous), Coimbatore, Tamil Nadu.

ABSTRACT

This study, titled *"Advancing Green Technology for Pollution Mitigation: Innovations, Challenges, and Sustainable Solutions,"* examines the adoption and impact of green technologies among manufacturing companies in Coimbatore district, Tamil Nadu. Employing a mixed-methods approach, the study integrates quantitative data from 150 surveyed firms and qualitative insights from interviews with industry leaders and policymakers. The findings reveal that green technologies have significantly reduced emissions, waste generation, and resource consumption, with a 40% improvement reported across key environmental metrics.

Regression analysis indicates a strong positive relationship between green technology adoption and pollution mitigation, while firm size and high implementation costs emerged as critical factors influencing adoption. Qualitative analysis highlights innovative practices, such as waste-to-energy systems and water recycling, which have enhanced sustainability and operational efficiency. However, challenges such as high implementation costs (73%), lack of technical expertise (63%), and insufficient policy support (57%) were identified as major barriers.

The study proposes actionable recommendations, including tax incentives, capacity-building programs, and enhanced public-private collaboration, to overcome these challenges and promote broader green technology adoption. This research contributes to the growing body of literature on sustainable industrial practices, providing valuable insights for policymakers and manufacturing firms striving to achieve environmental and economic sustainability.

Keywords: Green Technology, Pollution Mitigation, Manufacturing Sector, Sustainable Practices, Coimbatore District.

HSS-06

IMPACT OF CLIMATE CHANGE AND WATER MANAGEMENT

***S. RAMAKRISHNAN, T. BUBARATHI KANNAN**

Department of Commerce with Computer Applications, Kongunadu Arts and Science College (Autonomous), Coimbatore, Tamil Nadu

ABSTRACT

Climate change refers to long-term shifts in temperatures and weather patterns. We often think that human-induced climate change as something will happen in the forthcoming future, but this is happening for now a days. Ecosystems and people of all over the world are affected by the ongoing process of climate change presently. Climate change affects the environment in many different ways, including rising temperatures, sea level rise, drought, flooding, and more. These events affect things that we depend upon and value, like water, energy, transportation, wildlife, agriculture, ecosystems, and human health. India has about 18 percent of the world's population and only 4 percent of the world's water resources. Water management is the control and movement of water resources to minimize damage to life and property and to maximize efficient beneficial use. Good water management of dams and level reduces the risk of harm due to flooding. Irrigation of water management systems make the most efficient use of limited water supplies for agriculture. Drainage management involves water budgeting and analysis of surface and sub-surface drainage systems. Sometimes water management influences changing practices, such as groundwater withdrawal rates, or allocation of water to different purposes.

Keywords: Ecosystems, Temperatures, Irrigation, Agriculture.

HSS-07

INNOVATIVE TECHNOLOGIES AND WATER RECYCLING CONSERVATION SYSTEM

S. THANGAVEL R. SURESH

Department of Commerce with Banking & Insurance, Kongunadu Arts and Science College, Coimbatore – 641 029, Tamil Nadu

ABSTRACT

The contemporary world exists amid two significant extremes – advancements are being hastened by cutting-edge technologies, while humanity stands on the brink of an environmental catastrophe. Over time, there has been swift progress in the application of technology in various life areas, resulting in positive effects such as improved healthcare delivery, communication, efficiency, and innovation. However, this progress brings along numerous risks as the environment worsens with the continually expanding technologies that humans investigate. In light of ongoing technological advancements and progress, we must also consider its impact on the planet. This presents a very delicate balance that distinguishes human development from environmental harm since we must remember that many of the consequences of the choices we make today will influence the lives of our future descendants. In this article, particular emphasis will be placed on how technology keeps evolving and the related alterations to nature that are frequently noticeable; both the benefits and drawbacks will be examined, and the essential objective of seeking to achieve progress while caring or the environment will be outlined. Positive Impacts of Technology Advancement on Nature

Keywords: Economy, Water System, Technology, Impact.

HSS-08

SOCIOECONOMIC IMPACT OF POLLUTION IN WATER BODIES AND REMEDIAL MEASURES - CULTURE, HERITAGE AND LIFESTYLE CHANGES DUE TO AQUATIC POLLUTION

R. MADHUVANTHI G.HEMALATHA A. JANSIRANI R. KAVIYA

Department of Psychology, Kongunadu Arts & Science College (Autonomous), Coimbatore, Tamil Nadu

ABSTRACT

Aquatic pollution profoundly impacts human culture, heritage, and lifestyle, particularly in communities closely connected to water resources. This paper explores how polluted water bodies disrupt traditional rituals, erode cultural symbols, and degrade historical sites, diminishing their significance in local and global contexts. The study highlights the socioeconomic consequences, such as shifts in occupation, dietary changes, and health challenges while emphasizing the psychological and emotional toll of losing cherished nature environment. Additionally, it examines how pollution-driven urbanization and migration alter general knowledge, gender roles and community structures. Despite these challenges, efforts to revive polluted water bodies through conservation movements and modern sustainable practices show promise in preserving cultural identity and heritage. By understanding the multifaceted impact of aquatic pollution, this research underscores the urgent need for sustainable interventions to protect water resources and the cultural frameworks support. The following study is compiled of data collected from the adults living in the areas near Noyyal River, Kumarasamy Lake and Ukkadam dam in Coimbatore(n=50). The findings show that pollution leads to declining fish populations, reduced agricultural yields, and disruptions to water-related cultural practices, such as fishing rituals and religious ceremonies. In response, communities are adapting by shifting towards alternative livelihoods and modifying certain cultural practices. The study depicts the importance of integrated policies that promote environmental restoration and protect cultural heritage, ensuring sustainable water management while preserving community traditions.

HSS-09

NATURE'S LAMENT: ENVIRONMENTAL CONCERNS AND THE METAPHORIC POLLUTION IN SPENSER'S "EPITHALAMION" AND "PROTHALAMION"

A. A. DHARANIDHARAN, Dr. P. RAJESWARI

Department of English, Kongunadu Arts and Science College (Autonomous), Coimbatore, Tamil Nadu

ABSTRACT

Edmund Spenser's pastoral and celebratory poems, Epithalamion and Prothalamion, resonate with vivid natural imagery that reflects the poet's profound connection with the environment. While these works primarily celebrate love, marriage, and harmony, they also present a subtle critique of human actions disrupting nature's sanctity. This article examines how Spenser's poetic descriptions of rivers, landscapes, and celestial elements can be interpreted through a contemporary lens to address pollution and environmental degradation. By analyzing key passages that depict polluted rivers in Prothalamion and the harmonious invocation of natural elements in Epithalamion, this study highlights Spenser's dual role as a celebrant of nature and a forewarner of its desecration. The research further draws parallels between Spenser's 16th-century concerns and modern environmental challenges, offering insights into how classical literature can inform ecological awareness and action.

Keywords: Edmund Spenser, Epithalamion, Prothalamion, pollution, environmental degradation, nature

THIRST AND SURVIVAL: WATER SCARCITY IN PERUMAL MURUGAN'S POONACHI OR THE STORY OF A BLACK GOAT

P. DHANASEKAR, G. YOUVENIYA

Department of English, Kongunadu Arts and Science College (Autonomous), Coimbatore, Tamil Nadu

E-mail: dhanasekarapds@gmail.com

ABSTRACT

This paper examines how Perumal Murugan's Poonachi or the Story of a Goat deals with environmental concerns and human struggles. This is a narrative of a unique goat born and brought up in difficult circumstances in a village of Tamil Nadu. Poonachi serves as a metaphor for the difficulties of survival in the face of environmental hardship. Perumal Murugan thoughtfully considers the lack of water as a major factor that influences both individual lives and social dynamics through the character of Poonachi. This essay contends that the novel emphasizes the brittleness of existence and the intricate relationship between people and their surroundings by using water as both a real resource and a metaphorical element. As a writer of modern Tamil literature, Perumal Murugan has frequently addressed issues of environmental degradation, cultural tradition, and social marginalization. He applies this critical lens to the environmental disaster in Poonachi, paying special attention to the depletion of water supplies and the sociopolitical ramifications in rural Tamil Nadu. The book urges a revaluation of the interaction between people and the environment while criticizing the overuse of natural resources and highlighting the grave risks posed by climate change. Poonachi's poignant depiction of water shortage makes it more than just a story of individual and group perseverance; it also serves as a larger meditation on ecological sustainability, calling for a reconsideration of current environmental and social narratives.

Keywords: Environmental concerns, Water scarcity, Ecological sustainability, Rural life, Environmental degradation, Climate change

HSS-11

EXAMINING ECOLOGICAL EXPLOITATION IN RIVER OF SMOKE BY AMITAV GHOSH

P. R. DAS NAVIS AROCKIYA RUBINI, G. YOUVENIYA*

PG Department of English, Kongunadu Arts and Science College, Coimbatore - 641 029, Tamil Nadu.

***Corresponding Author**: youveniyag_el@kongunaducollege.ac.in

ABSTRACT

This Paper explores the issue of ecological exploitation in River of Smoke, a landmark historical fiction novel by Amitav Ghosh. The work skillfully combines stories of colonialism, trade, and environmental devastation against the backdrop of the Opium Wars. This paper examines Amitav Ghosh's writings critically and Eco critically, illuminating the intricate relationship between colonialism and the natural world. This paper highlights the complex relationships among imperial authority, capitalist growth, and ecological deterioration, water scarcity and water pollution by using an ecocritical framework. This study intends to provide a deeper awareness of the intricate relationships between the human and non-human worlds as well as the necessity of sustainable coexistence in the Anthropocene period by dissecting the historical and cultural settings of ecological exploitation.

Keywords: Exploitation, colonialism, Anthropocene, water scarcity, water body

HSS-12

RIPPLES OF RETRIBUTION: THE RIVER'S REFLECTION IN ANURADHA ROY'S *AN ATLAS OF IMPOSSIBLE LONGING*

[*]ANNAMMA. J, G. YOUVENIYA[#]

PG Department of English, Kongunadu Arts and Science College, Coimbatore -641 029, Tamil Nadu.

[*]**Presenting Author**: annammaj_el@kongunaducollege.ac.in

[#]**Corresponding Author**: youveniyag_el@kongunaducollege.ac.in

ABSTRACT

In Anuradha Roy's *An Atlas of Impossible Longing*, the river is both a real and symbolic, illustrating the interwoven relationship between nature and humans. The river serves as a major metaphor in this Paper, representing the effects of environmental neglect and human exploitation. This study explores how the novel exemplifies the idea that when humans damage nature, nature eventually retaliates by deconstructing the river's evolution from a source of life and foo d to a contaminated and abandoned entity. According to the study, which is viewed through the ecological critique lens, the river in Roy's work serves as a mirror of environmental degradation, reflecting not just the physical degeneration of the area but also the characters emotional and societal consequences. By highlighting the cyclical nature of abuse and its effects, Roy's novel highlights the precarious equilibrium between environmental preservation and human advancement, leading to a re-examination of humanity's place in the larger ecological system. By attempting to disentangle the symbolic layers of the river's function in the novel, this paper urges readers to consider the cost of environmental neglect and concludes that it serves as a potent metaphor for the unavoidable results of ecological exploitation. The main function of the river in Roy's novel and its relationship to environmental retribution are summarised in this abstract. It also has wider ecological and social ramifications, presenting the river as a crucial representation of how people engage with the natural world.

Keywords: Human's Life & Choices, Societal changes, Loss of Prior Values, Reaction of Nature, Ecological Retribution and imbalance, Wakeup call

HSS-13

CULTURE, HERITAGE AND LIFESTYLE CHANGES DUE TO AQUATIC POLLUTION

R. MADHUVANTHI A. JANSI RANI G. HEMALTHA L. RAGUNATH, B. KAVITHA, K. VASUGI

Department of Psychology, Kongunadu Arts and Science College (Autonomous), Coimbatore, Tamil Nadu

ABSTRACT

Aquatic pollution profoundly impacts human culture, heritage, and lifestyle, particularly in communities closely connected to water resources. This paper explores how polluted water bodies disrupt traditional rituals, erode cultural symbols, and degrade historical sites, diminishing their significance in local and global contexts. The study highlights the socioeconomic consequences, such as shifts in occupation, dietary changes, and health challenges while emphasizing the psychological and emotional toll of losing cherished nature environment. Additionally, it examines how pollution-driven urbanization and migration alter general knowledge, gender roles and community structures. Despite these challenges, efforts to revive polluted water bodies through conservation movements and modern sustainable practices show promise in preserving cultural identity and heritage. By understanding the multifaceted impact of aquatic pollution, this research underscores the urgent need for sustainable interventions to protect water resources and the cultural frameworks support. The findings show that pollution leads to declining fish populations, reduced agricultural yields, and disruptions to water-related cultural practices, such as fishing rituals and religious ceremonies. In response, communities are adapting by shifting towards alternative livelihoods and modifying certain cultural practices. The study depicts the importance of integrated policies that promote environmental restoration and protect cultural heritage, ensuring sustainable water management while preserving community traditions.

Keywords: Water pollution, Tamil Nadu, Cultural heritage, lifestyle changes, Environmental impact

HSS-14

MODERN APPROACH FOR RESTORING; THE MADHURAM RIVER, BORN AND DYING IN COIMBATORE

V.VANJIKAVIPRIYA, M.VEDHAPRIYA, T.DEVA PRIZILLA, S.DIVYA DHARSHINI, M.KARTHIKKUMAR, B. KAVITHA

Department of Psychology, Kongunadu Arts and Science College (Autonomous), Coimbatore, Tamil Nadu

ABSTRACT

The majority the India's small and medium-sized rivers possess adequate storage capacity for water to hold extra water during floods. The present investigation evaluates the Kousika (Madhuram) River progressively disappeared as the result of monsoon failure, erratic rainfall, encroachment through catchment areas, channel closures or diversions, and the adverse consequences of expanding urbanization. The most contaminated region is in Coimbatore, wherein the river has been adversely affected by urbanization, industrialization, and agricultural decline. Death, waterway blockages or diversions, and deteriorated catchment areas. The article attempts to examine the various factors that contribute to the revitalization of the dying Kousika (Madhuram) River.

Keywords: Kousika River, Urbanization, Water Storage, Encroachment, Catchment Area.

HSS-15

BEYOND THE INDIVIDUAL: ACTING WHERE POWER RESIDES

K.VARSHA, Ks. AARTHI, GEOFFREY, H. SHANKAR, AMRUTHA ANOOP, B. KAVITHA

Department of Psychology, Kongunadu Arts and Science College (Autonomous), Coimbatore, Tamil Nadu

ABSTRACT

Never in history have we been so advanced technologically or economically, yet we seem incapable of stopping the fast degradation of the environment. Water pollution, one of the significant causes of ecological collapse, falls under the general systemic cause of climate change. Public debate has a way of shifting responsibility from systemic to personal; people are always advised to stop using plastics and use eco-friendly products. However, industrial practices, weak regulations, and institutional negligence form the core causes of pollution.

This study hypothesizes that while individual efforts are valuable, they are not sufficient to meaningfully mitigate pollution when compared to the transformative potential of systemic reforms. This research quantifies the disparity in impact between personal and industrial contributions to water pollution based on a door-to-door questionnaire targeting 100 regular individuals and 10 industrial entities. For instance, while the reductions in landfill waste or the shift to electric cars garner accolades, those emissions from sectors such as steel mills and fertilizer production still dominate the former.

The research will also examine the technological solutions addresses pay attention to obstacles in financial and systemic limits that prohibit its widespread use. Using case studies that have succeeded in water control from limited existing resources, including countries like Singapore, would further highlight governmental and corporate one at most play the role. At last, it calls for an approach shift of personal responsibility mechanism to structural or economic mechanisms in causing pollution.

HSS-16

EXAMINING THE IMPACT OF WATER POLLUTION IN MANJALAR RIVER AND PRACTICES OF BIOREMEDIATION

G. RISHIGANDH, A. HEMALATHA, F. FEBINA, V. SHRUTHI, S. MANMADAN AMRUTHA ANOOP, B. KAVITHA

Department of Psychology, Kongunadu Arts and Science College (Autonomous), Coimbatore, Tamil Nadu

ABSTRACT

Water pollution in freshwater ecosystems, such as the Manjalar River, has become a growing concern due to its adverse effects on local biodiversity, public health, and traditional livelihoods. The Manjalar River, a critical water source for surrounding communities, has experienced rising levels of contamination from agricultural runoff, industrial waste, and untreated sewage. This research aims to examine the extent of water pollution in the dam and its impact on the surrounding environment, culture, and lifestyle of the local population. The study highlights how deteriorating water quality affects daily life, from agriculture and fishing to cultural practices that are deeply tied to the natural water sources. Additionally, the research explores the traditional knowledge and practices of bioremediation employed by local communities to combat water pollution, including the use of native plants, natural filtration methods, and community-driven water management practices. These indigenous methods, which have been passed down through generations, offer sustainable solutions to restore water quality and protect cultural heritage. By integrating modern scientific approaches with these traditional practices, the study seeks to identify effective strategies for improving water quality in the Manjalar River. The findings emphasize the importance of preserving traditional ecological knowledge while incorporating contemporary techniques in addressing the growing challenge of water pollution. Ultimately, this paper calls for a holistic approach to water management that respects both environmental and cultural values, ensuring the health and sustainability of both the river and the communities dependent on it.

Key words: Manjalar River, Water pollution, Biodiversity, Bioremediation.

HSS-17

SOCIO ECONOMIC IMPACT ON POLLUTION OF WATER BODIES AND REMADIEL MEASURE

KS. NANDHANA, H. TEENA, M. KEERTHIKA, V. PAVITHRA, JOHN JOEL, M. KARTHIKKUMAR, B. KAVITHA

Department of Psychology, Kongunadu Arts and Science College (Autonomous), Coimbatore, Tamil Nadu

ABSTRACT

This research examines the relationship between socioeconomic status and pollution exposure among adults aged 25 to 50. A total of 50 samples 25 from males and 25 from females were collected using the convenience sampling method. Data collection was conducted using the Pollution Exposure Questionnaire and personal data sheet. T-test and Pearson Correlation Coefficient test of SPSS 20.0 were used for the data analysis. The results of the research show a significant relationship between socioeconomic status and pollution exposure among adults aged 25 to 50, and there is also a significant gender difference. These findings highlight the importance of considering both socioeconomic and gender factors when assessing the impact of pollution on individuals.

Key Words: Socio-economic Status (SES), Pollution Exposure, Gender Difference, T-test, Pearson Correlation Coefficient

HSS-18

SOCIAL ISSUES AND CHALLENGES AS INFLUENCED BY INDUSTRIAL WASTES AND EFFLUENT FACED BY PEOPLE AROUND NOYYAL RIVER, COIMBATORE

PAVITHRA JEYACHANDIRAN, KISHORE KUMAR. B, DHAZSHA. S, KAVITHA.S M.KARTHIKKUMAR, B. KAVITHA

Department of Psychology, Kongunadu Arts and Science College (Autonomous), Coimbatore, Tamil Nadu

.

ABSTRACT

This study is about the social issues and challenges as influenced by industrial wastes and effluent faced by people around Noyyal River, Coimbatore. This study examines the pollution's multifaceted impact based on the following objectives Economic issues, Mental health, Difficulties in education, Residential issues, and Inborne illnesses. We used the Social Readjustment Rating Scale (SRRS) to collect data from 50 samples in and around Noyyal Canals. Through this research, we conclude that the residents around Noyyal River were found to be facing mental, physical, economic, and residential issues. The research shows that the population faces drastic lifestyle changes. The conclusion includes the remedial solutions that can be implemented in order to solve the issue.

நீர் மாசுபாடு மற்றும் நீர்நிலை ஆக்கிரமிப்புகளால் ஏற்படும் பொருளாதார மாற்றம்

திருமதி து. சுபஸ்ரீ,

உதவிப்பேராசிரியர், தமிழ்த்துறை,கொங்குநாடு கலை அறிவியல் கல்லூரி (தன்னாட்சி), கோயம்புத்தூர் - 641029.

ஆய்வுச் சுருக்கம்

அதிவேகமாக ஓடிக்கொண்டிருக்கிற மனித வாழ்க்கையில் என்றும் நிலைத்த தன்மையைக் கொண்டது நீர் மட்டுமே. காற்றின் வழியாக அதன் பாதையில் ஒவ்வொரு உயிரினத்தையும் நீர் இணைக்கிறது. அதுமட்டுமல்லாது எல்லைகள், கண்டங்கள் கடந்து வளிமண்டல ஈரப்பதத்தைக் கொண்டு ஒரு நாட்டிலிருந்து மற்றொரு நாட்டிற்குப் பயணிக்கிறது, நீர். இவ்வாறாக, பயணிக்கும் நீர் நாட்டின் பொருளாதார வளர்ச்சி மற்றும் வீழ்ச்சிக்குக் காரணமாகிறது. எவ்வாறெனில், நிலையான மழைப்பொழிவு முறைகள், விவசாயம், தொழில்களுக்கான நிலத்தடி நீர் ஆகியவை பொருளாதார வளர்ச்சியை ஆதரிக்கின்றன. அதற்குமாறாக மனித குலத்தினால் செய்யப்படும் மாசுபாட்டு செயல்கள் நீரியல் சுழற்சியைச் சமநிலையில் இருந்து சீர்குலைக்கின்றன. இவ்வாறு அமையும் போது காலநிலை மாற்றம், நில பயன்பாட்டில் ஏற்படும் மாற்றங்கள், அதிகப்படியான நுகர்வுகள் போன்றவை பொருளாதாரத்தில் பெரும் மாற்றத்தையும், வீழ்ச்சியையும் ஏற்படுத்துகின்றன. அன்றாடம் வீடு மற்றும் தொழிற்சாலைகளில் இருந்து வெளியேற்றப்படும் கழிவுகள், நீர் ஆதாரங்களாகிய ஏரி, குளம், கடல் போன்றவைகளில் கொட்டப்படுவதாலும், நகர்ப்புற விரிவாக்கத்திற்கு ஆதரவாக நீர்நிலை ஆக்கிரப்புகள் நடைபெறுவதாலும் உள்நாட்டில் உள்ள நன்னீர் வளங்களின் தரம் மற்றும் அளவு குறைவதால் மழைப் பொழிவின் அளவும் குறைகிறது. இதனால், தண்ணீர் பற்றாக்குறை ஏற்படுகிறது. இவ்வாறு தண்ணீர் பற்றாக்குறை ஏற்படும்பொழுது தண்ணீரையே நம்பி இருக்கக்கூடிய விவசாயம் மற்றும் மண்சார் தொழில்களும் பாதிக்கப்பட்டு, அத்தொழில்கள் நடைபெறுவதில்லை. அவ்வாறு நடைபெறாமல்போகும் பொழுது, நாடானது பெரும்பொருளாதார வீழ்ச்சியைச் சந்திக்கிறது. ஆக, ஒரு நாட்டின் பொருளாதார வளர்ச்சி மற்றும் வீழ்ச்சியானது நாம் பாதுகாக்கின்ற நீரின் அளவை வைத்தே தீர்மானிக்கப்படுகிறது.

HSS-20

CULTURAL HERITAGE AND LIFESTYLE CHANGES OF THE NILGIRIS KUNDAH BADUGAR TRIBES DUE TO WATER POLLUTION

N. ARI, K. MUTHUKUMAR

Department of Tamil, Kongunadu College of Arts and Science (Autonomous), Coimbatore-641029, Tamil Nadu, India.

ABSTRACT

The Nilgiris district of Tamil Nadu, India is home to many tribal peoples. The hills in the district, home to tribal groups like Thodhavar, Badughar, Kothar and Kurumbar, are part of the Nilgiri Bio Reserve (NBR). It is a UNESCO World Heritage Site. It was designated as India's first biosphere reserve in 1981. The Badughar people are the indigenous people who protect the mountains, according to the UNESCO Mountain Partnership. The natural forests of the mountains, known as oasis forests and grasslands, have been home to water resources for centuries, which have been the ecology of the district. Since the arrival of the British in the 19th century, the indigenous landscape has undergone various changes. The article examines the changes that have taken place in the Kunda taluk of the district, which threaten the cultural heritage and livelihood of the Badughar people.

Keywords: Tribals - Todhavar, Badugar, Kothar, Kurumbar - Nilgiri Bio Reserve (NBR) - UNESCO Mountain Partnership - Solai Forests - Grasslands – Uttuneeru – bavi – Naali - Upper Bhavani- Kundah Taluk - Water Pollution – Cultural Traditional Lifestyle Changes.

HSS-21

பவானி ஆறு மாசடைவதால் மக்களின் பண்பாடு மற்றும் நாகரீக மாற்றங்கள்

ச. சிவரக்ஷவி

முனைவர் பட்ட ஆய்வாளர் (முழுநேரம்), தமிழ்த்துறை, கொங்குநாடு கலை அறிவியல் கல்லூரி (தன்னாட்சி), கோயம்புத்தூர் – 6410 29,

மின்னஞ்சல்: sivarakshavi4@gmail.com

ஆய்வுச் சுருக்கம்

பவானிசாகர் அணை (கீழ் பவானி அணை) பவானி ஆற்றில் மோயாறு மற்றும் பவானி நதி சங்கமிக்கும் இடத்திற்குச் சற்று கீழே அமைந்துள்ளது. பவானி ஆறு மேற்குத் தொடர்ச்சி மலையில் இருந்து கிழக்கு நோக்கி பாய்கிறது. பவானி ஆற்றின் மொத்த நீளம் 217 கி.மீ. இந்த ஆறு ஈரோடு மாவட்டம் வழியாக 160 கிலோமீட்டர்களுக்கு மேல் கிழக்கு நோக்கித் தொடர்கிறது, கொடிவேரி அணைக்கட்டில், கோபிசெட்டிபாளையம் அருகே, ஈரோடு மாவட்டத்தில் காவிரியுடன் சங்கமிக்கிறது. இந்த நீர்த்தேக்கத்தால் ஈரோடு, கரூர், திருப்பூர் மாவட்டங்கள் பயன்பெறுகின்றன. இந்த நீர்த்தேக்கத்தால் சத்தியமங்கலம், கோபிசெட்டிபாளையம், ஆண்டிபூர், பவானி, பெருந்துறை, காங்கேயம் மற்றும் ஈரோடு தாலுகாக்கள் பயன்பெறுகின்றன. பவானி ஆற்று பாலம் அருகே உணவு அங்காடிகள் வைத்திருப்பவர்கள், எச்சில் இலைகளை, பவானி ஆற்றில் கொட்டி வருகின்றனர். அப்பகுதி மக்களும் பலர் ஆற்றில் குப்பைகளைக் கொட்டுகின்றனர். காந்தி மைதானத்தில் சாக்கு மண்டிகள் அதிகம் உள்ளன. சில மண்டிகளின் சாக்கு குப்பைகளை, ஆற்றில் கொட்டி வருகின்றனர். இது அல்லாமல் மேட்டுப்பாளையம் நகரின் ஒட்டுமொத்த கழிவு நீரும், பவானி ஆற்றில் சேர்கிறது. அதுமட்டுமல்லாமல் பவானி ஆற்றில் தொழிற்சாலைக் கழிவுகள் நேரடியாகக் கலப்பதால் பவானி ஆற்று தண்ணீரைக் குடிநீராகப் பயன் படுத்துவோர், ஐந்து நாட்களுக்கு மேல் தண்ணீரை இருப்பு வைத்தால், ஒருவித வாசம் அடிக்கிறது. புண்ணிய நதி என்ற பெயர் பெற்ற “பவானி ஆறு” தண்ணீர் மாசடைந்து வருகிறது என, இதன் வாயிலாக அறிந்துகொள்ள முடிகிறது. இவ்வாறாக பவானி ஆறு மாசடைவதால் ஏற்படும் மக்களின் பண்பாடு மற்றும் நாகரீக மாற்றங்களைப் பற்றி இக்கட்டுரை எடுத்தியம்புகின்றது.

HSS-22

சங்க இலக்கிய வையைப் பாடல்கள் காட்டும் மதுரை நகரத் தொன்மைப் பண்பாட்டு மரபும் தொடர்ச்சியும்

சி. காயத்ரி, கு. முத்துக்குமார்,

தமிழ்த்துறை, கொங்குநாடு கலை அறிவியல் கல்லூரி (தன்னாட்சி), கோயம்புத்தூர் - 641 029. gayathrisiva7890@gmail.com, muthunilakasc@gmail.com

ஆய்வுச் சுருக்கம்

வைகை நதி தமிழ்நாட்டில் உள்ள தேனி, திண்டுக்கல் மாவட்டத்தின் சில பகுதிகள், மதுரை, சிவகங்கை மற்றும் இராமநாதபுரம் ஆகிய மாவட்டங்கள் வழியாகப் பாய்கின்றது. தென்தமிழ் நாட்டின் வேளாண்மை மற்றும் பண்பாடு சார்ந்த வாழ்வியலின் உயிரோட்டமாக இன்று வரை திகழும் இந்நதியானது சுருளி ஆறு, கொட்டக்குடி, வராகநதி, மஞ்சளாறு, மருநதி, உப்பாறு போன்ற சிறிய கிளை நதிகள் ஆங்காங்கே கலந்து பெருகி வைகை நதியாக விரிகின்றது. சமவெளியில் விரிவடையும் வைகை நதியானது மீண்டும் சுருங்கி சிறு நதியாக இறுதியில் இராமநாதபுரம் கண்மாயைச் சேர்ந்து ஆத்தங்கரை என்ற இடத்தில் வங்காளவிரிகுடாவில் கலக்கிறது. இத்தகைய வரலாற்றுச் சிறப்புமிக்க வைகை நதி வங்காள விரிகுடாவுடன் சந்திக்கும் இந்த இடம் முன்னர், துறைமுக நகரமாகத் திகழ்ந்த தொல்லியல் தளமான ஆலங்குளத்துக்கு அருகில் அமைந்திருக்கின்றது. சங்க இலக்கியத்தில் “வையை” என்ற சொல் 72 முறை இடம்பெற்று இருக்கின்றது. மதுரை நகரையும் வையை நதியையும் மையமாக வைத்துச் சங்க இலக்கியம் விளக்குகின்ற வாழ்க்கை முறையைக் கீழடியில் கிடைக்கும் தொல்லியல் சான்றுகள் உறுதி செய்கின்றன. பெருநகர வளர்ச்சியின் பொருட்டு வையை ஆறு மாசுபாட்டிற்கு உள்ளாகின்றது. இவ்வையையாறானது மாசுபடுவதால் அந்நகர மக்களின் வாழ்வில் ஏற்பட்ட சமூகப் பொருளாதாரப் பண்பாட்டு மாற்றங்களையும், அவற்றை மீட்டுருவாக்கம் செய்தல் குறித்தும் ஆராய்வதாக இவ்வாய்வுக்கட்டுரை அமைகின்றது.

திறவுச் சொற்கள்: வையையின் வளமை - மதுரை நகரம் - பண்பாட்டு மரபுகள் - பெருநகர வளர்ச்சி - ஆறு மாசடைதல் - மீட்டுருவாக்குதல்.

HSS-23

நீர் மாசுபாட்டினால் பொருளாதார வளர்ச்சியில் ஏற்படும் தாக்கம்

தி. பச்சையம்மாள், முனைவர் மு. ருக்மணி

தமிழ்த்துறை, கொங்குநாடு கலை அறிவியல் கல்லூரி (தன்னாட்சி), கோயம்புத்தூர் – 641029. மின்னஞ்சல்: pachaiyammalarunoli@gmail.com,

ஆய்வுச் சுருக்கம்

"நீரின்றி அமையாது உலகு" - இது நம் முன்னோர் வாக்கு. அன்றைய நாட்களிலேயே நீரின் சிறப்பை உணர்ந்து; வாழும் இடங்களுக்கு அருகில் குளங்களையும், ஏரிகளையும், கிணறுகளையும் வெட்டி நீரைத் தேக்கி மாசடையாமல் பாதுகாத்து பண்டைய மக்கள் வந்தனர். மேலும் அதனை வேளாண்மைக்காகவும், குடிநீருக்காகவும் பயன்படுத்தினர். நீரின் வளமானது ஒரு நாட்டின் பொருளாதார வளர்ச்சி, மக்களின் சுகாதாரம், விவசாயம் மீன்பிடி தொழில் சுற்றுலா மற்றும் பலதரப்பட்ட தொழில்களின் வளர்ச்சிக்கு உறுதுணையாக அமைகின்றது. இவை நீர் மேலாண்மையின் முக்கியத்துவத்தை வலியுறுத்துகின்றது. தற்காலத்தில் அதிக மக்கள் தொகை காரணமாக நீரை மாசுபடுத்தும் சூழல் அதிகரித்துள்ளது. இது உலகளாவிய சுற்றுச்சூழல் பிரச்சனையாகும். தொழிற்சாலைக் கழிவுகள் விவசாயக் கழிவுகள் சுத்திகரிக்கப்படாத கழிவுகள் மற்றும் ரசாயனங்கள் மூலம் உண்டாகும் கழிவுகள் நல்ல நீரில் கலந்து அதன் தரத்தைக் குறைக்கின்றது. இதனால் தனிமனித குடும்பம் மற்றும் நாட்டின் ஒட்டுமொத்த பொருளாதாரம் எவ்வாறு பாதிக்கிறது என்பதை ஆராய்வதே இவ்வாய்வின் நோக்கமாகும்.

திறவுச் சொற்கள்: நீர்,பொருளாதாரம், மாசுபாடு, மக்கள் தொகை வளர்ச்சி.

HSS-24

ஆற்றுநீர் மாசுபாட்டால் ஏற்பட்ட பண்பாட்டு நாகரீக மாற்றம்

த. சபிதா பேகம்

தமிழ்த்துறை, கொங்குநாடு கலை அறிவியல் கல்லூரி (தன்னாட்சி), கோயம்புத்தூர் – 641029.

ஆய்வுச் சுருக்கம்

நீர் இல்லாவிட்டால் எந்த உயிரும் வாழாது, உலக ஒழுங்கு கெட்டு, உலக வாழ்வே முடிந்து விடும் என்று திருவள்ளுவர் கூறியுள்ளார். நீர்தான் அனைத்து உயிர்களுக்கும் ஆதாரமாக இருக்கிறது. பழந்தமிழர்கள் நீரை ஆதாரமாக வைத்தே அனைத்து சடங்குகளையும் செய்து வந்தனர். உலக மக்கள் தாயைப் போலவே நீரையும் மதித்துப் போற்றி வணங்கி வருகின்றனர். “தாயைப் பழித்தாலும் தண்ணீரை பழிக்கக் கூடாது” என்ற பழமொழியின் மூலமாக நீரின் முக்கியத்துவத்தை நமக்கு எடுத்துரைத்துள்ளனர். இன்றைய தலைமுறையினர் நீரின் முக்கியத்துவத்தைப் பொருட்படுத்தாமல் அலட்சியப்படுத்துகிறார்கள். ஆற்று நீர் மாசுபடுவதால் நீரில் உள்ள உயிரினங்கள் அழிந்து வருகின்றன. இதனால் நீரை ஆதாரமாக வைத்து நடைபெறும் தொழில்கள் பாதிக்கப்படுவதால் பொருளாதாரம் பாதிப்படைகிறது. பழந்தமிழர்கள் ஆற்றுப்படுக்கையை ஒட்டியே தங்களது குடியிருப்புகளையும், வாழ்வாதாரத்தையும் செய்து வந்தார்கள். இதனால் நீரை மையமாகப் பயன்படுத்தி நடைபெறும் தொழில்கள் மற்றும் விவசாயம் செழித்து இருந்தன. இன்று ஆற்று நீர் மாசுபட்டு வருவதால் நம் முன்னோர்கள் கடைபிடித்த சடங்கு முறைகளும், பாரம்பரிய முறைகளும், வழிபாட்டு முறைகளும் நடத்தப்படுவதில்லை. நமது நாட்டில் இருக்கும் பெரும்பாலான கோவில்களில் குளங்களும், கிணறுகளும் அமைக்கப்பட்டு சரியான காலங்களில் கிடைக்கும் நீரைச் சேமித்து வைக்கும் வழக்கம் இருந்து வருகிறது. அவ்வாறு சேமித்து வைக்கப்படும் நீரை மக்களுக்குத் தக்க நேரத்தில் பயன்பாட்டிற்கு வழங்கியும் வந்தனர். இன்றையத் தலைமுறையாகிய நாம், நீரின் முக்கியத்துவத்தை உணர்ந்து ஆற்று நீர் மாசுபடாமல் பாதுகாப்போம்.

HSS-25

நீர் வழித்தட உருவாக்கமும் வடிகட்டி மேலாண்மையும்: காடழிப்பு அரசியலையும் மேல்நிலையாக்க தனியார் முதலாளித்துவ நிலையையும் முன்வைத்து

முனைவர் சு. விமல்ராஜ்,

தமிழாய்வுத்துறை, அ.வ.அ.கல்லூரி (தன்னாட்சி), மன்னன்பந்தல், மயிலாடுதுறை-609305

மின்னஞ்சல்: thamizhvimalavc@gmail.com

ABSTRACT

Sangam Age Tamils people with a keen sense of water and a clear understanding of it. They have a habit of approaching everything with scientific knowledge. The water management of Tamils can be understood through the literature of the Sangam period. Water purification should be done by using water purifying plants and by making reservoirs as terminals and the water coming out of them should be returned to a similar terminal. The water channels should be reconstructed. Not only plants benefit from water purity, but humans will also be healthy. This article examines the creation of such water channels, terminal management, water purity, and water filtration.

Key Words: Water management - Sangam Tamil people water Management knowledge – water purification - water filtration system – reservoirs - reservoir terminals - water purification plants.

சோழகங்கம்

முனைவர் இரா. மணிமேகலை

தமிழ்த்துறை, கொங்குநாடு கலை அறிவியல் கல்லூரி (தன்னாட்சி), கோயம்புத்தூர் – 641029.

ஆய்வுச் சுருக்கம்

தமிழ்நாட்டின் தலையாய அறிவுச் செல்வத்தில் ஒன்று நீர் மேலாண்மையாகும். வேளாண்மையை முதன்மைத் தொழிலாகக் கொண்ட தமிழகத்தில் இச்சிந்தனை வளர்ச்சியடைந்ததில் வியப்பில்லை. மிகப்பெரிய வற்றாத ஜீவநதிகள் அதிகம் இல்லாத காரணத்தால் குளங்களையும் ஏரிகளையும் உண்டாக்குவதில் அரசர்களும் குடிமக்களும் இணைந்து செயல்பட்டனர். இதனால் வான் மழையை முழுமையாகப் பயன்படுத்தும் தொழில்நுட்பம் வளர்ச்சி பெற்றது. இந்த அடிப்படையில் தொலைநோக்கு சிந்தனையுடன் அமைக்கப்பட்ட ஏரிதான் பொன்னேரி என்று இந்நாளில் அழைக்கப்படும் சோழகங்கம் ஆகும். கி.பி. 1025 முதல் தென்னகத்தின் தலைசிறந்த நகரமாக மூன்று நூற்றாண்டுகள் திகழ்ந்திருந்த நகரம் கங்கைகொண்டசோழபுரம் ஆகும். 'கங்கை கொண்ட சோழன்' எனும் விருதுக்கு உரியவனாகிய இராசேந்திர சோழனால் கங்கையிலிருந்து பொற்குடங்களில் கொண்டு வரப்பட்ட நீரை தான் வெட்டிய பெரிய ஏரியில் கலந்து அதற்கு 'சோழகங்கம்' என்று பெயரிட்டான்.உலக வரலாற்றில் மாபெரும் கடற்படைக்குச் சொந்தக்காரனும், கிழக்காசிய நாடுகள் பலவற்றை வெற்றி கண்டவனும், இந்தியா முழுமையையும் தன்னாட்சியில் இணைத்தவனுமாகிய இராசேந்திர சோழன் வெட்டியது 'சோழகங்கம்' ஏரி. இராசேந்திர சோழனது கங்கைப் படையெடுப்பு வெற்றியைக் கொண்டாட வெற்றித் தூணாக ஜலஸ்தம்பம் எனப்படும் நீர்த்தூணாக அமைக்கப்பட்டது "சோழகங்கம்" ஏரி. அக்காலத்திலேயே கொள்ளிடத்திலிருந்து அறுபது கல் தொலைவுக்குக் கால்வாய் வெட்டி, சோழகங்கத்துக்கு நீர்வழித் தடத்தை உருவாக்கியுள்ளனர். மிகச் சிறந்த தொழில்நுட்பத்துடன் கால்வாய் ஏற்படுத்தி ஏரிக்கு நீர்த்தடத்தை உருவாக்கியுள்ளனர். இவ்வேரி கங்கைகொண்ட சோழபுரம் கோயிலிலிருந்து 3 கீ.மீ. தூரத்தில் ஜெயங்கொண்டம் செல்லும் சாலையில் உள்ளது. இதன் கிழக்குப் பக்கத்தில் காணப்படும் மதகுக்கு அருகில் பண்டைய மதகின் கட்டமைப்பை அறியும் வகையில் அகழாய்வு மேற்கொள்ளப்பட்டது. இதன் மூலம் இராசேந்திர சோழன் காலத்திய மதகு

வெளிப்படுத்தப்பட்டது.சோழகங்கம் ஏரியில் மதகுக்கு மேல் பகுதியில் மராட்டியர் காலக் கட்டடப் பகுதியும் அதற்கும் மேற்பகுதியில் ஆங்கிலேயர் காலக் கட்டடப்பகுதியும் காணப்படுகின்றன. ஆதலால் சோழர் காலத்தில் கட்டப்பட்ட மதகை, மராட்டியர் காலத்திலும், ஆங்கிலேயர் காலத்திலும்சீர்திருத்தியுள்ளார்கள் என்பதும் மற்றும் அதே மதகைத் தொடர்ந்து பிற்காலங்களிலும் பயன்படுத்தியிருக்கிறார்கள் என்பதும் தெரியவருகிறது. நீர்ப்பகிர்மானத்தை முறையாகக் கண்காணித்துப் பணி செய்பவர்களை "நீர்க்கட்டிகள்"என்றழைத்துள்ளனர். ஏரியைக் காத்துக் கண்காணித்து வர ஏரிவாரியம் அமைத்திருந்தனர். இவ்வாறு வெட்டப்பட்ட சோழகங்கம் ஏரி இன்று சுருங்கி வறட்சியடைந்து பெய்யும் மழையைச் சேமிக்க வழியின்றி சிதிலமடைந்து காணப்படுகிறது. குடிமக்களின் நல்வாழ்வு செழிப்பதற்கென்று மாபெரும் அரசன் இராசேந்திர சோழனால் உண்டாக்கப்பட்ட சோழகங்கத்தின் நினைவுகளையும் நீட்சியையும் இக்கட்டுரை சிந்திக்கிறது.

கௌசிகா நதியின் தோற்றமும் மாசுபாடும்

ஐ. சரண்யா

தமிழ்த்துறை, கொங்குநாடு கலை அறிவியல் கல்லூரி (தன்னாட்சி), கோயம்புத்தூர் - 641029.

மின்னஞ்சல்: saranyaaruumugichamy2@gmail.com

ஆய்வுச் சுருக்கம்

மனிதர்களின் உடம்பில் ஓடும் நாடி நாம்புகள் குருதியைக் கொண்டு செல்வது போல நாட்டில் ஓடும் நதிகள் தண்ணீரைக் கொண்டு செல்கின்றன. அந்த நதிகள் மனிதர்களால் அழிக்கப்பட்டு வருகின்றன. அவ்வாறு அழிக்கப்பட்ட நதி கோவை மற்றும் திருப்பூர் மாவட்டத்தை வளப்படுத்திய கௌசிகா நதியாகும். அத்தகு கௌசிகா நதி தோன்றிய சிறப்பை தவத்திரு கந்தசாமி சுவாமிகள் இயற்றிய கௌசைத் தலபுராணத்தில் கூறப்பட்டுள்ள செய்திகளின் வாயிலாகவும் கௌசிகா நதியின் அழிவால் மக்களுக்கு ஏற்பட்ட துயரையும் இக்கட்டுரை எடுத்தியம்புகிறது.

திருக்குறளில் நீர் மேலாண்மை

ப. உமாமகேஸ்வரி

தமிழ்த்துறை, கொங்குநாடு கலை அறிவியல் கல்லூரி (தன்னாட்சி), கோயம்புத்தூர் – 641029. மின்னஞ்சல்: uma738507@gmail.com

ஆய்வுச் சுருக்கம்

தமிழ் மக்களின் விழுமியங்களில் முக்கியத்துவம் வாய்ந்தது. மேலாண்மை அவற்றில் கால மேலாண்மை, உணவு மேலாண்மை, வாணிப மேலாண்மை, நீர் மேலாண்மை என்று அனைத்துத் துறைகளிலும் சிறந்த நிர்வாகத் திறமைகளைக் கொண்டு விளங்கினர் தமிழ் மக்கள். அவற்றை பறைச்சாற்றும் விதமாகத் தமிழ் இலக்கியங்கள் உள்ளன. அவற்றில் அற இலக்கியத்தின் விழுமியமாகக் கருதப்படுவது திருக்குறளாகும். திருக்குறளில் கூறப்படாத விழுமியங்களே இல்லை எனலாம். அவ்வாறு போற்றத்தக்க இலக்கியத்தில் நீர் சார்ந்தும், நீரின் மேலாண்மை பற்றியும் சிறந்த செய்திகள் இடம் பெற்றுள்ளன. மனிதனின் அடிப்படை தேவைகளில் ஒன்று நீர். அந்த நீரின் தன்மை இன்று மாசுபாடு காரணமாக மக்களின் வாழ்வாதாரம் பாதிக்கப்படுகிறது. எனவே நீர் மேலாண்மை என்பது மிகவும் அத்தியாவசிய தேவைகளில் ஒன்றாக உள்ளது. அவற்றை நம் முன்னோர்கள் எவ்வாறு கையாண்டு உள்ளனர் என்பதை திருக்குறள் மூலம் அறியலாம்.

குளம்தொட்டு வளம் பெருக்கிய கோவை நகரம்

சு. சதீஷ்குமார்

தமிழ்த்துறை, கொங்குநாடு கலை அறிவியல் கல்லூரி (தன்னாட்சி), கோயம்புத்தூர் – 641029.

ஆய்வுச் சுருக்கம்

கோவை நகரில் பேராறுகள் எவையும் பயணிப்பதில்லை. மேற்குத் தொடர்ச்சி மலையில் உற்பத்தியாகும் காஞ்சி நதி என்று அழைக்கப்படும் நொய்யல் ஆறு மட்டுமே கோவை நகரின் மையப்பகுதியில் ஓடுகின்றது. இந்த ஆற்றிலும் மழைக் காலத்தில் மட்டுமே நீர்ப்பெருக்கு மிகுதியாக உள்ளது. ஆண்டு முழுவதும் இதில் நீர் செல்வதில்லை. இதனை அறிந்தே கொங்குச் சோழர்கள் காலத்தில் நொய்யல் ஆற்றில் பதினாறு அணைகளைக் கட்டி நீரைத் தேக்கினர். மழைக் காலங்களில் நொய்யலில் பெருக்கெடுத்து வருகின்ற நீரைச் சேமிக்கவும் சேமித்த நீரைத் திறம்படப் பயன்படுத்தவும் குளங்கள் வெட்டப்பட்டன. நொய்யலாற்றிலிருந்து அதிராஜ வாய்க்கால் என்ற பெயரில் வாய்க்கால் வெட்டப்பட்டு பெரிய குளம், சிறிய குளம், வாலாங்குளம், புளியகுளம் உள்ளிட்ட குளங்களில் நீர் தேக்கப்பட்டது. சித்திரைச்சாவடி வாய்க்கால் வழியாகச் செல்லும் நொய்யலாற்று நீர் செல்வாம்பதி, கிருஷ்ணாம்பதி, குமாரசாமி குளம் ஆகியவற்றில் சேமிக்கப்படுகிறது. நொய்யலிலிருந்து பிரியும் மற்றொரு வாய்க்கால் குறிச்சிக் குளத்தின் நீராதாரமாகத் திகழ்கிறது. கொங்குச் சோழர்களைப் போன்றே கோவையை ஆட்சி செய்த கன்னடிய அரசர்களும் இரண்டு குளங்களை நகரத்தின் மையத்தில் மக்களின் குடிநீர் தேவைக்காக வெட்டினர். இவ்வாறு கோவை நகரத்தை வளப்படுத்தியதிலும் குடிநீர் தேவையை நிறைவு செய்ததிலும் வேளாண்மையைப் பெருக்கியதிலும் நொய்யலாற்று நீரை ஆதாரமாகக் கொண்ட குளங்கள் இன்றியமையாததாகத் திகழ்கின்றன. அவற்றின் சிறப்புக்களையும் தற்காலத்தில் அதன் மாசுபாடுகளையும் சிந்திக்கும் நோக்கில் இக்கட்டுரைஅமைகிறது.

List of Committees

2nd International Conference on
Socioeconomic Impact of Pollution in Water Bodies and Remedial Measures
(ICPWRM-2025)
6th & 7th January 2025
WORK ALLOTMENT

S. No	Head / Activity	Faculty Incharges
1.	Brochure Design & Print	**Mr. N. Senthilkumar** Assistant Professor of CT
2.	MoC	**Dr. G. Youveniya** Assistant Professor and Head, Department of English **Dr. P. Rajeswari** Assistant Professor of English (UA)
3.	Prayer Song	**Dr. R. Manimegalai** Associate Professor of Tamil
4.	Abstract Segregation	**Dr. G. Vadivelan** Assistant Professor of Chemistry (PG)
5.	i) Communication to the authors ii) Receiving Full paper as per Journal format iii) Article Publication Process iv) Abstract Book	**Dr. G. Vadivelan** Assistant Professor of Chemistry (PG) **Dr. G. Dhandapani** Assistant Professor of Botany **Dr. R. Rekka** Assistant Professor of Botany **Dr. K. Saminathan** Assistant Professor of Chemistry **Dr. K. Velmurugan** Assistant Professor of Zoology
7.	Programme Schedule	**Dr. K. Muthukumar** Assistant Professor of Tamil **Dr. M. Vivek Prabu** Assistant Professor of Mathematics
8.	Refreshment and Lunch	**Dr. M. Venkatachalam** Assistant Professor of Mathematics **Mr. S. Sivakumar** (Hostel) **Mr. S. Yasothkumar** (Aided Office)
9.	Attendance Certificate	**Dr. J. Anitha** Assistant Professor and Head i/c Department of Biochemistry (PG)
10.	Registration and Certificate Writing	**Dr. S. Bhargavi** Assistant Professor of Biotechnology

S. No	Head / Activity	Faculty Incharges
		Dr. V. Elakkiya Assistant Professor of Biotechnology
11.	Conference Accounts, Receipts and Voucher	**Dr. M. Vigneshwaran** Assistant Professor of Mathematics **Dr. M. Venkatachalam** Assistant Professor of Mathematics
12.	LCD and Laptop	**Dr. K. Chandra Prakash** Assistant Professor of Chemistry **Mr. Sundaramoorthy** (CS Lab Admin)
13.	Press Note and Conference Report	**Dr. S. Sathishkumar** Assistant Professor of Tamil **Dr. K. Kaviyarasu** Assistant Professor of English
14.	Conference Website	**Dr. L. Kathirvelkumaran** Assistant Professor and Head Department of Computer Science with Data Analytics
15.	Photography	**Mr. B. Damodhara Prasath** Assistant Professor of English (UA)
16.	Banner Design and Print	**Mr. V. Fedric Stanley** (PRO)
17.	Stage arrangement	**Dr. K. Velmurugan** Assistant Professor of Zoology **Dr. P. Matheswaran** Assistant Professor of Physics
18.	Conference Kit	**Mr. S. Velmurugan** Assistant Professor of Computer Science (UA) **Dr. G. Srinivas** Assistant Professor of Wildlife Biology

SECTIONAL COORDINATORS

1.	**Biological Sciences**	Department of Botany	**Dr. G. Dhandapani,** Assistant Professor of Botany **Dr. R. Rekka**, Assistant Professor of Botany
		Department of Zoology	**Dr. S. Raja**, Assistant Professor of Zoology **Dr. K. Velmurugan,** Assistant Professor of Zoology

		Department of Biochemistry	**Dr. K. Nirubama**, Assistant Professor of Biochemistry **Dr. M. Santhoshkumar,** Assistant Professor of Biochemistry **Dr. J. Anitha** Assistant Professor & Head (i/c), Department of Biochemistry (PG)
		Department of Biotechnology	**Dr. R. Sathishkumar,** Assistant Professor of Biotechnology **Dr. S. Bhargavi**, Assistant Professor of Biotechnology
		Department of Wildlife Biology	**Dr. G. Srinivas,** Assistant Professor of Wildlife Biology
2.	**Physical and Chemical Sciences**	Department of Physics	**Dr. P. Matheswaran,** Assistant Professor of Physics **Dr. B. Gokul,** Assistant Professor of Physics **Dr. V. Nithya,** Assistant Professor of Physics
		Department of Chemistry	**Dr. K. Saminathan**, Assistant Professor of Chemistry (UG) **Dr. K. Kalpanadevi** Associate Professor & Head, Dept. of Chemistry (PG) **Dr. G. Vadivelan**, Assistant Professor of Chemistry (PG)
3.	**Mathematical and Computer Sciences**	Department of Mathematics	**Dr. D. Vijayalakshmi** Assistant Professor of Mathematics **Dr. C. Ravichandran** Assistant Professor of Mathematics
		School of Computer Science	**Dr. Saravana Moorthy,** Associate Professor and Head, Department of Computer Science (UA) **Dr. L. Kathirvelkumaran**, Assistant Professor and Head, Dept. of Computer Science with Data Analytics **Dr. K. Sumangala**, Associate Professor and Head, Department of Computer Applications

4.	**Social Science and Humanities**	Department of Tamil	**Dr. K. Murugesan**, Associate Professor and Head, Department of Tamil **Dr. R. Manimegalai**, Associate Professor of Tamil
		Department of English	**Dr. K. Kaviyarasu,** Assistant Professor of English **Dr. G. Youveniya**, Associate Professor & Head, Dept.of English (PG)
		School of Commerce and Management	**Dr. S. Punitha Devi** Associate Professor and Head, Department of Business Administration with CA **Dr. B. Divya Priya** Associate Professor and Head, Department of Commerce with Information Technology **Dr. T. Kumar** Associate Professor and Head, Department of Commerce with Computer Applications
		Department of CDF	**Dr. P. Sasikala** Associate Professor and Head, Department of CDF
		Department of Psychology	**Mrs. B. Kavitha** Assistant Professor & Head, Dept. of Psychology
5.	**Library and Information Technology**	Library and Information Centre	**Dr. R. Senthilkumar**, Librarian (SG) and Head, Library and Information Centre
		Department of Computer Technology	**Dr. A. Indhumathi** Associate Professor and Head (i/c), Department of Computer Technology
		Department of Information Technology	**Dr. K. Dhanalakshmi** Associate Professor and Head (i/c), Department of Information Technology

நீர்இன்று அமையாது உலகெனின் யார்யார்க்கும்
வான்இன்று அமையாது ஒழுக்கு

When water fails, functions of nature cease, you say;
Thus when rain fails, no men can walk in 'duty's ordered way'.

Thirukkural - 20

இருபுனலும் வாய்ந்த மலையும் வருபுனலும்
வல்லரணும் நாட்டிற்கு உறுப்பு

Waters from rains and springs, a mountain near, and waters thence;
These make a land, with fortress' sure defense.

Thirukkural - 737

EDUCATE AND RAISE THE MASSES, AND THUS ALONE A NATION IS POSSIBLE.

Education has yet to be in the world, and civilisation - civilisation has begun nowhere yet.

The training by which the current and expression of will are brought under control and become fruitful is called education.

- Swami Vivekananda

KONGUNADU ARTS AND SCIENCE COLLEGE (AUTONOMOUS)
Affliated to Bharathiar University
Re-Accredited by NACC with 'A+' Grade (4th Cycle)
College of Excellence (UGC)
52nd Rank among Colleges in NIRF - 2024
G.N. MILLS (Post), Coimbatore-641029
www.kongunaducollege.ac.in

Published By:
Royal Book Publishing
contact@royalbookpublishing.com
www.royalbookpublishing.com

9 789348 505637