EAST POINT COLLEGE OF ENGINEERING & TECHNOLOGY

AN AUTONOMOUS INSTITUTION AFFILIATED TO VTU & ACCREDITED BY NBA - CSE, ECE & ISE

PROCEEDINGS OF THE IUPAC ENDORSED INTERNATIONAL CONFERENCE

On

Pesticides and Related Emerging Organic Pollutants Impact on the Environment and Human Health and Its Remediation Strategies

Endorsed by IUPAC and selected papers published in Pure and Applied Chemistry through peer review. process

Sponsored by DST-SERB, CSIR, VTU, KSCST, INSA, Quiklrn, Adani Cement and EPCET.

CONVENER

Dr. Sreenivasa Rao Amaraneni CSci, CChem, FRSC.,

DAAD, Royal Society, RSCDWF, EACHVS, INSA, JNCASR & IASc Fellowships Awardee.,

Professor in Department of Chemistry, EPCET &

Convener of the Conference

ORGANIZED BY

Department of Basic Sciences

East Point College of Engineering and Technology

Virgo Nagar Post, Avalahalli,

Bangalore - 560049, Karnataka, India

ABSTRACTS OF PLENARY AND INVITED TALKS & ORAL AND POSTER PRESENTATIONS

ISBN Number : 978-93-341-1945-9 (Online Version)

EDITORS

Dr. Sreenivasa Rao Amaraneni CSci, CChem, FRSC.,

DAAD, Royal Society, RSCDWF, EACHVS, INSA, JNCASR & IASc Fellowships Awardee.,

Professor in Department of Chemistry, EPCET

Dr.Wayne Carter,

University Nottingham Medical School, Derby, UK

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MESSAGES

Message

Smt. B L Ramadevi Venkatpathi
Chairperson, East Point Group of Institutions

It is a privilege to welcome you to the IUPAC Endorsed International Conference on *Pesticides and Related Emerging Organic Pollutants: Impact on the Environment and Human Health and Its Remediation Strategies,* hosted by the Basic Science Department at East Point College of Engineering and Technology.

As pesticides and pollutants increasingly affect our ecosystems and health, this conference unites experts to address these pressing issues and inspire sustainable solutions. East Point College is honored to support this vital dialogue, furthering our commitment to knowledge and innovation.

My sincere congratulations to the Convener and Organizing Committee of conference, and Best Wishes for a successful and impactful conference.

Smt. B L Ramadevi Venkatpathi
Place : East Point Group of Institututions
Dated: 07-11-2024

Message

Sri S V Pramod Gowda
CEO, East Point Group of Institutions

Greetings!

It is a true pleasure to invite you to the IUPAC Endorsed International Conference on "*Pesticides and Related Emerging Organic Pollutants: Impact on the Environment and Human Health and Its Remediation Strategies"* organized by the Basic Science Department of East Point College of Engineering and Technology.

The study of pesticides and organic pollutants is at the forefront of both environmental and public health research, with significant advancements transforming the field both theoretically and practically. With its unwavering commitment to excellence, East Point College of Engineering and Technology is proud to present this distinguished platform, dedicated to advancing knowledge and fostering innovative research that will contribute to a sustainable future.

This conference promises a rich exchange of ideas and discoveries that will benefit students, faculty, and professionals alike. It stands as an invaluable opportunity for collaboration, inspiration, and the pursuit of meaningful solutions to global challenges.

I extend my heartfelt congratulations to the Convener and Organizing Committee of the conference for their dedication in bringing this conference to fruition and wish everyone a successful and impactful event.

Sri S V Pramod Gowda
Place : East Point Group of Institututions
Dated: 07-11-2024

Message

Sri S V Rajiv Gowda
CEO , East Point Group of Institutions

We are passionately pursuing a dream that our late father, Dr. S.M. Venkatpathi, held dear: to empower lives through the transformative power of knowledge and education. This vision continues to guide the institute he established, which has now become one of the leading groups of institutions in the region.

It is an honor to welcome you to the IUPAC Endorsed International Conference on Pesticides and Related Emerging Organic Pollutants: Impact on the Environment and Human Health and Its Remediation Strategies, hosted by the dedicated Basic Science Department at East Point College of Engineering and Technology.

As we come together to discuss these crucial topics, we are reminded of the urgent need for innovative solutions and responsible practices that can safeguard both our environment and public health. East Point College, renowned for its commitment to academic excellence and research-driven progress, provides the ideal setting for this conference, where fresh perspectives and scientific advancements will be at the forefront.

My heartfelt congratulations go to the Convener and Organizing Committee of the conference for their outstanding efforts in bringing this event to life, and I extend my best wishes for a successful, enriching conference for all involved.

Sri S V Rajiv Gowda
Place : East Point Group of Institututions
Dated: 07-11-2024

Message

Sri Peter Francis
Secretary, MG Charitable Trust,
East Point Group of Institutions

It is with great enthusiasm that I extend a warm welcome to all of you at the IUPAC Endorsed International Conference on Pesticides and Related Emerging Organic Pollutants: Impact on the Environment and Human Health and Its Remediation Strategies, organized by the Basic Science Department at East Point College of Engineering and Technology, Bengaluru.

This conference aims to tackle the pressing challenges posed by pesticides and emerging pollutants, which have significant implications for both our environment and public health. We are fortunate to have an exceptional lineup of experts and thought leaders ready to share their insights and explore innovative solutions to these critical issues.

I would like to commend the Convener and Organizing Committee of the conference for their unwavering commitment and hard work in making this event possible. I encourage all participants to engage actively in the discussions and collaborations that will arise during our time together.
Wishing you a rewarding and inspiring conference experience!

Sri Peter Francis
Place : East Point Group of Institututions
Dated: 07-11-2024

Message

Dr.Wayne Carter
Nattingham University, UK and Guest Editor
of the Conference Speical Issue of Pure and Applied Chemistry Journal of UPAC

The IUPAC Endorsed International Conference on Pesticides and Related Emerging Organic Pollutants: Impact on the Environment and Human Health and Its Remediation Strategies, organized by department of Basic Science, East Point College of Engineering and Technology, Bangalore will provide an interactive platform to deliberate the impact of the pesticides and other environmental pollutants on the environment and human health. I am also confident that conference will discuss about the technology to reduce the pollution to protect the Environment and human health.

I am happy to be part of the internationals conference as plenary speaker and Guest Editor for the IUPAC Journal Pure and Applied Chemistry and welcome the Honourable Chief Guest, Guests of Honour, foreign delegates, Scientists, academicians and students and research scientists to conference in East Point College of Engineering and Technology, Bangalore, India

I wish the conference a grand success.

Dr.Wayne Carter
Place : Nattingham University, UK
Dated: 07-11-2024

Message

Prof. A. Ganesan
Chief Editor of Pure and Applied Chemistry Journal, IUPAC
Professor of Chemical Biology,School of Pharmacy
University of East Anglia, Norwich Research Park, Norwich NR4 7TJ, United Kingdom

I am so much happy to note that the "*Pesticides and Related Emerging Organic Pollutants: Impact on the Environment and Human Health and Its Remediation Strategies"* organized by department of Basic Sciences chemistry, East Point College of Engineering and Technology Bangalore . I am happy to recognized that the International Union of Pure and Applied Chemistry(IUPAC) has Endorsed the International conference ICPIPEHH-2017. selected papers will be published in the special issue of Pure and Applied Chemistry journal through peer review process. The Dr.Wayne Carter, University of Nottingham, UK and Dr.Sreenivasa Rao Amaraneni, East Point College of Engineering and Technology are the Guest Editors for the special issue of the Pure and Applied Chemistry Journal.

The IUAC Endorsed International Conference has established itself as worldwide reference for the dissemination of high-quality interdisciplinary research in all aspects of Pesticide and related organic pollutant impact on Environment and Human Health for the fostering interaction and exchange of ideas.

The conference the theme was rightly selected and it is very useful and essential discuss about the impact of pesticides and other environmental contaminants which effect on the environment and human health. I am sure that the conference will deliberate the fruitful discuss about the effects of pollution on environment and human health and technology to reduce the pollution to protect environment. I am happy to welcome Honorable Chief Guest, Guests of Honor, foreign delegates, Scientists, academicians and students and research scientists to conference

I will all the success for the conference.

Prof. A. Ganesan
Editor IUPAC PAC Journal
Place: University of East Anglia,UK
Dated: 07-11-2024

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Prof. Bruce D. Hammock,
Distinguished Professor , University of California – Davis, USA

I am so happy to be included remotely in the "*International Conference on Pesticides and related Emerging Organic Pollutants Impact on the Environment and Human Health and Its Remediation Strategies.*" This conference has been organized by Prof Dr. Sreenivasa Rao Amaraneni, department of chemistry at East Point College of Engineering(Autonomous), Bangalore-560049, India during 7 th – 9 th November 2024.

I am happy note that this conference has been recognized by the International Union of Pure and Applied Chemistry(IUPAC), and that the IUPAC has Endorsed the International conference and that selected papers will be published in the special issue of IUPAC Journal – "Pure and Applied Chemistry" free of cost. The IUPAC conferences have established themselves as worldwide references for the dissemination of high quality interdisciplinary research in all aspects of Pesticides and Related Emerging Organic Pollutants Impact on the Environment and Human Health and Its Remediation Strategies for the fostering interaction and exchange of ideas.

The conference the theme was rightly selected and it is very useful and essential to discuss about the impact of pesticides and other environmental contaminants which effect on the environment and human health. I am sure that the conference will result in fruitful discussions about the effects of pollution on environment and human health and novel technology to reduce the pollution to protect environment. I am happy to welcome Honorable Chief Guest, Guests of Honor, foreign delegates, Scientists, academicians and students and research scientists to the conference. I wish you all the success for the conference. I wish I could be there with you but an organ transplant prevents me from traveling by air.

Sincerely yours,

Bruce D. Hammock

Bruce D. Hammock
Distinguished Professor of Entomology
& UC Davis Comprehensive Cancer Center
Director, NIEHS-UCD Superfund Basic Research Program
Dated: 7 th , November 2024
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Email bdhammock@ucdavis.edu Lab site http://www.biopestlab.ucdavis.edu/ Superfund site http://www-sf.ucdavis.edu

Message

Dr.Prakash S
Senior Vice President
East Point Group of Institutions

Welcome to the IUPAC Endorsed International Conference on *Pesticides and Related Emerging Organic Pollutants: Impact on the Environment and Human Health and Its Remediation Strategies!*

In this era of escalating environmental concerns, tackling the challenges posed by pesticides has never been more critical. By unearthing innovative solutions, we can not only mitigate their detrimental impact but also pave the way for sustainable agricultural practices that safeguard our ecosystems and future generations.

As we delve into the complexities of pesticides and emerging pollutants, I encourage each of you to embrace this unique opportunity to exchange ideas, challenge assumptions, and spark innovation. The diverse backgrounds and experiences represented in this room are what make this gathering so special.

I would like to extend my heartfelt thanks to our esteemed international speakers for traveling from various corners of the globe to share their invaluable insights with us. Your presence enriches our dialogue immensely. I also want to express my gratitude to all participants for your engagement in this critical conversation; your voices are essential to our collective success.

A special thank you goes to the Convener and organizing committee of the conference for their tireless dedication and meticulous planning in bringing this conference to fruition. Your efforts have created a platform for meaningful dialogue and collaboration.

Let us embark on this journey together, inspiring one another as we explore sustainable solutions and forge pathways to a healthier planet. I am excited to witness the collaborations and insights that will emerge from our time together.

Here's to an inspiring and transformative conference!

Dr.Prakash S
Place : East Point Group of Institututions
Dated: 07-11-2024

Message

Dr.Sreenivasa Rao Amaraneni,
CSci,CChem,FRSC
Professor in Department of chemistry,EPCET and Convener of the Coference and
Guest Editor of the Conference Speical Issue of Pure and Applied Chemistry Journal of IUPAC

Welcome to IUPAC Endrosed International Conference at EPCET.
I, on behalf of the East point college of Engineering & Technology and organising committee of International Conference, its my great pleasure to welcome Honourable Chief Guest, Guests of Honour, foreign delegates, Scientists, academicians and students and research scientists from different institute from abroad and within India to the IUPAC endorsed International Conference on Pesticides and Related Emerging Organic Pollutants Impact on the Environment and Human Health and Its Remediation Strategies organised by the Department of Basic Sciences, East Point College of Engineering and Technology(EPCET) Bangalore, India during 7^{th} – 9^{th} November 2024.
It has been real honor and privilege to serve as the convener of the IUPAC endorsed International Conferencewhich has been sponsored by DST-SERB, CSIR, VTU, KSCST, INSA, Quikln, Adani Cement and East point College of Engineering and Technology (EPCET) etc and Conference Endorsed by International Union Pure & Applied Chemistry(IUPAC) USA.
The conference was fortunate to attract a high interest among the academicians, scientist , research scholars and students and the conference received about 65 abstracts from delegates from institute from foreign and with in India. This conference will provide the inter-disciplinary venue for the researchers to address the issues the relating the esticide and environmental pollution and its effect on environment and human health The conference programme spans 3 days includes 5 plenary talks, 11 invited talks, 37 oral presentations and 7 poster presentations.
I am deeply grateful to our esteemed international speakers who have travelled great distances to share their insights with us. I also wish to thank all participants for their enthusiastic involvement and contributions to this important cause.A heartfelt thanks goes to our reviewers, whose careful assessment and invaluable feedback have played a crucial role in upholding the quality of research presented here. Your expertise and commitment to excellence are greatly appreciated.
The conference would not have been possible without the support of the EPGI management, Senior Vice President, Principal, Vice-Principal,Dean Academics, Director R & D and HOD,other admistrators and all advisory committee members and also the enthusiastic and hard work of a number of colleagues. I appreciate the support of our sponsors.

I look forward to exciting and insightful presentations, discussions and sharing of technical ideas with colleagues from foreign and within India. I thank you for attending the conference and I hope that you enjoy your visit to East Point College of Engineering and Technology and beautiful city Bangalore,Karnataka..
Wish you all success for future endeavours.

Message

Prof. Ashok Herur
Director of Academics
East Point Group of Institutions

As we embark on this significant journey with the *International Conference on Pesticides and Related Emerging Organic Pollutants: Impact on the Environment and Human Health and Its Remediation Strategies,* I am delighted to extend a warm welcome to all esteemed participants, speakers, and guests.

This conference is a vital gathering in our pursuit of understanding and mitigating the harmful effects of pesticides on both ecosystems and human health. Through our discussions, we aim not only to identify pressing issues but to forge practical, science-driven solutions that will impact future generations positively.

A heartfelt thank you to our international speakers for traveling from afar to share your expertise with us. Your insights are invaluable to our collective efforts and will undoubtedly enrich our understanding. To each participant, thank you for your enthusiasm and commitment to this cause your contributions are key to the success of this event.

I would also like to express my sincere gratitude to the organizing committee. Your dedication and meticulous planning have transformed this vision into a dynamic forum for learning and innovation.

Let us use this platform to inspire and collaborate, as we work towards sustainable practices and a healthier world. I am confident that the knowledge and partnerships formed here will lead to meaningful impact.

Best Wishes,

Prof. Ashok Herur
Place : East Point Group of Institututions
Dated: 07-11-2024

Message

Dr. Prahlada Rao
Director R & D
East Point Group of Institutions

Esteemed guests, speakers, and participants,

It is a pleasure to welcome you all to the *International Conference on Pesticides and Related Emerging Organic Pollutants: Impact on the Environment and Human Health and Its Remediation Strategies.* This event is a powerful platform for collaboration, uniting experts from diverse fields to address some of the most critical challenges of our time.

As we confront the environmental and health implications of pesticide use and related pollutants, your presence here signifies a shared commitment to pioneering sustainable and science-driven solutions. This conference offers us the unique opportunity to exchange perspectives, challenge prevailing ideas, and inspire one another to effect meaningful change.

To our international speakers, who have traveled far to enrich this gathering with your expertise and insights—thank you for your dedication and invaluable contributions. And to each participant, your engagement fuels the dynamic conversations that make this conference impactful.

I would also like to commend the organizing committee, whose diligent work has transformed this vision into a reality, creating an environment conducive to learning and collaboration.

Let us make the most of these days ahead, embracing the chance to innovate and lay the groundwork for a healthier future. Together, we can forge a path forward that ensures environmental stewardship and well-being for generations to come.

With warm regards,

Dr. Prahlada Rao
Place : East Point Group of Institututions
Dated: 07-11-2024

Message

Dr. T K Thivakaran
Dean IQAC
East Point Group of institutions

Greetings to all attending the *International Conference on Pesticides and Related Emerging Organic Pollutants: Impact on the Environment and Human Health and Its Remediation Strategies.*

This conference marks a vital convergence of minds dedicated to safeguarding our environment and well-being. In a world increasingly affected by industrial and agricultural pollutants, it's essential that we come together to share our expertise, explore solutions, and forge new paths for sustainable progress.

I am deeply appreciative of our esteemed international speakers who have come from across the globe to lend their invaluable perspectives. Your insights will not only enlighten us but will also drive our shared mission forward. I also thank every participant for your commitment to addressing these urgent issues—your engagement is critical to the success of our discussions.

My heartfelt gratitude extends to the organizing committee, whose hard work and meticulous efforts have brought this event to life. You have provided an invaluable space for collaboration and knowledge exchange.

As we delve into these significant issues, may this conference serve as a beacon for impactful ideas and practical solutions. I am confident that our time together will foster advancements that will echo well beyond these walls.

Warm regards,

Dr. T K Thivakaran
Place : East Point Group of Institututions
Dated: 07-11-2024

Message

Dr. Mrityunjaya V Latte
Principal
East Point College of Engineering & Technology

As we gather today, we are presented with a remarkable opportunity to confront the pressing challenges that pesticides and emerging organic pollutants pose to our environment and public health. This conference serves as a vital platform for sharing knowledge, exchanging ideas, and fostering collaboration among experts and practitioners from various fields.

I would like to extend my heartfelt thanks to our esteemed international speakers for traveling from different parts of the world to enrich our discussions. Additionally, I appreciate the active engagement of all participants, as your insights are crucial to the success of our dialogue.

A special acknowledgment goes to the convener and organizing committee of conference for their unwavering dedication and hard work in bringing this conference to fruition. Your efforts have created an environment where innovation and sustainable solutions can thrive.

Let us work together to inspire meaningful change and contribute to a healthier, more sustainable future.

Dr. Mrityunjaya V Latte
Place : East Point Group of Institututions
Dated: 07-11-2024

Message

Dr. Yogesh G S
Vice Principal
East Point College of Engineering & Technology

It is my distinct honor to welcome all of you to the International Conference on *Pesticides and Related Emerging Organic Pollutants: Impact on the Environment and Human Health and Its Remediation Strategies.*

In today's world, finding solutions to reduce the adverse effects of pesticides on both human health and the environment is an essential and urgent task. This conference brings together brilliant minds from across the globe to explore sustainable approaches that could reshape how we address these critical challenges.

I am profoundly grateful to our distinguished international speakers who have joined us, traveling from far and wide to share their expertise and insights. Your presence here significantly enriches our conversations and elevates the impact of this gathering. I would also like to extend my heartfelt appreciation to all participants—your active engagement and contributions are invaluable to the success of this event.

A special thank you to our dedicated organizing committee, whose hard work and meticulous planning have made this conference a reality. Your efforts have provided us all with a platform for meaningful dialogue and collaboration.

Let us embrace this opportunity to learn, share, and innovate together as we strive for a healthier and more sustainable world. I look forward to the productive discussions and collaborations that will emerge from our time here.

Warm regards,

Dr. Yogesh G S
Place : East Point Group of Institututions
Dated: 07-11-2024

Message

Dr.Manjunath,
HOD Chemistry
East Point College of Engineering & Technology

On behalf of the convener and organizing committee of conference , I extend my heartfelt thanks to each of you for joining us at the IUPAC Endorsed International Conference on Pesticides and Related Emerging Organic Pollutants: Impact on the Environment and Human Health and Its Remediation Strategies, hosted by the Basic Science Department at East Point College of Engineering and Technology.

Your presence and active participation are essential to the success of this conference as we seek solutions to some of the most pressing environmental and health challenges of our time. I am especially grateful to our esteemed international speakers, who have travelled from afar to share their expertise and perspectives with us. Your contributions are invaluable in advancing our understanding of these complex issues.

A sincere thank you as well to all participants and also thank to the convener and the dedicated organizing team, whose hard work and commitment have made this event possible. Together, let us harness the insights and ideas shared today to inspire impactful change and drive forward the sustainable practices that our world urgently needs.

Wishing everyone a fruitful and engaging conference!

Dr.Manjunath, HOD Chemistry
Place : East Point College of Engineeirng & Technology
Dated: 07-11-2024

About the East Point Group of Institutions

East Point Group of Institutions stands as a distinguished and revered educational establishment in Bangalore, Karnataka, India. Nestled amidst the serene and picturesque expanse of 90 acres, this institution has become a shining beacon of quality education. With a resolute vision to provide students the skills and knowledge they need to excel in their chosen fields, East Point Group has consistently upheld its commitment to academic excellence, innovation, and holistic development. Its sprawling campus, set amidst the natural beauty of its lush green surroundings, offers an ideal backdrop for a rich and immersive learning experience, making it a truly exceptional hub for education and personal growth.

Central to East Point Group's mission is the commitment to offering a comprehensive range of educational programs across various disciplines. The institution provides an extensive array of courses spanning Engineering (CSE, ISE, ECE, ME, Civil, AI& DS, AI and ML, CSE(IOT)), Management (MBA), Pharmacy, Medical sciences, Physiotherapy, Nursing, Schools, Pre-University, and other degree programs.

The dedication to excellence at East Point Group extends to its faculty members, who are not only accomplished educators but also seasoned professionals in their respective fields. Their wealth of knowledge, industry insights, and practical experience enrich the learning environment, ensuring students receive a well-rounded and practical education. Faculty development programs further enhance the quality of teaching and research, making it a dynamic and innovative learning institution.

East Point Group places a strong emphasis on preparing its students for the workforce. The institution's dedicated placement cell actively connects students with opportunities at top companies and organizations. The remarkable success of its students in placement drives serves as a testament to the institution's commitment to career development and readiness.

Further reinforcing its industry connections, East Point Group collaborates with reputable companies through Memoranda of Understanding (MOUs). These partnerships facilitate internships, industry exposure, and research collaborations, offering students a real-world perspective of their chosen fields. This emphasis on practical experience helps bridge the gap between theory and practice.

East Point Group of Institutions, with its commitment to academic excellence, cultural inclusivity, practical experience, and holistic development, stands as a cornerstone in the educational landscape of Bangalore, providing students with an exceptional platform to explore and achieve their aspirations.

Thanking to Sponsorships

On behalf of East Point College of Engineering and Technology, I would like to extend our deepest appreciation to our sponsors for their invaluable support of the *IUPAC Endorsed International Conference on Pesticides and Related Emerging Organic Pollutants,* organized by the Department of Basic Sciences, East Point College of Engineering and Technology, Bangalore, India, from 7th to 9th November 2024.

	Department of Science & Technology(DST-SERB),
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IUPAC ENDROSED - INTERNATIONAL CONFERENCE
ON
PESTICIDES AND RELATED EMERGING ORGANIC POLLUTATNS IMPACT ON THE ENVIRONMENT AND HUMAN HEALTH AND ITS REMEDIATION STATEGIES
(7^{th} - 9^{th}, November 2024)

(The conference is endorsed by the IUPAC and selected papers will be published in the special issue of Pure and Applied Chemistry journal through peer review process. Sponsored by Visvesvaraya Technological University (VTU), Karnataka State Council of Science and Technology(KSCST), Indian National Science Academy(INSA), Department of Science & Technology(DST-SERB),Council of Scientific & Industrial Research (CSIR), Quikln, Adani Cement and East point College of Engineering and Technology (EPCET) etc)

Organized by Department of Basic Science, East Point College of Engineering & Technology(EPCET)
Convener: Dr.Sreenivasa Rao Amaraneni, CSci, CChem, FRSC.,
DAAD, Royal Society, RSCDWF, EACHVS, INSA, JNCASR & IASc Fellowships Awardee.,
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Venue: Auditorium, East Point College of Medical Sciences & Research Centre (EPCMSRC)

PROGRAMME SCHEDULE

08.30 - 09.30:	Registration
09.15 - 09.20:	State Anthem
09.20 - 09.25:	Invocation
09.25 - 09.30:	Lighting of the lamp
09.30 - 09.35:	Welcome address by Dr. Mrityunjaya V Latte Principal, EPCET
09.35 - 09.40:	About the Conference by Dr. Sreenivasa Rao Amaraneni, Professor in Chemistry Department , EPCET,& Conference Convener
09.40 - 09.50:	Address by Dr. Aravindakumar C.T, Vice Chancellor, Mahatma Gandhi University, Kottayam, Kerala
09.50 - 09.55:	Release of Proceeding
09.55 - 10.05:	Address by Dr. Jan Andersson, University of Münster, Münster.Germany
10.05 - 10.15:	Presidential Address by Dr. Prakash , Sr. Vice President, EPGI
10.15 - 10.20:	Felicitation of Guests
10.20 - 10.30:	Vote of thanks by Dr. Manjunath, HOD Chemistry, EPCET
10.30 - 10.35:	National Anthem
10.35 - 10.40:	Group Photo
10.40 - 11.00:	High Coffee/Tea

1	**PT1-1**	11.00 – 11.40 AM *Navigating Emerging Contaminants: Key Monitoring, Health Effects, and Future Challenges.* **C.T. Aravind Kumar**, Vice Chancellor, Mahatma Gandhi University, Kottayam, Kerala, India.
2	**PT1-2**	11.40 – 12.20 PM *50 years of EPCA priority PAHs – do we still need them?* **John Anderson, University of Münster, Münster, Germany.**

3	**PT1-3**	12.20 – 01.00 PM *Pesticide usage and the impact on human health and the environment.* **Wayne Carter** , Nottingham University, Faculty of Medicine & Health Sciences,Royal Derby Hospital, Derby,UK.
Lunch : 01.00 – 01.55 PM		
Invited Talks Day1 (IT1):01.55 – 03.25 PM		
1	**IT1- 1**	01-55 - 02.25 PM *Kisan Kavach: An anti-pesticide protective suit for farmers to prevent pesticide – induced toxicity and lethality.* **Praveen Kumar Vemula**, Institute for Stem Cell Biology and Regenerative Medicine *(*inStem*)*. Bangalore, Karnataka, India.
2	**IT1- 2**	02-25 - 02.55 PM *Widespread Occurrence of Pesticides in India: Environmental Accumulation and its Impact on Wildlife and Human Health.* **Dhananjayan V,** ICMR-Regional Occupational Health Centre (Southern), NIOH, Bangalore, Karnataka, India.
3	**IT1- 3**	02-55 - 03.25 PM *Nature based solutions for rejuvenation of Lakes: Insights from the success story of Jakkur Lake.* **Ramachandran, T.V**. Energy & Wetlands Research Group, Centre for Ecological Sciences, Indian Institute of Sciences, Bangalore, Karnataka,India.
Oral Presentations Day 1 (OP1) **Session 1: 03.45 – 04.45 PM** Chairperson: Dr.Dhananjayan V, ICMR, Bangalore Co-Chairperson**:** Dr.Zeena George, EPCET,Bangalore		
4	**OP1.1-1**	03.45 - 04.00 PM *Assessing Agricultural Pesticide Contamination in Lentic Small Water Bodies and Soils: A High-Resolution Study in Northern Germany***.** **Lukas Paul Loose**, U. Ulrich & N. Fohrer, Department of Hydrology and Water Resources Management, Institute for Natural Resource Conservation, Kiel University, Germany.
	OP1.1-2	04.00 - 04.15 PM *Evaluation of face masks to minimize the occupational inhalation exposure of pesticides to farm workers through gas chromatography***.** **Ganesan K,** Selvi C, Sangeetha S V and Murugan M. Tamil Nadu Agricultural University, Coimbatore , Tamil Nadu, India.
5	**OP1.1-3**	04.15 - 04.30 PM Enterobacter cloacae strain Isolated from Wastewater - a Potential Candidate for Formulation of Bioremediation Strategie. Honey Mol K. P., **Emmanuel Simon**, Supriya Radhakrishnan & Denoj Sebastian. Department of Life Sciences, University of Calicut, Malappuram, Kerala, India.
6	**OP1.1-4**	04.30 - 04.45 PM *Exposure to pesticide residues in the Environment and their impact on human Health in Western Odisha, India.* **Samikshya Mishra** and Malaya Ranjan Mahananda.Department of Environmental Sciences, Sambalpur University, Sambalpur, Odisha,India.
Oral Presentations Day1 (OP1) **Session 2 : 04.45 – 05.30 PM** Chairperson: Dr. Narendra Kumar , Åbo Akademi University, Turku/Åbo, Finland Co-Chairperson : Dr P.V. Vidya, Jubilee Mission Medical College & Research Institute,Thrissur,		
7	**OP1.2-5**	04.45 - 05.00 PM *A look down the drains: Spatiotemporal Dynamics and Ecological Risk of Estrogenic Endocrine Disrupting Chemicals in Gangetic Dolphin Habitats.*

		Ruchika Sah, Syed Ainul Hussain, Gautam Talukdar, Ruchi Badola" Wildlife Institute of India, Dehradun, Uttarakhand, India.
8	**OP1.2-6**	05.00 - 5.15 PM *Larvicidal activity of leaf extracts of Oroxylum indicum against Musca domestica.* **G. K. Tingre**, R.V. Kshirsagar, J. P. Sarwade, Department of zoology in Modern College of Arts, Science and Commerce, Ganeshkhind, Pune, Maharashtra,India.
9	**OP1.2-7**	05.15 - 05.30 PM *Adsorptive Removal of Pyrene by Magnetic Activated Carbon Nanocomposite: Mechanism, Kinetics and Isotherms.* **Rahul K. Yaji**, Vaishnavi Vinayak Gudigar, Vipna K. V., Tanya G., Johanna Pereira, B. ShivaniShenoy, Louella Concepta Goveas. NMAM Institute of Technology (NMAMIT), Karkala, Karnataka, India.
Day 2 : 8th November 2024 (Friday) Women Scientist Sessions		
Plenary Talk Day2 (PT2) 09.30 – 10.10 AM		
1	**PT2-1**	*9.30 - 10.10 AM* *Selected pesticides in use screened for toxicity and analyzed as inhibitors of human acetylcholinesterase and butyrylcholinesterase.* Zrinka Kovarik ,University of Zagreb, Institute for Medical Research and Occupational Health, Croatia.
Invited Talks Day2(IT2) 10.10 – 11.50 PM		
1	**IT2-1**	10.10 – 10.40 AM *Effect of ZSM-5 catalyst on product distribution of pyrolysis of PLA and PBAT/PLA blend.* **Khulud Alsouleman**, Technische Universität, Berlin, Germany.
2	**IT2-2**	10.40 – 11.10 AM *Analysis and remediation of additive chemicals in Food-grade Plastics.* **Garima Kaushik**, Central University of Rajasthan,Ajmer, Rajasthan, India.
Coffee/Tea Break : 11.10 – 11.20 AM		
3	**IT2-3**	11.20 – 11.50 AM *Green synthesized nano-silver as potent antifungal agent against agriculturally significant phytopathogenic fungi.* **Manasi Mishra,** School of Science and Environmental Studies, MIT World Peace University, Pune, Maharshtra, India.
Oral Presentations Day 2(OP2) Session 1 :11.50 – 12.50 PM Chairperson: Dr. Zrinka Kovarik, University of Zageb, IMROH, Croatia Co-Chairperson : Dr.Bhargavi, EPCET, Banglaore		
1	**OP2.1-1**	11.50 - 12.05 PM *Genotoxic Effects and Alterations in Antioxidant Systems Induced by Chlordecone in the Cichlid Fish, Etroplus maculatus (Bloch, 1795).* **P.V. Vidya** and Alex George. Jubilee Mission Medical College & Research Institute(JMMC&RI), Thrissur, Kerala, India.
2	**OP2.1-2**	12.05 - 12.20 PM *Photocatalytic activity of C, N and S doped SnO_2: Effective band gap engineering to increase the quantum efficiency and exploration of the change in the position of Fermi energy with dopant concentration and its influence on photoreactivity.* **Shyamala R**. and Gomathi Devi L. NMKRV college for women, Bangalore, Karnataka, India.
3	**OP2.1-3**	12.20 - 12.35 PM *Highly Hazardous Pesticides In India.* **C. K Heera** and A. D. Dileep Kumar , Pesticide Action Network (PAN) India, Thrissur, Kerala, India.

4	**OP2.1-4**	12.35 - 12.50 PM *An Ultrasensitive Electrochemical Detection of Nitrite using modified carbon paste electrode with Novel Polyaniline encapsulated CuO doped Magnetite.* **Roopa D. L** and RinkuKumari Solanki S . NMKRV college for women, Bangalore, Karnataka, India.
Lunch Break : 12.50 - 1.45 PM		
Oral Presentations Day 2 (OP2) Session 2: 01.45 – 03.30 PM Chairperson: Dr. Manasi Mishra, MIT World Peace University, Pune Co-Chairperson : Dr.Chandrakala V, Prosthodontist , KLE Dental Sciences & Hospital, Bangalore,		
5	**OP2.2-5**	01.45 - 02.00 PM *Thermodynamic Investigations and Reaction Kinetics of Ir(III)-Catalyzed α-Amino Acid Oxidation by HCF(III) in Aqueous Alkaline Medium.* Shakunj Rajput, Rajni Lasyal and **Savita Garg,** Government Degree College, Bhupatwala, Hardwar, Uttarakhand and East Point College of Engineering & Technology, Bangalore, Karnataka, India.
6	**OP2.2-6**	02.00 - 02.15 PM *Toxicity and environmental impact of paraphenylenediamine (PPD) in Oreochromis mossambicus (Peters, 1852)***.** **Koottasseri Amrutha**, Kumari Chidambaram Chitra,Endocrinology and Toxicology Laboratory, Department of Zoology, University of Calicut, Kerala, India.
7	**OP2.2-7**	02.15 - 02.30 PM *Hepatic biotransformation in climbing perch (Anabas testudineus) under environmental exposure to polystyrene microplastics.* **Reeha Mashirin** and Kumari Chidambaran Chitra,. Endocrinology and Toxicology Laboratory, Department of Zoology, University of Calicut, Kerala, India.
8	**OP2.2-8**	02.30 - 02.45 PM *Developing Ni-BDC Incorporated Polysulfone Membranes for the Efficient Removal of Pharmaceutical Pollutants from Water.* **Ramya. N**, Usha Nellur, Roopa .D.L, Mahesh Padaki,NMKRV college for women, Bangalore, Karnataka, India.
9	**OP2.2-9**	02.45 - 03.00 PM *The Concentration of Heavy Metals in Soil Samples and Vegetables Collected from inand around of Bangalore.* **Supradha N**, Madhushree K V, Rakesh B M[1],Shalini Meyyammai,Padmasree S[1], Sreenivasa Rao Amaraneni and Vidya S M.,The Oxford College of Engineering, Bangalore, Karnataka,India.
10	**OP2.2-10**	03.00 - 03.15 PM *Developing Fe_3O_4@pineapple peel extract (PPE) – Cu nanocomposite for waste water treatment.* **Nandana V.A**, Usha Nellur, Roopa D.L and Mahesh Padaki, NMKRV college for women, Bangalore, Karnataka, India.
11	**OP2.2-11**	*03.15 - 03.30 PM* *Adsorptive Removal of Pharmaceutically Active Compounds from Aqueous Environment using ZnO coated Invasive Weed Biochar***.** **Syeda Rabia Asma**, S. Rajkumar Reddy and Manjunath S.V, B.M.S College of engineering, Bangalore, Karnataka, India.
Coffee/Tea Break: 03.30 – 03.50 PM		
Oral Presentations Day 2 (OP2) Session 3 : 03.50 – 05.05 PM Chairperson:Dr.Garima Kaushik, Central University of Rajasthan,Ajmer, Rajasthan, India. Co-Chairperson : Prof.Shilpa Patil, EPCET, Bangalore.		
12	**OP2.3-12**	03.50 - 04.05 PM

		Porous and mesoporous materials for applications in desalination and removal of pesticides, pharmaceuticals and personal care products from Water. **Bhargavi Koneru** and Sreenivasa Rao Amaraneni, East Point College of Engineering & Technology, Bangalore, Karnataka, India.
13	**OP2.3-13**	4.05 - 4.20 PM *Green Synthesis, Characterization and Bioactivity Analysis of Eco-friendly Silver Nanoparticles Using Schefflera actinophylla Flowers.* Harishankar S. , Haripriya V. R. , Aswathy S. Nair , Rani V.S., Emmanuel Simon , **Supriya Radhakrishnan** . SVR NSS College, Vazhoor, Kerala, India.
14	**OP2.3-14**	4.20 - 04.35 PM *Nanotechnology in Pesticide Degradation: Mechanisms, Applications, and Environmental Implications***.** **A. Rose**, S. Rana, H. Pisupati, V. Vinod, N. Dova, S. Munjal, Multidisciplinary Research & Innovation Center, National Forensic Sciences University, Goa Campus, Ponda, Goa, India.
15	**OP2.3-15**	04.35 - 04.50 PM *Machine learning analysis for differential gene expression induced by pesticides for progression of parkinson's disease.* **Navya Ramachandran**, Bianca Maria Lewis, Apoorva Prashanth, Arun Kumar A & Sasmita Sabat , Department of Biotechnology, PES University, Bangalore, Karnataka, India.
16	**OP2.3-16**	04.50 - 05.05 PM *Evaluating the Environmental and Health Impacts of Chlorpyrifos : A Focus on Bioremediation Strategies.* Preethi Rajesh, **R.Evangeline Reshma**, Manisha Gopireddy , Garden City University, Bangalore, Karnataka, India.
Poster Presentations Day 2 (PP2) 05.05 – 05.30 PM		
1	**PP2-1**	*Analysis of Arsenic in Teeth due to Passive Smoking and Effect of Magnetite Iron-oxide Nanoparticles in its Removal: An In-vivo Study.* **Chandrakala V,** Prosthodontist , Dept. of Prosthodontics, KLE Dental Sciences & Hospital, Bangalore, Karnataka, India.
2	**PP2-2**	*Mitigating Pollution using Biosurfactants and Nanotechnology.* **Kavita.Y. Hiremath**, School of Life Science, Central University of Karnataka, Kalaburagi, Karnataka.
3	**PP2- 3**	*Comprehensive Assessment and Risk Analysis of Emerging Contaminants in Key Urban Areas of Karnataka, India.* **V.Divya** , and H.P. Shivaraju , Department of Environmental Science, JSS Academy of Higher Education & Research, Mysuru, India.
4	**PP2- 4**	*Validation of QuEChERS method for determination of organophosphorus residues in grapes using GC-FTD.* **C. Selvi**, M. Paramasivam K. Ganesan and K.Bhuvaneswari, Tamil Nadu Agricultural University, Coimbatore, India.
5	**PP2- 5**	*Contaminants in Conservation: Ecological impacts of Endocrine Disrupting Chemicals in Haiderpur Ramsar site.* **Kirti Rani,** Ruchika Sah, Pooja Choudhary, Samridhi Gururani, S.A Hussian, Ruchi Badola, Wildlife Institute of India, Dehradun, India.
6	**PP2 6**	*Emerging Endocrine Disrupting Chemicals in Fish: A Preliminary Assessment of Their Occurrence in the Upper Ganga River.* **Samridhi Gururani**, Ruchika Sah, Pooja Choudhary, Kirti Rani, S.A. Hussain, Ruchi Badola, Wildlife Institute of India, Dehradun, India.
7	**PP2-7**	*Quantification and Ecological Risk Assessment of estrogenic Plastic additives in a Tourist-influenced Nainital Lake.* **Pooja Chaudhary**, Ruchika Sah, Aishwarya Ramachandran, Syed Ainul Hussian, Ruchi Badola, Wildlife Institute of India, Dehradun, India.

Day 3 : 9th November 2024 (Saturday)		
Plenary Talk Day 3 (PT3) **0 9.30 – 11.10 AM**		
1	**PT3-1**	09.30 – 10.10 AM *Removal of pharmaceuticals from aqueous phase using catalytic materials: Catalyst synthesis, 23 hysic-chemical characterizations and reaction mechanism.* **Narendra Kumar** , Åbo Akademi University, Turku/Åbo, Finland.
Invited Talks Day 3(IT3) Time: 10.10 -12.50 PM		
2	**IT3-1**	10.10 – 10.40 AM *Exploring the Impact of Air Pollution on Genomic Stability and Public Health: Insights from Zagreb, Croatia.* **Goran Gajski**, Institute for Medical Research and Occupational Health,Division of Toxicology, Croatia.
3	**IT3-2**	10.40 – 11.10 AM *Novel Eco-friendly Surface Modification Technologies.* **Harish Barshilia**, Surface Engineering Division, CSIR-National Aerospace Laboratories, Bangalore, Karnatka, India.
Coffee/Tea Break :11.10 – 11.20 AM		
4	**IT3-3**	11.20 – 11.50 AM *Impact of Neonicotinoid Insecticide Exposure on the Survival and Foraging Activity of the Indian Honey Bee, Apis cerana.* **Murali Mohan.K**, Agricultural University, GKVK, .Bangalore .
5	**IT3-4**	11.50 -12.20 PM *nable alternatives to Single use plastics: where we are and future directions.* **D. Jeevan Prasad Reddy**, Department of Food Packaging Technology, CSIR- Central Food technological Research Institute, Mysore Karnataka, India.
6	**IT3-5**	12.20 – 12.50PM *Small molecule drug discovery and development*. **K. Narasimha Rao** , Senior Scientist, Aurigene Oncology Limited ,Bangalore ,Karnataka, India.
Lunch :12.50 – 01.45 PM		
Parallel Sessions		
Parallel Session 1 : Oral Presentations Day 3 (OP3) **Session 1 : 01.45 – 03.30 PM Room No: 2** **Chairperson: Dr. Murali Mohan.K, Agricultural University, GKVK, .Bangalore** **Co-Chairperson : Dr. Savita Garg ,EPCET, Bangalore**		
1	**OP3.1-1**	01.45 – 2.00 PM *Neurotoxic effects of carbamazepine, an antiepileptic drug, on the mosquitofish Gambusia affinis.* **John Nikhil**, Kumari Chidambaran Chitra . Endocrinology and Toxicology Laboratory, Department of Zoology, University of Calicut, Malappuram District, Kerala, India.
2	**OP3.1-2**	02.00 – 02.15 PM *Photocatalytic Degradation of Dye Pollutants and Pharmaceuticals overManganese-Doped Bismuth Molybdate (Mn-Bi2MoO6) Double-Layered Perovskite Nanomaterials.* **Amruth H D Gowda** and Srilakshmi Chilukoti. GITAM University, Bangalore, Karnataka, India.
3	**OP3.1-3**	2.15 – 02.30 PM *Biogenic Calcium Iron Oxide Nanocomposite: An exploration of pesticide photocatalytic degradation.* **Mayur Uday Karvekar**, Kalyan Raj,B.M.S College of Engineering, Bangalore, Karnataka, India.
4	**OP3.1-4**	02.30 – 02.45 PM *Generating a predictive model of human gut microbiome to degrade chlorpyrifos using cell designer tool to control parkinson's disease.* **Chaitra N T**, Arun Kumar A & Sasmita Sabat, PES University, Bangalore, India.
5	**OP3.1-5**	02.45 – 03.00 PM

		Valorization of Prosophis Juliflora biochar for adsorptive removal of emerging pollutants. **S. Rajkumar Reddy**, Syeda Rabia Asma , S.V Manjunath,B.M.S College of engineering, Bangalore, Karnataka, India.
6	**OP3.1-6**	03.00 - 03.15 PM *A System Biology Approach to Mitigate Risk for Parkinson's Disease in the Degradation of Cypermethrin Using CellDesigner by Lacticaseibacillus paracasei –A Human Gut Micrbiome.* **Tanush P Harish**, Sayim Ali Akabara, Anusha H V and Sasmita Sabat, PES University, , Bangalore, Karnataka, India.
7	**OP3.1-7**	03.15 – 03.30 PM *Advancements in Electrochemical Sensors: Nanotechnology-Driven Innovations for Enhanced Detection***.** **Shaikshavali M**, Sumiya Bhanu Shaik, Girish Victor Allu, Dova Nani, S. Munjal Multidisciplinary Research & Innovation Center, National Forensic Sciences University, Goa, India.
Parallel Session 2 : Oral Presentations Day 3 (OP3) Session 2: 01.45 – 03.45 PM Room No: 1 Chairperson:Dr.Jeevan Prasad Reddy.D, CFTIR, Mysore Co-Chairperson: Dr.Manjunatha.M, EPCET,Bangalore		
1	**OP3.2-8**	01.45 – 2.00 PM *Nano Janue-like N-doped ZnO bundles as efficient Photocatalysis for the removal of endocrine disruptor under Visible-light Irradiation.* G.A. Suganya Josephine, S. Rubesh Ashok Kumar, D. Vasvini Mary, **M. Prathap Kumar**, A. Sivasamy. MVJ College of Engineering, Bangalore, Karnataka, India.
2	**OP3.2-9**	02.00 – 02.15 PM *Herbicide use, public health, and environmental consequences in India.* **K. S Roshni** and A. D. Dileep Kumar. Pesticide Action Network (PAN) India, Thrissur, Kerala, India.
3	**OP3.2-10**	2.15 – 02.30 PM *Regulatory failures in pesticide management compromise public health and environmental wellbeing.* **A. D. Dileep Kumar**, Pesticide Action Network (PAN) India, Thrissur, Kerala, India.
4	**OP3.2-11**	02.30 – 02.45 PM *Assessment of Polychlorinated Biphenyls (PCBs) in ambient air and its health risk evaluation in an urban city, Bangalore, India.* **Thamaraikannan M**, Dhananjayan V, Ravichandran B, Jayanthi P , Raghavendra N , Jawahar S ,Mala A , Panjakumar K. ICMR-Regional Occupational Health Centre (Southern), Bangalore, India.
5	**OP3.2-12**	02.45 – 03.00 PM *Repurposing Bamboo Scraps as Carbon Adsorbents for Cephalexin Decontamination in Wastewater* Gautham Krishna1, Dushyanth V Babu R, **Harshitha V** . Jain deemed to be University, Bangalore, Karnataka, India .
6	**OP3.2-13**	03.00 - 03.15 PM *Assessment of Groundwater Quality in Bangalore Rural District: A Decadal Analysis.* Dimple Bahri, A. K. Dasarathy, Gautham Krishna, **Valentine Nyanchama**, Jain deemed to be University, Bangalore, Karnataka, India.
7	**OP3.2-14**	03.15 - 03.30 PM *Sources of noise pollution and effective measures for noise attenuation,* **Shankar Reddy,M**, Dasarathy, A, K, M. Tamil Selvi. , Ranjithkumar R, S.Ponkumar Ilango, Jain deemed to be university, Department of Civil Engineering, Jain deemed to be university, Bangalore, Karnataka, India.
8	**OP3.2-15**	03.30 – 03.45 PM *Mechanochemical Activation of Natural Bentonite for Producing Nanoporous Bentonite by using Ball Milling and Extrusion Processes for the Removal of Cationic Dyes from Wastewater.* **Neshat Moradi**, Narendra Kumar, Kari Eränen, Päivi Mäki-Arvela, Dmitry Murzin, Riitta. L. Keiski,

		Environmental and Chemical Engineering Research Unit, Faculty of Technology, University of Oulu, Oulu, Finland.

03.45 -04.00 PM
IUPAC: Brief Presentation about International Union of Pure And Applied Chemistry(IUPAC) by Prof. Arunan.E,, Indian Institute of Science Bangalore, Karnataka, India.

High Coffee/Tea

Valedictory, Certificate Distribution. Time: 04.00 – 04.45 PM

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Plenary Talks (PT)

Plenary Talks (PT)

PT1-1

NAVIGATING EMERGING CONTAMINANTS: KEY MONITORING, HEALTH EFFECTS, AND FUTURE CHALLENGES

C.T. Aravindakumar
School of Environmental Sciences
Mahatma Gandhi University, Kottayam 686560, Kerala

ABSTRACT

The quest for comfort, convenience, and profit has undeniably propelled human progress throughout history, with early advancements closely linked to fundamental needs. However, the Industrial Revolution marked a dramatic shift, ushering in rapid technological and industrial developments that came at a significant environmental cost. This growth disrupted natural balances, leading to substantial ecological degradation. We saw destabilized food chains, shifts in the Earth's radiation budget, and imbalances in carbon cycles as direct consequences. In response, the ideas of the Anthropocene and sustainable development have gained traction, becoming central themes in conversations about progress and environmental responsibility. Climate change mitigation has become a vital aspect of everyday life, prompting the introduction of numerous environmental regulations worldwide in the latter half of the twentieth century, fuelled by a growing recognition of the damaging effects of human activities.

Despite advancements in science and technology, the emergence of new pollutants remains a serious challenge. Recent years have seen the rise of next-generation chemical contaminants, posing a quiet yet profound threat to our ecosystems and disrupting the fragile balance that sustains life. These substances, often unregulated and inadequately understood, infiltrate our soil, water, and air, creating a cacophony of imbalance that drowns out the natural harmony. From microplastics to pharmaceuticals, each pollutant adds to a growing dissonance that impacts wildlife, plants, and human health alike. As we witness declines in species and the degradation of habitats, we are reminded of the intricate connections that link us to the natural world. The once-echoing balance of our environment is fading, urging us to tackle this crisis with urgency and creativity before the melodies of nature are lost forever.

The key aspects of monitoring of emerging contaminants in natural ecosystem and molecular insight of pollutant-protein interactions leading to the understanding of the health impact, will be discussed in this presentation. Understanding these interactions is vital for assessing the health impacts of ECs. Humans are constantly exposed to low concentrations of environmental contaminants, originating from both natural and anthropogenic sources. Key pollutants of global concern include bisphenols,

microplastics, mycotoxins, heavy metals, pesticides, flame retardants, BTEX compounds related to oil, and pharmaceuticals and personal care products (PPCPs).

The analysis of these polar and non-polar pollutants and their metabolites in environmental and biological contexts has become increasingly important for environmental monitoring and medical diagnostics. Effective analysis techniques must be precise, sensitive, rapid, robust, and time-efficient. Currently, electrospray ionization mass spectrometry coupled with ultra-high performance liquid chromatography (UPLC-ESI-MS/MS) is favored for polar emerging contaminants, meeting many of these criteria. High-resolution mass spectrometry, combined with low-energy collisionally induced dissociation (CID), significantly enhances our understanding of molecular structures. The reliability of compound identification can be further improved through theoretical calculations using density functional theory (DFT) and techniques like energy-resolved mass spectrometry (ERMS). However, non-target analysis remains challenging, particularly when identifying unknown compounds.

The immediate toxic effects of emerging contaminants (ECs) on humans often manifest through conformational changes and aggregation of protein molecules. When ECs bind to proteins, they disrupt the proteins' structure and function, leading to toxic consequences. To comprehend the toxicological implications of these chemicals, it is essential to investigate their interactions with biological macromolecules, particularly proteins. Our research focuses on model compounds such as serum albumins (SAs), specifically bovine serum albumin (BSA) and human serum albumin (HSA). Our findings indicate that all selected ECs can induce protein aggregation in SAs. Nanoscale morphological characterization using atomic force microscopy (AFM) reveals various aggregation pathways, leading to the formation of protein aggregates such as oligomers, fibrils, and amorphous aggregates, reminiscent of those found in protein aggregation disorders.

Raman spectroscopic analysis has provided insights into the secondary structural characteristics of these protein aggregates, which predominantly exhibit an abundance of antiparallel β-sheet fractions, indicative of their toxicity. Additionally, steady-state fluorescence, time-resolved fluorescence, and UV-vis absorbance studies have confirmed the binding interactions between selected ECs and SAs. Understanding these interactions is critical for elucidating the mechanisms of EC action in humans and animals, which can inform further toxicological research, the development of detoxification strategies, and the identification of biomarkers related to these pollutants.

PT1-2

50 YEARS OF EPA PRIORITY PAHS – DO WE STILL NEED THEM?

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ABSTRACT

Polycyclic aromatic hydrocarbons (PAH) are among the most widely investigated and monitored compounds in the environment. Much work is centered on a list of 16 PAHs as priority pollutants that was introduced by the Environmental Protection Agency (EPA) in 1976 to monitor the quality of U.S. waterways. However, since then this compilation of PAHs has become the standard even for toxicological assessments of environmental samples, a task for which it was never intended and is not particularly well suited: several highly toxic PAHs are not on the list, and several on the list are not highly toxic.The knowledge of PACs in the environment has grown enormously since the 1970s, and this is reflected in other selections of PAHs that are now also used for regulatory purposes, i.e. in the U.S. Clean Water Act and in the 15+1 PAHs for food analysis of the European Commission. However, the original EPA list remains extensively used by many scientists as if it were a code of best practice. A scientific discussion on whether one set of compounds can answer the needs in all areas of investigation or whether different sets would be more to the point is ongoing. Adding more relevant compounds may represent a cautious start. Such compounds should belong to PAH classes so far not represented, i.e. larger compounds, heterocyclic aromatic compounds and substituted PAHs and they should be of well-recognized carcinogenicity.A strong case can be made for including several isomers of the dibenzopyrenes. They frequently are found in environmental samples and some of them are known to be much stronger carcinogens that benzo[*a*]pyrene. Likewise, benzo[*c*]30luorine is estimated to show a carcinogenicity 20 times more strongly than benzo[*a*]pyrene, yet is rather unfrequently analyzed.Besides the toxicity, other factors should also be considered before deciding on an extension of a mandated list. Analyzability is among them and so is the bioavailability that strongly influences the relative amount of a compound that an organism actually takes up from the sample and thus exerts an adverse health effect. These points will be discussed and concrete examples given. No consensus has been reached yet so that various opinions would be highly welcome.

PT1-3

PESTICIDE USAGE AND THE IMPACT ON HUMAN HEALTH AND THE ENVIRONMENT.

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ABSTRACT

Pesticides are a broad chemical grouping that includes herbicides, insecticides, and fungicides, that are used to kill, repel, or control certain forms of plant or animal life. Pesticides are a necessity for economically viable food production, in orderto prevent disease and infestation of crops. Global pesticide usage has increased year-on-year, but the somewhat indiscriminate use of pesticides has led to their ineffectual application, the emergence of pesticide-resistant insects, and undesired pollution of soil, water, and air. Organophosphates (OPs) and carbamates are widely employed insecticides that share a common mechanism of action through the targeted inhibition of acetylcholinesterase (AChE) within synapses, triggering cholinergic toxicity and pest paralysis. However, pesticide exposures and poisonings from OPs and carbamates do not completely align with cholinergic toxicity, indicative that these pesticides have additional mechanisms oftoxicity including non-target effects. We have studied off-target effects in vitro and in vivo and identified a panel of proteins differentially adducted by OP pesticides, for which the structure-activity relationships and mechanisms of toxicity differ from those for AChE adduction. These off-target effects in humans may contribute to acute and chronic ill-health and provide a means of biomonitoring exposures. Collectively, there are a number of recommendations that could be consideredto reduce the use of toxic pesticidesand their potential impact on human health and the environment.

PT2-1

SELECTED PESTICIDES IN USE SCREENED FOR TOXICITY AND ANALYZED AS INHIBITORS OF HUMAN ACETYLCHOLINESTERASE AND BUTYRYLCHOLINESTERASE

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ABSTRACT

The main action mechanism of organophosphorus compounds (OP) is the inhibition of acetylcholinesterase (AChE) that causes the accumulation of the neurotransmitter acetylcholine leading to the paralysis of cholinergic synaptic transmission. Although BChE is generally considered as having no natural physiological function, the most likely function for BChE is as backup for AChE and protection of synaptic AChE from man-made and naturally occurring poisons. Our findings offer a valuable kinetic data on inhibition of both cholinesterases with OP pesticides and reactivation of inhibited AChE. Although structure of pesticides governs inhibition specificity and selectivity, similarly as for the reactivation process, it was clearly showed that pesticides ethoprophos, fenamiphos, methamidophos and phosalone inhibited both enzymes, while ethoprophos and fenamiphos displayed higher potency. Our results show that methamidophos-inhibited AChE was more susceptible to reactivation by selected oximes than AChE inhibited by fenamiphos. Further on, based mainly on the structural similarity with inhibitors of AChE, we selected a dozen of commercial herbicides for *in vitro* biological tests, and reported that anilofos and flufenacet were the most potent inhibitors of AChE (25 μM) and BChE (6.4 μM), respectively. Oxadiazon, tembotrione and terbuthylazine were poor inhibitors with an estimated IC_{50} above 100 μM. It is worth pointing out that OP herbicides - anilofos, bensulide and piperophos inhibited both cholinesterases through a network of non-covalent and covalent interactions, while butamifos inhibited only with covalent binding to the catalytic serine. Our focus was also glyphosate, known as a weak cholinesterase inhibitor in fish and mammals, but without conclusive data concerning the inhibition of human AChE and BChE. Our results showed a slight binding preference for BChE but inhibition was exhibited only in a high concentration range. In other words, it appears that environmental exposure to glyphosate does not inhibit human AChE and BChE, and our results are in line with studies reporting that its neurotoxic effect is not primarily linked to the cholinergic system. In conclusion, these findings along with the observed cytotoxicity on neuronal and hepatic cells give insight into the potential toxic effects of herbicides in use and can be used in the development of novel pesticides with less deleterious effects to humans and the environment. Supported by the European Regional Development Fund (KK.01.1.1.02.0007), Next Generation EU (BioMolTox project), and Croatian Science Foundation (IP-2022-10-6685).
Keywords: cholinesterase; herbicide; neurotoxicity; organophosphorus compounds; pesticide

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PT3-1

MECHANOCHEMICAL ACTIVATION OF NATURAL BENTONITE FOR PRODUCING NANOPOROUS BENTONITE BY USING BALL MILLING AND EXTRUSION PROCESSES FOR THE REMOVAL OF CATIONIC DYES FROM WASTEWATER

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ABSTRACT

Industries utilizing dyes, including textile, paper, plastic, and food sectors, are among the largest producers of wastewater. The textile industry alone discharges approximately 100 tons of dyes into water streams annually. This discharge of polluted water with dyes causes significant risks to the health of local residents, environment, fertile lands and ecosystems. Therefore, effective treatment wastewater contaminated with dyes is a top priority. Adsorption is a highly efficient method for color removal due to its cost-effectiveness, simplicity, and resistance to toxic substances. Natural bentonite is widely used as an adsorbent because of its excellent efficiency in removing organic compounds. However, synthetic dyes cannot be efficiently removed by natural bentonite, necessitating the improvement of low-grade bentonites through activation, a common practice in the bentonite industry. The aim of this research is to develop a method for activating sodium bentonite with an alkali solution and to use extrusion and ball milling techniques to evaluate the effects of mechanochemical activation on the efficiency and rate of dye removal from wastewater. Activation parameters such as soda and moisture contents, aging time, and temperature during the extrusion process, along with time, rotational speed, and ball-to-powder mass ratio during the ball milling process, will be analyzed using response surface methodology (RSM). The significance of these independent variables and their interactions will be tested by blending the obtained powder with dye-containing wastewater and evaluating adsorption via spectrometry. As changes in the properties of activated bentonite are reflected in the extrusion and ball milling processes, controlling the processing factors is crucial for optimizing the product properties.

Keywords: Bentonite, Alkali activation, Extrusion, Ball milling, Dyes, Wastewater.

Fig.1. ***SEM analysis of (a) Natural bentonite, (b) Activated bentonite.***

INVITED TALKS (IT)

INVITED TALKS (IT)

IT1-1

KISAN KAVACH: ANTI-PESTICIDE SUIT FOR FARMERS TO PROTECT PREVENT PESTICIDE-INDUCED TOXICITY AND LETHALITY

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ABSTRACT

Our lab is focusing on clinical translational research through biomaterials and chemical biology programs. By using chemical design tools, we have been developing therapeutic and prophylactic technologies for medical applications. For example, in this talk a few examples will be discussed in detail. We will discuss about developing prophylactic technologies to prevent pesticide-induced toxicity and lethality that is prevalent in farmers in India and developing countries. Furthermore,we will discuss how our efforts in drug discovery and drug delivery areasto develop innovative technologies that will have enormous clinical implication. Overall, we will see a snapshot of various technologies that could be developed in the lab, and translated into the clinic/market.

IT1-2

WIDESPREAD OCCURRENCE OF PESTICIDES IN INDIA: ENVIRONMENTAL ACCUMULATION AND ITS IMPACT ON WILDLIFE AND HUMAN HEALTH

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ABSTRACT

India ranks among the highest in global pesticide use, relying on various chemical pesticide groups for agriculture and public health, despite bans in many countries. This dependence has resulted in severe environmental contamination and bioaccumulation, posing significant risks toboth wildlife and human health. Pesticides persist in the environment, accumulating in soil and biota, and bio-magnifying through the food chain. High levels of pesticide residues in agricultural areas contaminate fish and aquatic organisms. Studies have shown significant concentrations of organochlorines in marine and inland fish species, which present dietary risks to humans. When pesticide residues exceed maximum residue limits (MRLs) and acceptable daily intake (ADI) standards, they can lead to chronic health issues such as endocrine disruption and carcinogenesis. Terrestrial wildlife, particularly vultures, is also affected, suffering from reproductive failures and population declines, especially among those that feed on contaminated carcasses. Research on raptorial birds has revealed high levels of DDT, which cause eggshell thinning and contribute to population collapse. Smaller bird species, such as sparrows, also accumulate organochlorines, which are assumed to correlate with population declines in agricultural regions. Occupational pesticide exposure poses significant risks for vulnerable populations, including agricultural workers, women, and children. These groups are frequently exposed through inhalation, dermal contact, and ingestion, leading to elevated levels of pesticide metabolites in blood and urine, indicating exposure. Cholinesterase inhibition is commonly documented among agricultural workers, resulting in neurotoxicity. Women working in tea plantations and floriculture are particularly vulnerable, exhibiting increased DNA damage and altered biochemical changes in blood. These findings highlight the urgent need for stringent pesticide regulations and monitoring in India. Implementing alternative pest management strategies, such as integrated pest management (IPM), along with increased use of personal protective equipment (PPE) among agricultural workers, is crucial. The impacts of pesticides on environment, fish and wildlife and the human health risks associated pesticides exposure necessitate robust regulatory frameworks and effective remediation strategies to protect public health and the environment from the long-term consequences of pesticide exposure.

Keywords: Pesticide exposure, bioaccumulation, wildlife, dietary intake, occupational exposure,vulnerable groups, biomarkers, DNA damage, remediation.

IT1-3
NATURE BASED SOLUTIONS FOR REJUVENATION OF LAKES: INSIGHTS FROM THE SUCCESS STORY OF JAKKUR LAKE.

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Wetlands include a wide range of aquatic habitats such as marsh, fen, peat land/open water, estuaries, flowing water (rivers and streams), or static (lakes and ponds). These ecosystems being the transition zone between land and water, are ecologically important in relation to the stability and biodiversity of a region and in terms of energy and material flow, evident from the recharge of groundwater aquifers and stabilization of shorelines. These ecotonal regions are repositories of rich biodiversity and support the food chain while performing a vital function of uptake of nutrients and bioremediation of heavy metals, volatile organics, and other xenobiotic compounds and are aptly known as "Kidneys of the landscape." Wetlands act as giant sponges, which help to retard runoff, lower flood heights, and reduce shoreline and stream bank erosion. The functional ability of wetlands depends on the type of trophic structure and material exchange. Algae, the primary producers, synthesize carbohydrates during photosynthesis and give out oxygen and produce other essential metabolites. The bulk of the CO_2 gets sequestered into algal biomass in these wetlands systems that aid in combating global warming through reductions of GHG (Greenhouse gases) in the environment. However, the functional aspects of wetlands are tied to the trade-off between the ecosystem function and anthropogenic impacts, including encroachment, altering the catchment (changes in land cover), solid waste disposal in lake beds, the sustained inflow of untreated sewage from the neighborhood, etc.

Jakkur Lake was constructed about 200 years ago to meet the domestic and irrigation water requirement of Jakkur village, Bangalore urban district, throughout the year and has been a source of livelihood to farmers, fishing, and dhobi (laundry) communities. During potential fish growing seasons, fish catch crosses 500 kgs per day. Twelve to fifteen dhobi (washermen) families depend on the lake for washing cloth daily. In the command area of the lake, agriculture and horticulture (coconut, banana, and mango plantations) have been practiced, and remnants of these plantations are present even today in the region. Rapid urbanization leading to large-scale land use changes has increased paved surfaces and declined groundwater recharge.

Lake was rejuvenated in 2010 with the removal of accumulated silt (desilting) and implemented integrated wetland system consisting of a secondary sewage treatment plant (STP), constructed wetlands, and algal ponds. Treated water from the integrated wetland system reaches the lake after final polishing (consisting of floating wetland species).

Conventional wastewater treatment options are energy and capital-intensive, apart from their inability to remove nutrients altogether and generate concentrated waste streams necessitating environmentally sound disposal. Compared to this, an integrated wetland system (figure 1) would help in the cost-effective tertiary treatment (removal of N, P, and heavy metals), which prevents contamination of lake water and groundwater resources. Algae grow rapidly and uptakes nutrients (C, N, and P) available in the wastewater. Algae convert nitrate into organic compounds (proteins, lipids) through photosynthesis. Algae exhibit higher growth rates than other plants due to their extraordinarily efficient light and nutrient utilization. Algal bacterial symbiosis is very effective as algae generate O_2 (during photosynthesis), which aids in the efficient oxidation of organic matter with the help of the chemo-organotrophic bacteria and provides algae with an enriched supply of CO_2, minerals, and nutrients.

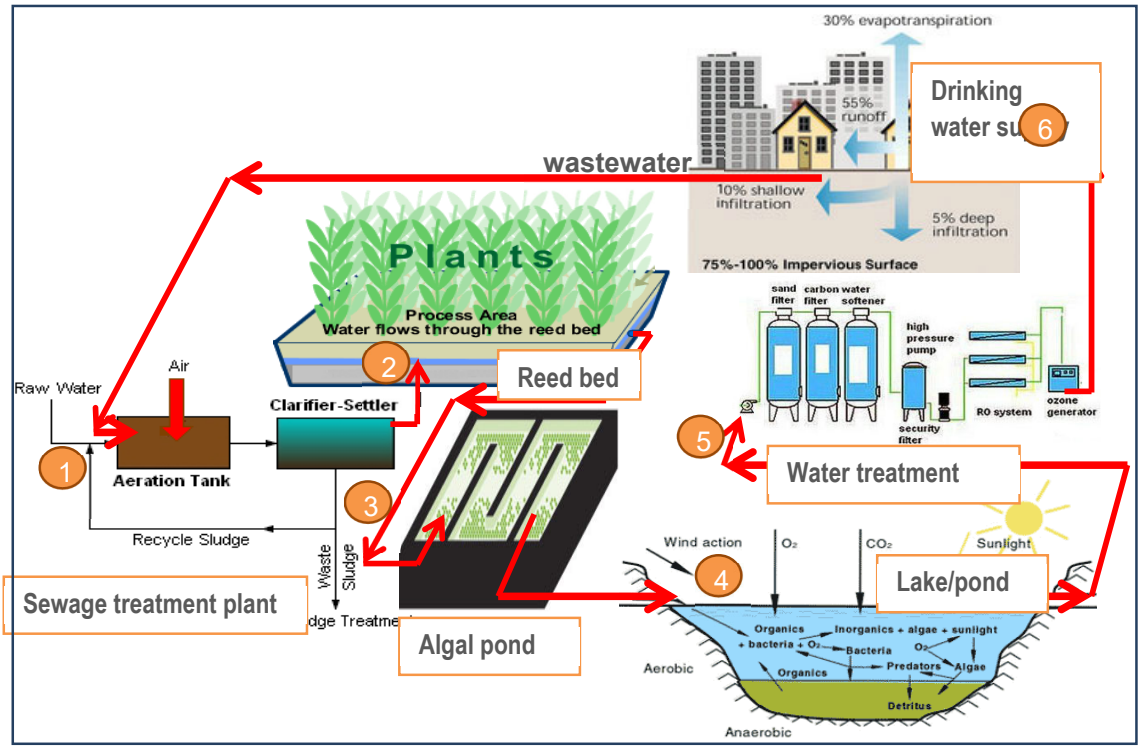

Figure 1. Integrated wetland system

The integrated wetland system (1.6 Ha) consists of Upflow Anaerobic Sludge Blanket Reactor (UASB) with an extended aeration system for 10 MLD sewage treatment. Treated effluent then gets into wetlands (settling basin) of spatial extent ~4.63 hectares consisting of diverse macrophytes such as *Typha* sp., *Cyperus* sp., *Ludwigia* sp., *Alternanthera* sp., Water hyacinth sp., etc., in the shallow region (with an area of ~1.8 hectares) followed by deeper algal basin (covering an area of about 2.8 hectares). This system with macrophytes and algae jointly helps in nutrient removal and wastewater remediation. The water from the settling basin through sluices (with moderate flow) flows into Jakkur Lake, which spans over 45 hectares. There was notably less occurrence of floating macrophytes, except near the outfalls (~0.5 Ha) due to blockage of the outflow channels by solid wastes and debris. Local fishermen

are managing these macrophytes. The clear water in Jakkur Lake, with abundant phytoplankton diversity in acceptable densities, indicates a healthy trophic status.

Integration of the conventional treatment system with the constructed wetlands and the algal pond has helped cost-effectively remove nutrients and chemical ions. Emergent macrophytes (such as typha) act as a filter to remove suspended matter and avoid anaerobic conditions by the root zone oxidation and algae taking the dissolved nutrients. Four to five days of residence time helps remove pathogens apart from nutrients. However, the integrated system requires regular maintenance through harvesting macrophytes and algae (from algal ponds). Harvested algae would have energy value, which could be used for biofuel production. The nutrient analysis highlights nutrient removal by wetlands due to macrophytes and algae, which removes 77 % COD, ~90 % BOD, ~33 % NO_3-N, and ~75 % PO_4^{3-}P. The first stage comprising of emergent vegetation and an algal pond, removes ~45% COD, ~66 % BOD, ~33 % NO_3-N, and ~40 % PO_4^{3-}P. Jakkur Lake aids in the final level of treatment and removes ~ 32 % COD, ~23% BOD, ~ 0.3 % NO_3-N, and ~34 % PO_4^{3-}P. The combination of all the stages leads to the complete removal of nutrients to acceptable levels according to CPCB norms. The algal species primarily comprised of Chlorophyceae, followed by Cyanophyceae, Eugelnophyceae, and Bacillariophyceae. The macrophytes in the wetland area and at the outfalls of the lake, include *Typha augustata* species (54%) followed by *Alternanthera philoxeroides* (28%). Floating macrophytes *Eicchornia crassipes* (84%) were restricted to the outlet reaches. A nominal residence time (~5 days) would help remove pathogens apart from nutrients. However, this system requires regular maintenance of harvesting macrophytes and algae (from algal ponds). Harvested algae would have energy value, which could be used for biofuel production. Biomass productivity is ~122 mg/l/d and lipid productivity ~32 mg/l/d. Gas chromatography and mass spectrometry (GC-MS) analysis of the fatty acid methyl esters (FAME) showed a higher content of desirable fatty acids (biofuel properties) with major contributions from saturates such as palmitic acid [C16:0; ~40%], stearic acid [C18:0; ~34%] followed by unsaturated such as oleic acid [C18:1(9); ~10%] and linoleic acid [C18:2(9,12); ~5%]. This study provided vital insights into the environmentally sound option of managing wastewater while addressing the water crisis due to unscientific and chaotic urbanisation in Bangalore. Replication of this model in Bangalore would help meet the water demand and also helps in recharging groundwater sources without any contamination. Measures required to mitigate the water crisis in burgeoning Bangalore are:

1. Rainwater harvesting at decentralized levels through rejuvenated lakes addresses the water crisis as it helps harvest 15 TMC of rainwater generated in the Bangalore catchment.
2. Rejuvenation and restoration of existing lakes are necessary to decontaminate water bodies due to the sustained inflow of untreated wastewater. Removing deposited silt would aid in eliminating nutrient-rich silt (which is useful for enriching croplands) apart from enhancing the storage capacity.
3. An integrated wetlands ecosystem consisting of constructed wetlands and algal pond helps treat wastewater through bioremediation. Replicating the Jakkur wetland ecosystem would help treat water and reuse it. Rejuvenating lakes will have the added advantage of maintaining groundwater quality in the vicinity.

The integrated wetland system at Jakkur provides an opportunity to assess treatment efficacy apart from providing insights for replicating similar systems to address the impending water scarcity in the rapidly urbanizing Bangalore.

IT2-1

EFFECT OF ZSM-5 CATALYST ON PRODUCT DISTRIBUTION OF PYROLYSIS OF PLA AND PBAT/PLA BLEND

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ABSTRACT

The continuous increasing demands of plastic products in our anthropogenic societies due to their versatile application, have created global challenges related to accumulation of these wastes. So far, it is uncertain that the biodegradable plastic BPs can be a complete substitute for conventional plastics (1). Different studies showed that even biodegradable polymers can contaminate our environment in different ways (2)(3). Therefore, an enormous demand for further characterization of biodegradable plastics and optimisation of their recycling process treatment is required.
In this study, analytical pyrolysis hyphenated with gas chromatograph/mass spectrometry (Py-GC/MS) and FTIR spectroscopy were used to assess the resource recovery potential of two biodegradable plastic (bio-based (PLA) and petroleum-based (PBAT-PLA) blend) bags in addition to the efficiency of the of the ZSM-5 catalyst on the composition of the pyrolysates. The main products were assigned to acetaldehyde and 1,4-Dioxane-2,5-dione, 3,6-dimethyl- (D-, L-lactide-). While the compound distribution in the PBAT- PLA blend pyrolysate, approved the dominance of polymeric bond cleavage as the main thermal composition pathway in pyrolysis of PBAT (not radical reactions). Also, the (GC–MS) analysis showed that oil product primarily contained gasoline (C6–C12) range hydrocarbons which proved the excellent high selectivity of ZSM- towards gasoline range fraction of these plastics.
Keywords: PLA; PBAT/PLA Blend; Catalytic Fast Pyrolysis; Py-GC/MS; ZSM-5

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IT2-2

ANALYSIS AND REMEDIATION OF ADDITIVE CHEMICALS IN FOOD-GRADE PLASTICS

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ABSTRACT

Bisphenol A (BPA) is commonly added to polycarbonate plastics to enhance their strength and is found in items like drinking bottles, cups, food cans, infant bottles, packaging, cutlery, dishes, and various consumer products. Concerns arise when BPA and similar additives leach from these containers into food, posing potential health risks. This highlights the need to evaluate the safety of food and beverage storage materials. This study measures BPA levels in everyday food-grade plastic containers and assesses its toxicity in environmental samples contaminated by BPA leachates. BPA was extracted from food-grade plastics and quantified using UV-Vis spectrophotometry. The toxicity of *Rhizobium* and *Chlorella* sp. was then evaluated. The highest concentration of BPA was detected in black poly bags (42.78 ppm), followed by slice juice bottles and infant milk bottles. Toxicity tests significantly affected *Rhizobium* and *Chlorella species*, representing soil and aquatic environments. Two potential bacterial strains, *Brucella sp.* and *Brevibacillus parabrevis*, were isolated from a municipal dumping site and used to biodegrade BPA. Qualitative and quantitative analyses of biodegraded BPA using U-HPLC and GC-MSMS revealed various BPA metabolites. The findings suggest that these native bacterial strains are promising strains for BPA degradation, transforming it into a less toxic form. The study also highlights the risks associated with food-grade plastic containers and recommends developing sustainable methods for managing plastic waste.

Keywords: Biodegradation, Bisphenol A, *Chlorella sp.*, Food-grade Plastics, *Rhizobium*, Toxicity

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IT2-3

GREEN SYNTHESIZED NANO-SILVER AS POTENT ANTIFUNGAL AGENT AGAINST AGRICULTURALLY SIGNIFICANT PHYTOPATHOGENIC FUNGI

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Abstract

Biosynthesis of nanoparticles using natural extracts is gaining attention because of its cost-effectiveness, eco-friendly approach and unique biological properties. In this study, we report eco-friendly and cost-effective synthesis of silver nanoparticles using the aqueous leaf extract of *Clitoria ternatea* and the evaluation of its broad-spectrum antifungal activity for potential applications in agriculture. The biosynthesized *C. ternatea* silver nanoparticles (Ag/Ag2O NPs) were characterized using UV-visible spectroscopy, Fourier transform infrared (FTIR) spectroscopy, X-ray diffraction, dynamic light scattering (DLS), Scanning electron microscopy (FE-SEM) and Zeta potential. AgNPs were evaluated for their fungicidal action against important fungal pathogens of plants, namely *Botrytis cinerea*, *Sclerotium rolfsii* and *Fusarium oxysporum*. AgNPs showed absorbance peak at 425 nm and spherical shapes of 24-44 nm in SEM. The biosynthesized nanoparticles showed dosage-dependent (2.5%, 5% and 10% AgNPs) inhibition activity on the growth of all phytopathogenic fungi used in the study with a significant reduction in the fungal disc diameter representing growth. 10% AgNPs exhibited significant antifungal activity against *B. cinerea* (80%), *S. rolfsii* (70.58%) and *F. oxysporum* (30%). FE-SEM analysis of the *B. cinerea* treated with AgNPs showed severe deformations of cell membrane and cell wall revealing the mechanism of action. This work affirms that the biosynthesized silver nanoparticles using *C. ternatea* leaf extract were associated with significant antifungal activity against various phytopathogenic fungi and therefore can be further exploited as potential candidate for effective biocontrol of plant pathogens in agriculture. We gauge the potential of biogenic nano silver for enhanced applications in agriculture as bio fungicides.

Keywords: Antifungal, *Clitoria ternatea*, Green synthesis, Nanosilver, Silver nanoparticles

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IT3-1

EXPLORING THE IMPACT OF AIR POLLUTION ON GENOMIC STABILITY AND PUBLIC HEALTH: INSIGHTS FROM ZAGREB, CROATIA

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ABSTRACT

Air pollution stands out as a significant concern in both environmental and public health domains, acknowledged by prominent global authorities as a risk factor associated with adverse health outcomes. Air pollution can alter DNA molecules and consequently affect human health in either ambient or occupational settings. Exposure to diverse air pollutants has been associated with the development of cardiovascular and respiratory diseases, premature mortality, and the onset of cancer. By mitigating air pollution levels, nations can alleviate the disease burden stemming from conditions like stroke, heart disease, lung cancer, and both chronic and acute respiratory ailments such as asthma. Therefore, we aimed to investigate how air pollution might trigger genomic instability and subsequently affect our well-being by exploring potential associations between air pollutants and biomarkers of exposure and effects. We initially conducted a retrospective evaluation of genomic instability in the general population (N=130) residing in Zagreb, Croatia. We associated these genomic instabilities measured in blood with the comet and micronucleus assays with air pollution levels from 2011 to 2015. No substantial positive associations were observed among the assayed parameters. Our findings also indicated that the measured air pollution parameters mostly remained within regulatory limits, except for B[a]P. Subsequently, we investigated the potential effects of air pollution and BTEX (benzene, toluene, ethylbenzene, o-, m-, and p-xylene) exposure on genomic instability. This involved employing comet and micronucleus assays on blood cells from the general population (N=60) in Zagreb, Croatia, during colder and warmer periods from 2021 to 2022. While all measured outdoor air pollutants aligned with previously reported values and stayed below regulatory limits, PM_{10} particles and B[a]P bound to PM_{10} exceeded these thresholds. Nonetheless, we did not observe a noteworthy impact of air pollution on the cytogenetic biomarkers tested. Given the transboundary nature of air pollution, our findings could hold significance at a regional level. Considering air pollution's profound implications for public health and its site-specific nature, further research employing various biomarkers of exposure and effect is warranted. Such an approach would aid in refining models to more accurately predict the health effects of air pollution on human populations. *Supported by the Croatian Science Foundation (HUMNap).*

Keywords: Air quality, Blood cells, Chromosomal damage, DNA damage, Human population

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IT3-2

NOVEL ECO-FRIENDLY SURFACE MODIFICATION TECHNOLOGIES

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ABSTRACT

In recent years, surface coatings have assumed a greater importance in the field of materials technology, particularly in the aerospace, engineering, missile and manufacturing applications. Surface coatings enable enhancing the performance of the materials at affordable cost to induce functional properties such as corrosion and wear, which otherwise cannot be provided by the substrate materials. The service life of the aerospace /engineering components can be enhanced significantly by employing external coatings or surface treatment on the engineering materials. Conventionally, a large number of electrochemical treatments / coatings have been used for enhancing wear and corrosion of aerospace /engineering components. These processes are hazardous to human health as well as environment. As per NASF forecast the aircraft industry is mandated to phase out all chemical processes which are not environment friendly by 2026. Towards these goals, in recent years, a large number of eco-friendly coating processes have been developed at CSIR-NAL at pilot plant scale. Some of these processes have been certified by certification agencies and efforts are currently underway for possible transfer of technology. This talk will provide an overview of these new eco-friendly coating processes suitable for manufacturing in aerospace, defence and engineering sectors.

IT3-3

IMPACT OF NEONICOTINOID INSECTICIDE EXPOSURE ON THE SURVIVAL AND FORAGING ACTIVITY OF THE INDIAN HONEY BEE, *APIS CERANA*

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ABSTRACT

Honey bees, essential pollinators for a wide range of important crops, are currently at risk from exposure to neonicotinoid insecticides. In this study we assessed the impact of two most commonly used neonicotinoid insecticides *viz.,* imidacloprid and thiamethoxam on *Apis cerana* F. using a controlled feeding technique atfour different doses (15 ng/bee, 30 ng/bee, 60 ng/bee and 120 ng/bee). Mortality rates were recorded at intervals of 4, 8, 18, 24 and 48 hours following insecticide exposure. At 18 hours, a 60 ng/bee dose of imidacloprid and thiamethoxam resulted in 43.75% and 51.25% mortality, respectively, while an 8-hour exposure to a 120 ng/bee dose led to 52.5% and 46.25% mortality. Higher insecticide doses correlated with increased mortality, whereas lower doses had minimal impacts initially. However, prolonged exposure to even low doses resulted in adverse effects like trembling and lack of coordination in bees. Furthermore, significant differences in toxicity were also observed between the insecticides at the 60 ng/bee dosage over various exposure times. Field studies carried out on foraging bees also demonstrated that even exposure to small doses of neonicotinoid insecticides negatively impact the foraging behavior in honey bees. Overall, these findings underscore the need to address the harmful effects of neonicotinoids on honey bees, impacting both mortality and behavior, especially with extended exposure.

Keywords: Beetoxicity**;** neonicotinoids; imidacloprid; thiamethoxam; foraging behaviour;*Apis cerana*

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IT3-4

SUSTAINABLE ALTERNATIVES TO SINGLE USE PLASTICS: WHERE WE ARE AND FUTURE DIRECTIONS.

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ABSTRACT

One of the primary concerns of the 21st century is the environment—raising awareness on pollution created by synthetic, non-renewable materials and a shift towards developing eco-friendly materials. The first revolution by plastics, such as PE and PP, has emerged as a viable material for food packaging and other applications. However, synthetic plastics spoil nature due to their non-degradability; they were restricted to single-use. On the other hand, single-use plastics have also been banned globally and in India. Though we have spoiled nature with synthetic plastic, nature gives sustainable alternatives in the form of agricultural food processing wastes. The first plastic made from cellulose derivatives was renewable. Recently, lignocellulose-based eco-friendly materials are extensively used for food packaging and other value-added applications as an alternative to single-use plastics. Sustainable alternatives for single-use plastics and present and future directions will be discussed in detail.

IT3-5

SMALL MOLECULE DRUG DISCOVERY AND DEVELOPMENT

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Abstract

Drug discovery is multi-level risk process that aims to identify a compound that will therapeutically cure disease. Selecting the biological target and developing a well optimized inhibitor is key to the success. Safety and Efficacy are the two most important factors in the process of drug discovery. New drug finding must continue to pass stringent criteria to emerge as safe medicine. Multi-disciplinary collaboration is inevitable in finding a candidate compound and optimizing it till IND and entering clinical stage. At many stages of discovery, pharma companies face the challenge of patent expiration of major products and learn from failures. From discovery to medicine is very challenging, long, complex and expensive process. Researchers goal is to transform novel ideas into new medicines to help patients to live healthier and longer. This talk will discuss the challenges and possible solutions in small molecule drug discovery.

ORAL PRESENTATION

ORAL PRESENTATION

OP1.1-1

ASSESSING AGRICULTURAL PESTICIDE CONTAMINATION IN LENTIC SMALL WATER BODIES AND SOILS: A HIGH-RESOLUTION STUDY IN NORTHERN GERMANY

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ABSTRACT

Lentic small water bodies (LSWB) are globally prevalent and play essential ecohydrological roles, supporting rural biodiversity. Due to their unique size and location, LSWB have complex interactions with their surroundings that are distinct from other water bodies. However, there is limited data on the contamination of LSWB by pesticides and their transformation products (TP), with insufficient understanding of their transport pathways and contamination sources.
This study investigates the contamination of surface water, groundwater, and soils surrounding two LSWB in Northern Germany, representative of similar water bodies in lowland regions worldwide. It focuses on the long-term storage of pesticides in soils as a continuous source of contamination, while also exploring the seasonal dynamics of pesticide transport and the influence of hydrological conditions on contamination pathways.
Over two years, a high-resolution sampling campaign was conducted, collecting daily to monthly samples from surface water, groundwater, and soils at various depths. Pesticides and TP were extracted from soil samples using CaCl2 and MeOH solutions, and both soil and water samples were analyzed for 27 target substances using LC-MS. Additionally, the hydrology of the LSWB and the properties of surrounding soils were thoroughly investigated.
The findings show that hydrology, particularly interactions with shallow groundwater and subsurface drainage systems, plays a key role in pesticides and TP contamination of LSWB. Highly mobile substances were detected in higher concentrations in surface and groundwater, while less mobile compounds remained bound to soil. Seasonal hydrological fluctuations contributed to variable contaminant inputs, with drainage leading to significant loads in one LSWB and groundwater being the primary source in the other. Long-term storage of pesticide/TP in soils was identified as a persistent source of contamination, even after pesticide applications had ceased.
These results demonstrate that LSWB contamination is not solely dependent on current pesticide use but is significantly influenced by the gradual release of stored pesticides from soils and groundwater transport. This highlights the complexity of pesticide transport, where groundwater plays a critical role as a contamination pathway.

To mitigate the long-term impacts of pesticides on LSWB and surrounding groundwater, sustainable land management practices are needed to reduce pesticide applications near vulnerable water bodies. Continuous monitoring systems should be established to track seasonal contamination trends and the release of stored pesticides. Additionally, the creation of buffer zones around LSWB may help limit surface runoff and groundwater contamination.

Keywords: Groundwater, lentic small water bodies, pesticides, soil, transformation products

OP1.1-2

EVALUATION OF FACE MASKS TO MINIMIZE THE OCCUPATIONAL INHALATION EXPOSURE OF PESTICIDES TO FARM WORKERS THROUGH GAS CHROMATOGRAPHY

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ABSTRACT

Pesticide applicators like sprayman, helper and bystander have considerable opportunity for exposure to pesticides by inhalation routes. The farmers live in their farms or villages adjacent to agricultural fields are also exposed to back ground concentration of pesticides through spray drift. Inhalation of large amount of nerve agent (vapour) causes respiratory failure within few seconds to minutes. This necessitates to study the efficacy face masks a better appraisal that have the capabilities to retain more pesticide molecules. Different types of face mask *viz*., kisan pesticide mask, pollution mask, safety mask special, safety mask ordinary, surgical mask disposable and surgical mask cloth received from the Central Institute of Agricultural Engineering, Bhopal, India were evaluated to for their efficiency based on their retention capabilities. Based on pesticide use patten survey in Tamil Nadu the highly used pesticides by the farmers in rice ecosystem *viz.,* chlorpyriphos, quinalphos and malathion were selected for the study. The retention capabilities of the face masks were measured with a portable battery powered modified air sampler and quantified with Chemito model 8610 Gas Chromatography (Kuttalam and Regupathy, 2001) Among the face masks evaluated, the kisan pesticide mask retained more amount of chlorpyriphos insecticide residues (1.9072 µg/l) followed by disposable surgical mask (1.7469 µg/l) and safety mask (special) (1.725 µg/l). The lowest amount of quinalphos residue was retained in cloth type surgical mask (0.4594 µg/l) followed by ordinary safety mask (0.5169 µg/l) and the maximum was in kisan pesticide mask (2.0510 µg/l). The maximum amount of malathion residue was retained by kisan pesticide mask (1.4543 µg/l) followed by special type safety mask (1.4202 µg/l) and minimum (0.2454 µg/l) in cloth type surgical mask. From the above results it may be concluded that kisan pesticides mask was the best for minimizing the inhalation exposure of air borne pesticides followed by safety mask (special) and disposable surgical mask. The cloth type surgical mask retained very minimum quantity of insecticide molecules for all three insecticides tested.

Keywords: Face Mask - GC Analysis - Pesticide Retention - Residue Quantification - Safety

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OP1.1-3

ENTEROBACTER CLOACAE STRAIN ISOLATED FROM WASTEWATER - A POTENTIAL CANDIDATE FOR FORMULATION OF BIOREMEDIATION STRATEGIES

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ABSTRACT

Organic pollution of water bodies resulting from human activities is a critical environmental concern. One promising approach to address this issue is the use of microorganisms as a sustainable option for bioremediation of such polluted water bodies. The present work explores potential of biofilm forming microorganisms as a sustainable solution for pollution control, thereby offering a cost-effective and environmentally friendly method to mitigate the harmful effects of organic pollutants in water bodies. In the present work wastewater samples along with sludge, was collected from kitchen sink, to foster biofilm development over a 10-day period. After treatment with pond water and measurement of Biological Oxygen Demand (BOD) reduction, the most efficient biofilm was selected based on BOD values. The selected biofilm exhibited 90% reduction in BOD, which is quite remarkable. Subsequent experiments revealed substantial BOD reducing capability of one specific isolate (50% reduction in BOD). Through biochemical and molecular characterization, the organism was identified as *Enterobacter cloacae*, specifically designated as *E. cloacae honeykp* (NCBI Genbank, Accession number: OP600573). Qualitative and quantitative assays further confirmed biofilm-forming capability of the new isolate validating its role as a biofilm producer. Utilizing *E. cloacae honeykp* in biofilms-based reactors, biofilters, activated sludge method, etc could lead to development of innovative methods for improving water quality and reducing the ecological impact of pollution.

Keywords: *Biofilms, Biological oxygen demand, Bioremediation, Enterobacter cloacae, Water quality*

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OP1.1-4

EXPOSURE TO PESTICIDE RESIDUES IN THE ENVIRONMENT AND THEIR IMPACT ON HUMAN HEALTH IN WESTERN ODISHA, INDIA

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ABSTRACT

This study investigates the presence, potential sources, and ecological and human dangers associated with pesticide residues in soil and rice from Bargarh district, Odisha. The study concludes that regular monitoring of water quality and vegetable safety is crucial. A reliable, rapid, and accurate method was developed for determining pesticide residues in soil and rice by LC-MS/MS and GC-MS/MS) combined with QuEChERS extraction method and adopted a mixed-mode SPE clean-up method. The developed method was applied for simultaneous determination of selected pesticides in 32 rice samples collected from paddy fields of 36 villages of Bargarh district during July, 2022, to May, 2023.Approximately 60% of the soil samples had pesticides in one of thirty possible combinations (25% had a single residue and 35% contained mixtures of two or more residues). The emerging ungovernable application of pesticides in rice farming has attracted public concerns as these hazardous chemicals leave long-lasting environmental impacts and cause severe health issues mainly cancer. The limits of detection and limit of quantification for all the pesticides were < 10 ng/g and < 25 ng/g, respectively. The fungicide Streptocycline had the greatest LADD at 15.74×10-6 mg/kg/day, whereas the insecticide Diafenthiuron had the lowest LADD at 0.157×10-6 mg/kg/day. Tricyclazole fungicide had the highest CR inhale at 7.284×103 µg/m3, whereas carbofuran insecticide had the lowest at 0.0728×103 µg/m3. Public awareness and policy interventions are also essential for reducing pesticide exposure. This research also contributes to understand pesticide contamination in water and vegetables, emphasizing the need for sustainable agricultural practices and robust monitoring systems.
Keywords: Cancer, GC–MS/MS, LC–MS/MS, paddy soil, pesticide

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OP1.2-5

A LOOK DOWN THE DRAINS: SPATIOTEMPORALDYNAMICS AND ECOLOGICAL RISK OF ESTROGENICENDOCRINE DISRUPTING CHEMICALS IN GANGETIC DOLPHIN HABITATS

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ABSTRACT

Among the array of chemical pollutants threatening freshwater biodiversity, estrogenic-Endocrine-Disrupting Chemicals (e-EDCs) have emerged as a critical ecological concern due to their persistence, bioaccumulation, mobility, and toxicity in aquatic environments [1]. The Middle Ganga Reach (MGR), along the state of Uttar Pradesh, serves as an important habitat for endangered Gangetic Dolphin, yet faces intensified habitat stress for this species due to various anthropogenic pressures, including e-EDC pollution from both point and non-point sources.While research on e-EDCs has progressed, gaps remain in understanding spatiotemporal impact and characterizing point source contamination, hindering informed conservation efforts.This study examines the spatiotemporal distribution and ecological risks of six e-EDCs – Triclosan (TCS), Estrone (E1), 17α-Ethinylestradiol (EE2), 17β-Estradiol (E2), Estriol (E3), and Diethylstilbestrol (DES) - within the rapidly urbanized MGR and the influence of drain discharges on these distributions.Surface water samples were collected from 16 sites across the 600 Km stretch of MGR including, including 10 sites along the mainstem and 6 sites representing drain discharges in Pre-Monsoon and Post-Monsoon seasons. Solid-phase extraction was used for sample preparation, and quantification of target e-EDCs was performed using Ultra-High Performance Liquid Chromatography–Tandem Mass Spectrometry.The average distribution profile showed Triclosan (8.59-169.30 ng/L) > E1 (Below detection Limit or <DL -15.46 ng/L) > E3 (<DL-14.120 ng/L) > DES (<DL-4.94) > E2 (<DL-2.33 ng/L). The concentrations of e-EDCs were generally higher in the Pre-Monsoon season and at the drain outfall sites. The entire MGR was classified as "high-risk" for at least one e-EDC. To protect vulnerable species, we recommend prioritizing targeted mitigation of high-risk e-EDCs, enabling efficient resource allocation, and informing policy development for long-term ecosystem resilience.

Keywords: Estrogenic Endocrine Disrupting Chemicals, Ecological Risks, Drain Discharge, Ganga River, Gangetic Dolphins

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OP1.2-6

LARVICIDAL ACTIVITY OF LEAF EXTRACTS OF *OROXYLUM INDICUM* AGAINST *MUSCA DOMESTICA*

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ABSTRACT

This study was built on previous research where adulticidal activity of ethanolic leaf extract of *Oroxlyum indicum* was found to be better at controlling *Musca domestica*. This study investigated the mortality effects of various organic solvent extracts from leaves of *Oroxylum indicum* on larvae of *Musca domestica*. The solvents tested included ethanol, ethyl acetate, acetone, chloroform, and hexane. In the control groups treated with ethanol, ethyl acetate, hexane and acetone, no mortality was observed, as evidenced by a mean mortality rate of 0% in all cases. However, chloroform extract exhibited significant toxicity, with a mean mortality of 46.67% ± 0.33, demonstrating a substantial impact on the tested subjects. Hexane extract showed minimal mortality, with a rate of 3.33% ± 0.33. These findings indicate that among the solvent extracts tested, chloroform extract presents the highest mortality rate, while ethanol, ethyl acetate, and acetone extracts pose no observable lethal effects. This shows that the *Oroxylum indicum* leaf extracts might provide certain extent of larvicidal activity.

Keywords : Larvicidal, leaf extracts, *Musca domestica*, organic solvents, *Oroxylum indicum*

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OP1.2-7

ADSORPTIVE REMOVAL OF PYRENE BY MAGNETIC ACTIVATED CARBON NANOCOMPOSITE: MECHANISM, KINETICS AND ISOTHERMS

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ABSTRACT

Polycyclic aromatic hydrocarbons (PAH) pose a severe environmental threat owing to their chemical persistence in nature. These compounds are not easily biodegradable and can travel long distances in water and air. Interaction of these compounds with the human body can stimulate carcinogenic and mutagenic effects. In this context, the present study describes the magnetization of commercial activated carbon and its subsequent utilization in adsorptive removal of pyrene, a potent PAH. Commercially activated carbon was utilized for the synthesis of a magnetic activated carbon nanocomposite (MAC), which was characterized by FESEM and FT-IR analysis. The synthesized nanocomposites depicted an irregular surface with the occurrence of similar sized circular nanoparticles. FT-IR analysis confirmed the presence of C-N, C-C, -OH and Fe-O bonds confirming that the nanoparticles on the nanocomposite surface were magnetic. This nanocomposite when applied for adsorptive removal of pyrene from aqueous solutions, a maximum removal of 87.8% of 15 mg/L pyrene at pH 2.0, 20 mg nanocomposite in 120 min. The adsorption process followed pseudo first order kinetics and Freundlich isotherm indicating that adsorption occurs in multilayers. MAC depicted a maximum adsorption capacity of 114.3 mg/g for pyrene indicating its suitability for remediation of pyrene from contaminated wastewater.

Keywords: activated carbon, adsorption, iron nanoparticles, nanocomposites, pyrene

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OP2.1-1

GENOTOXIC EFFECTS AND ALTERATIONS IN ANTIOXIDANT SYSTEMS INDUCED BY CHLORDECONE IN THE CICHLID FISH, *ETROPLUS MACULATUS* (BLOCH, 1795).

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ABSTRACT

Chlordecone, an organochlorine compound used widely as an agricultural insecticide, miticide and fungicide, was exposed at sub lethal concentration (3.5 μg/ L) to cichlid fish, *Etroplus maculatus* for 24, 72 and 96 h. The acute toxic effects of chlordecone were evaluated by maintaining respective control groups. Antioxidant enzymes such as superoxide dismutase, catalase and glutathione reductase and the levels of lipid peroxidation and hydrogen peroxide generation were assessed in the gill, liver and muscle tissues, along with genotoxicity assay using micronucleus test in peripheral erythrocytes. Body weight of the treated fishes remained unchanged throughout the experiments. However, mucous deposition was significantly increased in time-dependent manner which states the defensive mechanism of the exposed fishes to chlordecone. Statistical analysis reports that chlordecone induced oxidative stress on gill, liver and muscle tissue by significant ($p<0.05$) reduction in the activities of antioxidant enzymes with concomitant increase in the levels of hydrogen peroxide and lipid peroxidation. The present study also showed a significant reduction in the marker enzyme, alkaline phosphatase in gill, liver and muscle and it could be due to decreased state of inter and intracellular membrane transport and possibly this could be also due to the toxicity of chlordecone. The results of micronucleus assay showed that *in vivo* chlordecone exposure significantly increase the incidence of micronucleus formation in erythrocytes of fish. In the control groups, no nuclear abnormalities were observed, whereas in chlordecone-exposed groups showed nuclear aberrations such as formation of micronucleus together with blebbed, notched, lobed and irregular nuclei. The changes were found to be positively correlated to the duration of exposure. The present data clearly demonstrated that chlordecone is toxic at sublethal concentration in cichlid fish, *Etroplus maculatus*.

OP2.1-2

PHOTOCATALYTIC ACTIVITY OF C, N AND S DOPED SNO_2: EFFECTIVE BAND GAP ENGINEERING TO INCREASE THE QUANTUM EFFICIENCY AND EXPLORATION OF THE CHANGE IN THE POSITION OF FERMI ENERGY WITH DOPANT CONCENTRATION AND ITS INFLUENCE ON PHOTOREACTIVITY

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ABSTRACT

SnO_2 and Carbon (C), Nitrogen (N) and Sulphur (S) - doped SnO_2 (CNS@SnO_2) samples were synthesized via a sol gel and grinding method respectively. The thiourea was used as precursor for all the three dopant ions whose concentration was varied as 0.03 wt%, 0.06 wt% and 0.09 wt%. PXRD results confirm the replacement of high density oxygen atom by low density C and N atoms. UV–vis spectroscopy confirms the incorporation of C, N and S dopant ions by the shift in absorption edge towards visible region. The oxidation states of the dopant ions were confirmed as C^{2-}, N^{3-} and S^{6+} by the X-ray photoelectron spectroscopic technique. The presence of N in the sample was also confirmed by FTIR technique. The optimum dopant concentration was found to be 0.06 wt% of thiourea. The higher value of photocurrent efficiency, photocurrent density and lower value of electrical energy per order confirms the efficiency of CNS@SnO_2 (0.06 wt %) sample due to the favourable function of Fermi energy (E_F) in the SnO_2 lattice.

Keywords: Congo red, Memory effect, Photocatalyst, Photocurrent and Tin dioxide.

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OP2.1-3

HIGHLY HAZARDOUS PESTICIDES IN INDIA

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ABSTRACT

Highly Hazardous Pesticides (HHPs) are among the most toxic chemicals that pose significant acute and chronic effects as well as ecosystem devastation. According to FAOWHO (2013), Highly Hazardous Pesticides (HHPs) are pesticides that are acknowledged to present particularly high levels of acute or chronic hazards to health or environment as per internationally accepted classification systems and that appear to cause severe or irreversible harm to health or the environment under conditions of use in a country. These hazardous pesticides permeate daily life in various forms, directly and indirectly impacting everyone with women and children disproportionately affected. They accumulate in organs and the lymphatic system, alter molecular structures, damage DNA, and can be transmitted across generations through genetic inheritance and breast milk. In India, regulations on HHPs are lenient, making these pesticides widely accessible for agriculture and household use. India ranks as the world's second-largest pesticide exporter and fourth-largest producer, with over 339 pesticides registered for commercial use as of March, 2024, of which 120 are HHPs, according to criteria set by Pesticide Action Network.

Eighty-one HHPs registered in India are banned or not approved in a number of other countries or listed in international conventions; and these constitute the majority of India's pesticide production, consumption, imports, and exports. This contributes to significant health issues, with 25 HHPs being carcinogenic, 21 causing neurotoxicity, and 20 affecting reproductive health. Many HHPs have been linked to occupational and self-poisoning cases in India. According to the 2021 National Crime Records Bureau (NCRB) report, 7,950 deaths in India were attributed to accidental pesticide ingestion. Environmentally, HHPs persist in the soil, leach into water, and diffuse in air, leading to bioaccumulation in animals. This contamination by dietary intake carries high toxicity potential spanning the length of the food chain from lower-order to higher-order animals, causing lipophilic pesticides to accumulate in fat tissues, milk, and meat, impacting animal health and physiology. These HHPs on exceeding MRLs (often unestablished for many crops) leads to unapproved pesticide use, posing risks to consumers when food safety standards are not closely monitored. Phasing out of HHPs substituting with agroecological approaches and practices is the key to get rid of these potential toxins, which requires stronger regulatory efforts, public investment and policy support.

Keywords: Highly Hazardous Pesticides, Acute and chronic effects, Pesticide Ban, Pesticide Risk, Food safety

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OP2.1-4

AN ULTRASENSITIVE ELECTROCHEMICAL DETECTION OF NITRITE USING MODIFIED CARBON PASTE ELECTRODE WITH NOVEL POLYANILINE ENCAPSULATED CUO DOPED MAGNETITE

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ABSTRACT

The electrochemical detection of nitrite ions (NO_2) using a novel nanocomposite, i.e., a conducting polymer anchored with bimetallic oxide nanoparticles, was reported in this paper. The hybrid material polyanilline-encapsulated copper oxide (CuO)-doped magnetite (Fe_3O_4) nanocomposite (CuO/Fe_3O_4@PANI) was synthesized ultrasonically probing the mixture obtained after oxidising aniline with ammonium peroxysulfate in the presence of CuO and Fe3O4. The characterization of the active material CuO/Fe_3O_4@PANI was done using FTIR, powdered XRD, SEM, and EDAX analysis. The electrode material CuO/Fe_3O_4@PANI illustrated excellent electrocatalytic activity for nitrite detection under ideal exploratory conditions. The nitrite detection calibration plot was linear in the concentration range of 10 to 140 μM with a low detection limit of 7 nM, which can be used in the determination of nitrite in rivers and drinking water with the benefits of good reproducibility, anti-interference, and long-term stability.

Key words: PANI, CuO, Magnetite, Nitrite.

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OP2.2-5

THERMODYNAMIC INVESTIGATIONS AND REACTION KINETICS OF IR(III)-CATALYZED A-AMINO ACID OXIDATION BY HCF(III) IN AQUEOUS ALKALINE MEDIUM

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ABSTRACT

Iridium is a platinum family member and used as a catalyst due to its variable oxidation states. Its toxicity and environmental impact are not much more reported, thus, it may be used as a green element in the various fields of its application. For various organic as well as inorganic chemical transformations Ir(III) complexes show great catalytic activity in both acidic and alkaline media. The oxidation of **α**-amino acid (abbreviated as [S]) by hexacyanoferrate (abbreviated as HCF (III)) was studied kinetically by spectrophotometry in presence of Ir(III) at 35^0C and a constant ionic strength of 0.5 mol dm^{-3}. For every amino acid, the reaction showed 2:1 i.e. for one mole of amino acid, two moles of HCF(III) are used. According to experimental results, the rate of oxidation increases when HCF(III) oxidant and catalyst concentrations rise. It exhibits first-order dependence at lower substrate concentrations and zero-order dependence at higher substrate concentrations. The reaction was examined at four distinct temperatures—35, 40, 45, and 50^0C—to determine the activation parameters. A suitable mechanism and rate law have been derived based on the above experimental results and product analysis.

Keywords: α-Amino Acid, HCF(III), Ir(III), Kinetics, Mechanism.

OP2.2-6

TOXICITY AND ENVIRONMENTAL IMPACT OF PARAPHENYLENEDIAMINE (PPD) IN *OREOCHROMIS MOSSAMBICUS* (PETERS, 1852)

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ABSTRACT

Emerging contaminants, including paraphenylenediamine (PPD), are of growing concern due to their persistence and potential ecological risks. PPD is widely used in industries such as hair dyes, rubber products, and pharmaceuticals. This study aimed to determine the median lethal concentration (LC_{50}) of PPD in *Oreochromis mossambicus*and assess its environmental concentrations (ECs) in various water bodies. Acute toxicity tests were conducted over 96 hours, with mortality rates analyzed using probit analysis to calculate the LC50. The LC50 for PPD in *O. mossambicus*was found to be 733 µg L^{-1}, indicating high toxicity. Environmental monitoring, using a UV-visible spectrophotometer, detected PPD in a canal near the Kondotty, Malappuram district, with an environmental concentration of 235.3 ng L^{-1}, while no PPD was detected in other nearby locations, including the Pamba River. These results highlight the potential threat of PPD to aquatic ecosystems, necessitating further research and stricter regulations to reduce environmental contamination and protect aquatic life.

Keywords: Environmental concentration, median lethal concentration, *Oreochromis mossambicus,* paraphenylenediamine, Probit analysis

OP2.2-7

HEPATIC BIOTRANSFORMATION IN CLIMBING PERCH (*ANABAS TESTUDINEUS*) UNDER ENVIRONMENTAL EXPOSURE TO POLYSTYRENE MICROPLASTICS

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ABSTRACT

Aquatic organisms are increasingly threatened by polystyrene microplastics (PS-MPs), which are emerging as a significant environmental pollutant. The study aims to examine the hepatic biotransformation responses and histopathological alterations in the liver tissues of *Anabas testudineus* exposed to environmentally relevant concentrations of PS-MPs (13.6 mg L^{-1} and 23.6 mg L^{-1}) over durations of 1, 7, 15, 30, and 60 days, followed by a 60-day depuration period.The study evaluated the functions of key phase I and phase II detoxification enzymes within cytosolic and microsomal fractions, specifically focusing on EROD, PROD, FMO, CPR, SULT, UGT, and GST. Furthermore, an analysis of mRNA expression for EROD and UGT was conducted. The findings revealed a notable induction of phase I enzymes, especially EROD, which was accompanied by changes in the activities of phase II enzymes, indicating a responsive adaptation in detoxification processes.Histopathological examination showed lesions, necrosis, vacuolization, and clustering of melanomacrophages, indicating liver tissue injury that persisted beyond the depuration period. Consequently, the results acquired demonstrate the substantial impact of PS-MPs at environmentallyrelevant concentrations on the liver tissue of *A. testudineus*by altering the detoxification process andemphasize the importance of mitigating plastic pollution in aquatic environments.

Keywords: *Anabas testudineus*, Detoxification, Hepatic biotransformation, Polystyrene microplastics, Subcellular fractions.

OP2.2-8

DEVELOPING NI-BDC INCORPORATED POLYSULFONE MEMBRANES FOR THE EFFICIENT REMOVAL OF PHARMACEUTICAL POLLUTANTS FROM WATER

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ABSTRACT

This study explores the synthesis of Ni-BDC metal-organic framework (MOF) and their incorporation into polysulfone (PSF) membrane to enhance porosity and hydrophilicity, focusing on the removal efficiency of pharmaceutical contaminants. Four variations of the membrane comprising 0% wt., 2.5% wt., 5% wt., and 7.5% wt. of Ni-BDC MOF were fabricated and characterized using Fourier Transform Infrared Spectroscopy (FT-IR), X-ray Diffraction (XRD), Scanning Electron Microscopy (SEM), Brunauer-Emmett-Teller (BET) sorption, and Energy-Dispersive X-ray Spectroscopy (EDX) analysis. The performance of these membranes was evaluated through assessments of contact angle, water uptake and water flux to determine their hydrophilicity and porosity. The results demonstrated that the membrane with 7.5 wt.% Ni-BDC MOF exhibited the highest permeation flux of 94.63 $Lm^{-2}h^{-1}$, coupled with excellent rejection rates of 94.63% for dopamine hydrochloride and 7.5% wt. membrane has given higher permeation flux of 12.81 $Lm^{-2}h^{-1}$ and highest rejection of 91.70% for Diclofenac sodium. Moreover, Bovine serum albumin (BSA) rejection tests were conducted to investigate antifouling properties. Flux recovery ratio (FRR), was found to be maximal at 56.18% for the 7.5 wt.% Ni-BDC membrane. These findings indicate that integrating Ni-BDC MOF into PSF membranes significantly enhances their functional properties, making them promising candidates for addressing pharmaceutical contamination in water treatment applications.

Key words: Ni-BDC, Membrane technology, Dopamine hydrochloride, Diclofenac sodium

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OP2.2-9

THE CONCENTRATION OF HEAVY METALS IN SOIL SAMPLES AND VEGETABLES COLLECTED FROM INAND AROUND OF BANGALORE

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ABSTRACT

The agricultural soils are contaminated with heavy metals due to industrial and anthropogenic activities. The accumulation of the metals by the vegetable plants grown on the contaminated soils is major concern. The human are continuous exposed to the toxic metals throughconsumption of the contaminated vegetables. In the present study, the heavy metals in the soils and vegetable were analyzed by inductively coupled plasma optical emission spectroscopy (ICP-OES). The vegetable Tomato (*Solanum lysopersicum)*, Carrot (*Daucus carota*), Spinach (*Spinacia oleracea*) and Cabbage (*Brassica oleracea*) were collected from the area of Nelamangala, Attibele, Hoskote and Malavalli in and around of Bangalore. About300 g – 500 g of soil sample was collected from the point of sampling i.e. the soil was collected from the point where the vegetable samples were collected, at a depth of 15 – 25 cm.The soil samples were prepared by DTPA extraction method for analysis of metals by CP-OES. Vegetable samples were air dried and powdered, then dissolved in 20 ml di-acid mixture.Heat-treated flask produced red-hot Nitrogen dioxide, allowing digestion and detecting of heavy metals. The concentration range of heavy metals in the soil is range, Cd (0.002- 0.08ppm), Cr (0.05-0.27ppm), Pb (0.21-2.32ppm) and Ni (0.08- 0.87ppm). Concentrationwas systematically calculated for heavy metal percentage. The concentration range of heavy metal accumulated in vegetables Tomato are Pb (0.10-2.15ppm), Cd (0.11-1.79ppm), Cr(1.31-2.65ppm), Ni (0.06 -1.45ppm). In Palak, Pb (2.83 - 7.41ppm), Cd (0.16 - 0.19ppm), Cr (5.15 -8.91ppm), Ni (0.33 -3.26ppm), Cabbage: Pb (0.68 - 3.45ppm), Cd (0.03-0.071ppm), Cr (1.63 - 3.34ppm), Ni (1.77-4.79ppm). Carrot contained Pb (0.15 - 0.33ppm), Cd (0.07- 1.54ppm), Cr (0.14 -3.61ppm), Ni (0.2- 0.63ppm). Further research focuses on the analysis of risk assessments of toxic metals with reference to Bio-Concentration Factor (BCF), Average Daily Dose (ADD), and Lifetime Carcinogenic Risk (LCR).

Keywords: Heavy metal, ICP-OES, Bio concentration factor, Average daily dose, Life timecarcinogenic risk.

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OP2.2-10

DEVELOPING "Fe_3O_4@PINEAPPLE PEEL EXTRACT (PPE) – CU NANOCOMPOSITE" FOR WASTE WATER TREATMENT

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ABSTRACT

This study explores the synthesis of "Fe_3O_4@pineapple peel extract-Cu nanocomposite" to embedded substances in a polysulfone (PSF) polymer matrix for membrane fabrication. Membranes were synthesized through a phase inversion method, followed by extensive characterization to evaluate their structural and functional properties. Four variations of the membrane comprising 0 wt.%, 2.5 wt.%, 5 wt.%, 7.5 wt.% of Fe_3O_4@pineapple peel extract-Cu nanocomposite fabricated and characterized using Attenuated Teller – Infrared Spectroscopy (ATR-IR), X- ray diffraction (XRD), Scanning electron microscopy (SEM), and Energy -dispersive X- ray spectroscopy (EDX) analysis. The performance of these membranes was evaluated through assessments of contact angle measurements, and water uptake to determine their hydrophilicity and porosity. The antifouling behavior of the membranes was assessed using bovine serum albumin (BSA) and humic acid as model foulants. The results demonstrated that the PSF membrane with 5 wt% of Fe_3O_4@PPE-Cu nanocomposite exhibited the highest flux recovery ratio (FRR%) of 99.01% and 99.52% for BSA and humic acid chemical respectively. The key performance metrics, including rejection rates and antifouling parameters like flux recovery ratio (FRR), reversible ratio (Rr), irreversible ratio (Rir) and total ratio of fouling in membrane were determined to evaluate the effectiveness of the membranes in mitigating fouling and maintaining high filtration performance. The results indicate a significant improvement in antifouling characteristics and filtration efficiency compared to conventional PSF membranes.

Keywords : Fe_3O_4, Pineapple peel extract, BSA, Humic acid.

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OP2.2-11

ADSORPTIVE REMOVAL OF PHARMACEUTICALLY ACTIVE COMPOUNDS FROM AQUEOUS ENVIRONMENT USING ZNO COATED INVASIVE WEED BIOCHAR

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ABSTRACT

Increasing attention is being drawn to pharmaceutically active compounds in diverse environments notably aquatic systems has raised alarm due to potential risks they present on non-target species, human health. In contrast, invasive weeds have spread globally posing serious environmental, economic threats by altering ecosystems. This research evaluates performance of nanoparticles-coated *Prosposis juliflora* weed derived biochar (ZPJC) for removing tetracycline (TET) and acetaminophen (ACT) individually (TET/ACT) and multi-component (TET+ACT) systems was examined in batch and column techniques. Synthesized ZPJC was analyzed using techniques like porosimetry, SEM, EDX, TGA, point of zero charge (pH_{pzc}), FTIR, XRD. ZPJC displayed mesopores, presenting diameter 2.868 nm /g, with surface area 5.928 m^2. Batch studies examined various influencing parameters like contact time (0-180 min), contaminant concentration (0.1-10 mg/L), biochar dosage (0.25-4 g/L), pH (2-12). At optimal conditions (time-60 min, pH-6.5, dose-3 g/L), ZPJC attained maximum sorption capacity TET: 8.51 mg/g, ACT: 4.63 mg/g employing batch technique. Results revealed pseudo-second-order and Langmuir models provided good fit for data obtained from batch studies Desorption studies were taken up, in first cycle (C1), ZPJC achieved higher desorption rates with 47.14% (TET)<70.57% (ACT). By second cycle (C2), desorption amount desorbed from adsorbent surface was noted to be 11.13% (TET)< 66.99 (ACT). This proves that ZPJC possessed greater regeneration ability for ACT when compared to TET.

In conclusion, invasive weed transformation into biochar to eliminate pharmaceutically active compounds offers sustainable strategy for safeguarding aquatic life while managing invasive weeds.

Keywords: Pharmaceutically active compounds, *Prosposis juliflora*, ZnO nanoparticles.

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OP2.3-12

POROUS AND MESOPOROUS MATERIALS FOR APPLICATIONS IN DESALINATION AND REMOVAL OF PESTICIDES, PHARMACEUTICALS AND PERSONAL CARE PRODUCTS FROM WATER

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ABSTRACT

The contamination of pesticides and pharmaceuticals in the environment poses a significant social concern, particularly in drinking water and wastewater. The increasing need for desalination to meet the demand for potable water adds to this challenge, as many water sources contain high concentrations of salts beyond permissible limits. Pesticides enter water systems primarily due to agricultural activities, while pharmaceuticals and personal care products (PPCPs) originate from various sources, including sewage treatment plants, hospitals, and improper disposal of drugs. These contaminants pose serious health risks to humans and other organisms, necessitating effective removal methods. Porous and mesoporous materials, such as synthetic zeolites and silica, have shown promise in removing pesticides and PPCPs from aqueous solutions and in desalinating water. This chapter reviews the literature on the use of these materials, discussing the types of adsorbents, experimental conditions, and outcomes of various studies. The insights provided will aid researchers in selecting appropriate materials and optimizing conditions for effective contaminant removal and water desalination.
Keywords: Porous and Mesoporous Materials, Desalination, Pesticides, PPCPs

OP2.3-13

GREEN SYNTHESIS, CHARACTERIZATION AND BIOACTIVITY ANALYSIS OF ECO-FRIENDLY SILVER NANOPARTICLES USING *SCHEFFLERA ACTINOPHYLLA* FLOWERS

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ABSTRACT

The synthesis of nanoparticles (NPs) has gained prominence due to their distinct properties and wide-ranging applications. Among various methods, green synthesis stands out for its environmentally friendly approach. This study investigates the green synthesis of silver nanoparticles (AgNPs) using the aqueous extract of Umbrella plant flowers (*Schefflera actinophylla*). Phytochemical analysis of the extract identified the presence of alkaloids, terpenoids, saponins, resins, carbohydrates, and phenols. Silver nanoparticles were synthesized using a 0.1 M $AgNO_3$ solution and monitored through UV-visible spectroscopy, which revealed an absorption peak at 370 nm. Characterization through infrared (FTIR) spectroscopy, Field Emission Scanning Electron Microscopy (FE-SEM), Dynamic Light Scattering (DLS), and Zeta potential measurements indicated an average particle size of 8.9 nm and a zeta potential of -8.8 mV. FE-SEM images showed nanoparticles in various shapes. The AgNPs exhibited significant antimicrobial activity against common bacteria such as *Staphylococcus aureus*, *Bacillus subtilis*, *Pseudomonas aeruginosa*, and *Escherichia coli*, as well as fungi including *Aspergillus niger* and *Candida albicans*. Furthermore, the nanoparticles displayed notable antioxidant activity with an IC_{50} value of 37.025 µg/ml. This study highlights the benefits of using plant-based methods for nanoparticle synthesis, offering an eco-friendly alternative to conventional chemical processes, thus reducing pollution and mitigating antibiotic resistance in microbes.

Keywords: Antimicrobial properties, Green synthesis, Phytochemical analysis,

Schefflera actinophylla, Silver nanoparticles (AgNPs)

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OP2.3-14

NANOTECHNOLOGY IN PESTICIDE DEGRADATION: MECHANISMS, APPLICATIONS, AND ENVIRONMENTAL IMPLICATIONS

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ABSTRACT

Increased use of pesticides has proven to be a serious threat despite their benefits, due to their prolonged persistence in the environment that poses serious toxic effects on non-target species as well as disrupts the ecosystems by contaminating soil and water. Current review covers the role of different metal oxide, chalcogenide, nitride and other novel nanomaterials in the degradation of pesticides. Contribution of nanotechnology has been emphasized by including several degradation mechanisms such as charge transfer, adsorption and role of surface defects or states. Recent advancement in the field has been focused by incorporating the examples of novel and 0D, 1D and 2D functional nanomaterials such as Graphene, Carbon Nanotubes, Carbon Quantum Dots, MoS_2 and their composites. Nanotechnology driven enhancement of selectivity and reactivity for pesticide breakdown, by surface modification and bandgap engineering has been included. As, in the current era the detection of trace pesticide residues becomes crucial, this review further covers the progress ofnanotechnology-basedsensors' implementations in pesticide residue detection and environmental monitoring. Environmental impact and safety of Nanotechnology in pesticides degradation has been highlighted by covering the aspects like potential risks and toxicity of nanomaterials. The article concludes with the important points like regulatory consideration and safety guidelines of using nanomaterials for environmental applications such as pesticide degradation.

Keywords: Adsorption, Nanosensors, Nanotechnology, Pesticide Degradation, Photocatalysis.

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OP2.3-15

MACHINE LEARNING ANALYSIS FOR DIFFERENTIAL GENE EXPRESSION INDUCED BY PESTICIDES FOR PROGRESSION OF PARKINSON'S DISEASE

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ABSTRACT

Neurodegenerative diseases, like Parkinson's disease (PD), have been prevalent in the world's population of ages 65 and above. One of the main features is the loss of dopaminergic neurons in the substantia nigra pars compacta which leads to tremors and bradykinesia among other physiological symptoms. The bioaccumulation of pesticides increases the risk of PD, clearly affecting its progression. Pesticides like cypermethrin, fipronil and paraquat have been linked to the pathogenesis of PD. This study discusses a machine learning model that can be used to predict the role of various pesticides which disrupt specific genes contributing to the progression of PD. Microarray datasets of the level of gene expression under different circumstances of pesticide treatment were obtained from the GEO Database. The datasets obtained from human neural tissues and neural stem cells were analyzed using GEO2R to obtain the gene symbol, which was then entered into DAVID v2024q2 for gene enrichment. The DAVID output was outlined with functional annotation tools to derive biologically relevant information regarding the specific genes dysregulated due to pesticide exposure. The GEO2R analyzed datasets were processed, and the common genes were found using Python ver 3.10.12 on GoogleColab. These common genes were entered into DAVID and the enriched data from these common genes were clustered to find inherent properties in DAVID datasets. This was done using the k-means method. The variation in the gene expression were analysed by the p values ranging between 10^{-5} to 10^{-10} for paraquat pesticides on neural tissues and 10^{-3} to 10^{-19} for neural stem cells. PCA will be used for visual analysis.

Keywords" Parkinson's Disease, Paraquat, Cypermethrin, DAVID Knowledgebase, Differential gene Expression

OP2.3-16

EVALUATING THE ENVIRONMENTAL AND HEALTH IMPACTS OF CHLORPYRIFOS : A FOCUS ON BIOREMEDIATION STRATEGIES

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ABSTRACT

Chlorpyrifos is a widely used organophosphate pesticide, primarily employed in agriculture to control various pests on crops. However, its extensive application has raised significant concerns due to its adverse effects on the environment and human health. Exposure to chlorpyrifos has been linked to neurological disorders, developmental issues, and various environmental hazards, affecting both ecosystems and human populations. Given its persistence and toxicity, there is an urgent need for effective strategies to mitigate its impact. This study focuses on exploring microbial biodegradation as a potential solution, investigating microbial pathways, enzymes, and metabolic processes capable of breaking down chlorpyrifos into less harmful compounds. By understanding these mechanisms, this research aims to identify scalable biodegradation strategies that could offer a sustainable approach to managing chlorpyrifos contamination. Colorimetric and biochemical analyses were conducted to assess pesticide concentrations in vegetable samples obtained from local markets, using 2,4-dinitrophenylhydrazine (DNPH) for qualitative detection. Calorimetric estimation was also performed using different solvents to analyse the concentration of pesticide removal, simultaneously it was also treated with methanol to estimate the remaining concentration of the pesticide . Additionally, ADMET studies and antimicrobial analysis were performed in silico. The bioremediation of pesticides using fungal laccases were studied in camparison with traditional methods.
Result: The findings indicate that pesticide residues can be reduced using conventional washing methods, with normal water being the most effective, followed by hot water, vinegar, and salt water. ADMET analysis shows that chlorpyrifos is readily absorbed through the mammalian gastrointestinal tract and can significantly inhibit cytochrome P450 isoenzymes, impacting liver function. Molecular docking in antimicrobial studies revealed chlorpyrifos's ability to bind with the nitrogenase enzyme, showing a binding affinity of -6.4 Kcal/mol. Fungal laccases demonstrated a notable capability to degrade chlorpyrifos, outperforming traditional washing methods.
Keywords: Bioremediation, chlorpyrifos, Environmental Impact, Human Health Risk

References: Chlorpyrifos Occurrence and Toxicological Risk Assessment: A Review. 2022 Sep 26;19(19):12209. doi: 10.3390/ijerph191912209

OP3.1-1

NEUROTOXIC EFFECTS OF CARBAMAZEPINE, AN ANTIEPILEPTIC DRUG, ON THE MOSQUITOFISH GAMBUSIA AFFINIS

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ABSTRACT

Carbamazepine, an antiepileptic drug, is persistently detected in aquatic environments at concentrations ranging from nanograms to milligrams per liter. Its adverse effects on non-target organisms, including fish, have raised significant environmental concerns. This study evaluated the neurotoxic effects of carbamazepine on the fish *Gambusia affinis*, focusing on alterations in neurotransmitter levels. The median lethal concentration (LC_{50}) for *G. affinis* after 96 hours of exposure was determined to be 24 mg L^{-1}. To assess changes in brain neurotransmitter levels during chronic exposure (up to 60 days), sublethal concentrations of one-fifth (4.8 mg L^{-1}), one-tenth (2.4 mg L^{-1}), and an environmentally relevant concentration (13 ng L^{-1}) were used. Neurochemical parameters, including acetylcholinesterase, dopamine, gamma-aminobutyric acid, serotonin, monoamine oxidase, 5-hydroxyindoleacetic acid, adrenaline, and noradrenaline, were analyzed. The observed variations in these neurotransmitters highlight the potential risks carbamazepine poses to fish populations in natural ecosystems, raising concerns about their long-term survival.

Keywords: Carbamazepine; *Gambusia affinis*; Neurotoxicity; Teratogenicity

OP3.1-2

"PHOTOCATALYTIC DEGRADATION OF DYE POLLUTANTS AND PHARMACEUTICALS OVER MANGANESE-DOPED BISMUTH MOLYBDATE (MN-BI_2MOO_6) DOUBLE-LAYERED PEROVSKITE NANOMATERIALS"

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ABSTRACT

In this study, we synthesized bismuth molybdate [1] and manganese-doped bismuth molybdate double perovskite using the coprecipitation method. The synthesized materials were thoroughly characterized using XRD, FTIR, and UV-DRS. The band gaps of the pure and Mn-doped bismuth molybdates were 2.5 eV and 2.8 eV, respectively. The performance evaluation of the materials was conducted for the photocatalytic degradation of Congo red at various concentrations ranging from 10 to 1000 ppm under UV and visible light. The materials' performance was also evaluated in the presence of other cationic and anionic dyes to assess their capability to work in the presence of other pollutants, achieving 90-100% degradation rates. Photodegradation of tetracycline pharmaceuticals was tested to demonstrate versatility across various concentrations. Kinetic studies suggest that the pseudo-first-order model agrees well with the data, and the rate constants of the Mn-doped bismuth molybdate were higher compared to pure bismuth molybdate. This study reveals that Mn-doped bismuth molybdate is a potential material for wastewater treatment.

Keywords: Dye degradation, Double Layered perovskites, Photocatalysis, Pharmaceutics, Bismuth molybdate

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OP3.1-3

BIOGENIC CALCIUM IRON OXIDE NANOCOMPOSITE: AN EXPLORATION OF PESTI CIDE PHOTOCATALYTIC DEGRADATION

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ABSTRACT

Restrained recombination of electron and hole in enhancing the photodegradation of pesticide pollutants has been a successful technique. Combustion synthesis of Calcium iron oxide $Ca_2Fe_2O_5$ at 400 °C and calcination at 600 °C using the ethanolic extract of *Acmella oleracea* plant is explored as an ecofriendly route in the current study. The prepared nano sized particles were subjected to XRD, SEM, along with UV and further utilized to Photo degrade popularly used pesticide Chlorpyrifos which poses a serious threat as organic pollutants. Among the various operating variables, variation of pH was found to predominate during degradation process. The results showed that the photocatalytic activity increased with rising pH from 4 to 10 due where production of hydroxyl free radicals and ions are maximum. The current study highlights the impetus of ecofriendly heterogeneous catalysis in pesticide pollution control.

Key Words: *Acmella oleracea,* Chlorpyrifos, $Ca_2Fe_2O_5$, Photodegradation

OP3.1-4

GENERATING A PREDICTIVE MODEL OF HUMAN GUT MICROBIOME TO DEGRADE CHLORPYRIFOS USING CELLDESIGNER TOOL TO CONTROL PARKINSON'S DISEASE

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ABSTRACT

Chlorpyrifos is one of the most widely and extensively used organophosphorus insecticide throughout the world having potential toxic effects on human health, making its degradation drive vital. The human gut microbiome is proven to degrade pesticides but the exact mechanism and pathway is obscure. This study aims to propose a degradation pathway of chlorpyrifos by human gut microbes *Ralstonia pickettii* & *E. coli* using CellDesigner Ver. 4.4 provides design to the pathway for gene-regulatory and biochemical networks. It enables to draw and edit the structured diagram for the parameters influencing the metabolic process of the cell. The construction of the pathway was succeeded by the determination of rate equation employing SBML squeezer 2.1 via Garuda community-driven platform v1.41. The results exhibited a decrease in the chlorpyrifos concentration eventually over time by the action of 2,4,6 trichlorophenol monooxygenase and NAD(P)H: flavin reductase enzymes suggesting that human gut microbes were potent in degrading the chlorpyrifos and its metabolites. This experimental design specifies the parameters concentration controlling and simulating the enzymatic process intuitively in the cell. The focus of the study is to use the human gut microbiome as biomarker to decipher the event of bioaccumulation of pesticides in the body and its influence on the Parkinson's disease.

Keywords: Chlorpyrifos, Human gut microbiome, CellDesigner, Parkinson's Disease, Pesticides

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OP3.1-5

VALORIZATION OF PROSOPHIS JULIFLORA BIOCHAR FOR ADSORPTIVE REMOVAL OF EMERGING POLLUTANTS

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ABSTRACT

Emerging contaminants (ECs) are hazardous compounds, doesn't have discharge standards; they are not monitored. On the other hand, invasive weeds like *prosopis Juliflora* widely spread across world turned into severe problem due to major economic and environmental impacts. Therefore, to mitigate adverse effects and maximize benefits, utilization of weed biomass as adsorbents appears prudent and promising solution for weed control. This study aims to assess performance of Iron coated *prosopis Juliflora* carbon (FPJC) derived from *prosopis Juliflora* for removing acetaminophen (ACT) and tetracycline (TET) in both mono-component (ACT/TET) and multi-component (ACT+TET) system. The synthesized FPJC are characterized through SEM, EDX, XRD, porosimetry, TGA, pHpzc and FTIR analysis. In batch study, operating conditions i.e., contact time (0-5 h), biochar dose (0.1-4 g/L), initial ACT/TET concentration (0.1-10 mg/L) and pH (2-12) are studied. Various kinetic and isotherm models are employed to determine rate constants and maximum adsorption capacity for ACT and TET sorption. Langmuir competitive model was used to analyse antagonistic or synergistic effect for removal of ACT/TET in ACT+TET multi-component system.
From results, it was observed that contact time of 60 min, biochar dosage of 1 g/L and pH of 6.5±3 was observed to be optimized condition for ACT and TET. Furthermore, utmost suitable models for describing adsorption kinetics and isotherm data of ACT and TET when employing FPJC as sorbents were pseudo-second-order kinetic model and Langmuir isotherm model. In mono-component system, it was determined that FPJC having maximum adsorption capacity (qm) of 3.59 mg/g for ACT and 1.16 mg/g for TET. Meanwhile, ACT+TET system, $qmax$ for FPJC was found to be 7.64 mg/g for ACT and 4.84 mg/g for TET. Multicomponent sorption of ACT and TET from ACT+TET system exhibited antagonistic behaviour. Moreover, TET exhibited higher desorption rate than ACT. In desorption the adsorption capacity of TET is 7.86 mg/g and for ACT is 6.02 mg/g. Overall, both adsorbents exhibit synergistic effect in simultaneously removing ACT and TET from multi-pollutant mixture.

Keywords: *prosopis Juliflora*; Kinetic and Equilibrium study; Acetaminophen; Tetracycline; Multi-component system.

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OP3.1-6

A SYSTEM BIOLOGY APPROACH TO MITIGATE RISK FOR PARKINSON'S DISEASE IN THE DEGRADATION OF CYPERMETHRIN USING CELLDESIGNER BY *LACTICASEIBACILLUS PARACASEI* –A HUMAN GUT MICRBIOME

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ABSTRACT

This study provides a significant role of human gut microbiome as an important tool in controlling the bioaccumulation of pesticide- cypermethrin in the human body. CellDesigner using Systems Biology Graphical Notation (SBGN) model to biodegrade the synthetic pyrethroid pesticide cypermethrin by *Lactocaseibacillus paracasei* through the synthesis of 3 essential enzymes: carboxylesterase, dioxygenase and monooxygenase. The prolonged presence of cypermethrin indicates, with an LD50 value of 250 mg/kg in animal models, poses serious risks to both human health and the ecosystem. Upon oral administration, cypermethrin shows 19–57% absorption. For its metabolic versatility *L. paracasei*, a gut bacterium known to metabolize a variety of xenobiotics is used as a potential microbial marker. This potentiality of *L. paracasei* is demonstrated by the model which mimics how these enzymes work together to break down cypermethrin into non- toxic metabolites. In order to produce less hazardous intermediates carboxylesterase cleaves the ester bond in cypermethrin and initiate the process of hydrolyis. Monooxygenase, with cofactor as FAD, further hydroxylates the byproducts increasing their solubility and promoting mineralization or excretion while dioxygenase, with cofactor as Iron (II), oxidizes the intermediates dissolving the intricate cyclic structures. By replacing chemical treatments for managing pesticide residues this integrated enzymatic process reduces pollution in the environment and offers a sustainable alternative. This strategy shows promising potential for using biotechnology to detoxify the environment creating new opportunities for microbial-based approaches to reduce the ecological effects of synthetic pesticides.

Keywords: Cypermethrin, *Lactocaseibacillus paracasei,* CellDesigner, Pesticides, Dioxygenase

OP3.1-7

ADVANCEMENTS IN ELECTROCHEMICAL SENSORS: NANOTECHNOLOGY-DRIVEN INNOVATIONS FOR ENHANCED DETECTION

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ABSTRACT

Electrochemical (EC) sensors play a vital role in the detection as well as quantitative analysis of chemical and biological analytes in different fields, including environmental monitoring, biomedical applications, and food safety. The current review article covers the different types of electrochemical sensors, such as impedimetric, potentiometric, and amperometric sensors, and key mechanisms behind these sensor technologies have also been discussed. The potential of nanotechnology for enhancing the performance and efficiency of electrochemical sensors has been explored. Further improved sensitivity, selectivity, and faster response of these sensors have been attributed to different properties of nanomaterials and nanocomposites and the possibility of miniaturization of these devices at the nanoscale. Applications of electrochemical sensors in the detection of pesticides and pollutants, detection of disease biomarkers, detection of contaminants, glucose monitoring, and pesticide residue monitoring have been discussed in detail. The review covers the challenges and limitations of using nanomaterials in electrochemical sensors, including stability, biocompatibility, scalability, and manufacturing constraints. Future perspectives, such as advances in hybrid nanomaterials, nanocomposites, and the incorporation of AI and IOT, have also been discussed. We believe that the current comprehensive review article could be beneficial for the researchers working in this field and will pave the path of development of electrochemical sensors having the potential for different novel applications.

Keywords:AI integration, Disease biomarkers,Electrochemical sensors, Environmental monitoring nanotechnology.

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OP3.2-8

NANO JANUE-LIKE N-DOPED ZNO BUNDLES AS EFFICIENT PHOTOCATALYSIS FOR THE REMOVAL OF ENDOCRINE DISRUPTOR UNDER VISIBLE-LIGHT IRRADIATION.

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ABSTRACT

Endocrine disruptors are of great concern and is a threat to humanity when present in the environment. With the rise of industrialization there has been increase in the release of endocrine-disrupting agents such as phenolics and phthalates into the environment. This has made it a challenging task for research groups worldwide to remove these agents from water. 2,4-dichlorophenoxy acetic acid has been chosen as the target for degradation which is used commonly for the control of weeds in the fields. These materials enter the aquatic system and percolate into the soil. Hence, we have employed nitrogen-doped ZnO nano-bundles for a visible ligth induced photocatalytic degradation of 2,4-D. The *Nano Janue-like* N-doped ZnO bundles (NZnO) were prepared and analyzed by various chracterization techniques. The NZnO nano janue bundles exhibits a particle size (10-12 nm), with band gap energy - 3.01 eV. The photocatalytic removal studies were conducted with an optimum catalytic dosage of 10 mg/10 mL. The kinetic rate constant was calculated as 5.64 to 2.75 x 10^{-3} min^{-1}, the reaction followed a pseudo-first order kinetics. The COD removal was found to be 93.75% for 10 ppm 2,4-D. This paves the way for employing NZnO nano janue bundles as photocatalysts for environmental remediation under visible irradiation.

Keywords: 2,4-dichlorophenoxy acetic acid; Endocrine disruptor; Environmental Remediation; Nano bundles; Photocatalyst.

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OP3.2-9

HERBICIDE USE, PUBLIC HEALTH, AND ENVIRONMENTAL CONSEQUENCES IN INDIA

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Keywords: Herbicides, Food safety, Intoxication, Ecotoxicology, Public health, Soil health.

Abstract

The escalations in herbicide use trivialize their multifaceted toxic effects on soil health, food safety, public health, and environmental well-being. These "Juggernauts" of agrochemicals, accounting for 47 % of the global pesticide market, are largely under-recognized by agro-social and regulatory frameworks, endorsing its principal consumption. Though deficient, the available production data of herbicides in India, provided by the Directorate of Plant Protection, Quarantine and Storage (PPQS), shows an increase in production from 59713 MT to 63688 MT in 2022-23. As of 2024, 100 herbicides are registered in India as per the Insecticides Act of 1968, of which 20 qualify to be highly hazardous pesticides, as per criteria defined by Pesticide Action Network and nine are categorized under "Deemed to be Registered Pesticides (DRPs)". These highly hazardous herbicides can cause neurological, endocrine, reproductive, and carcinogenic effects in human beings and other organisms and trigger serious illnesses both short-term and long-term. 33 herbicides have been banned or not approved in other countries for their toxic nature and adverse effects. Many herbicides are recognized for their ecotoxicological effects on terrestrial and aquatic life and for disrupting ecosystem functions in organisms. A plethora of intentional and occupational poisoning cases and farmer deaths have been witnessed in different parts of India due to herbicide intoxication. Many herbicides do not have tidotes and this makes less chances for survival after intoxication. Furthermore, the persistence of herbicidal residues in food resources has been documented in scientific studies, raising food safety concerns. Furthermore, herbicide use reduces floral biodiversity, including species that have medicinal properties and nutritional qualities. There is an urgent need for sustainable alternatives to conventional herbicides toensure both agricultural productivity and environmental integrity. Stringent scrutiny and regulation of herbicides need to be adopted and solidified in India to protect citizens from adverse effects.

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OP3.2-10

REGULATORY FAILURES IN PESTICIDE MANAGEMENT COMPROMISE PUBLIC HEALTH AND ENVIRONMENTAL WELLBEING

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ABSTRACT

Synthetic pesticides dominate pest control strategy for many decades in agriculture, industrial, public health and household use sectors. Theiruse continues to escalate both in terms of number and volume, while potential adverse effect has been scientifically acknowledged.Synthetic pesticides - Insecticides,fungicides, weedicides and plant growth regulators - are intrinsically toxic and has the potential to trigger adverse and unintended effects, while the suitability of mitigation measures has not been assessed and considered in regulatory decision-making process. This paper analyse regulatory issues of pesticides in India and its implications on public health and wellbeing.
As on March 2024, 339 pesticides are registered for use in India. Among nearly 40% qualify to be highly hazardous, meeting internationally recognized criteria on adverse effects. The provision for '*deemed to be registered' (DRP)* for those pesticides used in the country before the Insecticides Act 1968 came into effect resulted in widespread use of potentially dangerous pesticides such as endosulfan and monocrotophos among others to be used with out having a comprehensive regulatory scrutiny and consequently resulted in numerous adverse effects including chronic illness and deaths.

Pesticide residues, both in food and human body arean emerging concern for public health and environmental pollution. Reportindicate samples detected with presence of pesticide residues in India has been increased from 22.6% in 2018-19 to 35.9% in 2022 – 23, raising concerns over food safety risks. The findings of a recent human blood analysis reporting 26 pesticides indicate widespread exposure of communities and potential adverse effects.

Regulatory delays further aggravate the adverse effects and risks for citizens, as the potentially toxic pesticides continue to be used in the due course. It took a lengthy span of two decades for stopping usage of endosulfan despite its evident adverse effects.The hindrances and delay in implementing recommendations of expert review of pesticides in India has to be unwelcomed as it causes continued risk for communities while manufactures fetch continues profits from toxic products. The delay in implementing regulatory decisions recommended by Expert Review Committee headed by Dr. AnupamVerma is a crucial example of regulatory laxity.

Many pesticide active ingredients have been recognized and acknowledged to cause poisonings and adverse effects such as reproductive toxicity, developmental toxicity, carcinogenicity, neurotoxicity, endocrine disruption and immunotoxicityare continuingused, while safety measures and PPE use can not be followed due as it causes suffocation in the given climate. Agricultural community studies points to the fact that various diseases and illnesses triggered by pesticide toxicity endpoints are on the rise in the population. This indicate that the regulatory process has been lax and regulators continue to approve pesticides over economic interest of the agrochemical industry, thus compromising health and well being of citizens and the environment. Banning pesticides backed with strong legislation and

promoting nonchemical alternatives is an inevitable step to protect citizens in the country from potential adverse effects from pesticides.

Key word: Pesticide regulation, Pesticide Toxicity, Regulatory Delays, Public health, Environment

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OP3.2-11

ASSESSMENT OF POLYCHLORINATED BIPHENYLS (PCBS) IN AMBIENT AIR AND ITS HEALTH RISK EVALUATIONIN AN URBAN CITY, BANGALORE, INDIA

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ABSTRACT

In recent years, polychlorinated biphenyls (PCBs) in the environment have gained scientific interest because of their persistent nature, widespread occurrence, and the potential threats they pose to humans and the environment. Urban populations are exposed to PCBs through inhalation of particles present in the air. The present study aimed to evaluate the gaseous and particulate PCBconcentrations present in the ambient air based on various seasons and location and to evaluate thehealth risks associated with PCBs in urban areas of Bangalore, Karnataka, India. The PolyurethaneFoam (PUF) and filter paper samples were collected for the analysis of PCBs in ambient air. PCBsin filter paper and PUF were extracted by ultra-sonication and soxhlet extraction methods respectively and analyzed using GC-MS/MS. The maximum mean ∑10PCBs concentration was observed in industrial areas (2.41 ng/m^3) and the minimum concentration in rural areas (0.83 ng/m^3). Similarly, among the different seasons monitored, the maximum values were observed in the winter season (1.82 ng/m^3) and the minimum was in the monsoon season (1.39 ng/m^3). The USEPA exposure risk model was used to assess the carcinogenic and non-carcinogenic risks of population exposure to PCBs. The current finding indicates that the overall carcinogenic risk from
∑10PCBs through inhalation exposure was lower than the acceptable limit for the urban population. However, the population residing near industrial areas has a high carcinogenic risk throughinhalation exposure. These results indicated that inhalation exposure was the primary source of PCBs in atmospheric air and posed a higher carcinogenic risk to the urban population. Therefore, to alleviate the situation and safeguard humans, further continuous monitoring of other toxic contaminants and investigations of biomarkers are highly recommended.

Key words: Air pollution, PCBs, risk assessment, spatiotemporal variation, health risk, India.

OP3.2-12

REPURPOSING BAMBOO SCRAPS AS CARBON ADSORBENTS FOR CEPHALEXIN DECONTAMINATION IN WASTEWATER

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ABSTRACT

Water pollution has become a serious concern and the contaminants of emerging concern needs to be addressed at the earliest. These pollutants make the wastewater even more dangerous. The persistent nature and high toxicity of wastewater contaminants necessitate their removal before environmental release. Among various wastewater treatment methods, adsorption has proven to be both cost-effective and efficient. The present research looks at determining the utility of the Bamboo-derived activated carbon, activated with Zinc Chloride ($ZnCl_2$), in extracting the antibiotic Cephalexin (cephalexin) from wastewater. The surface area of the BAC was found to be 790 m^2/g, and the pore size was ascertained to be 0.8 nm by the Brunauer-Emmett-Teller (BET) analysis. The presence of different functional groups was thus clearly shown on the BAC surface by Scanning Electron Microscope (SEM) combined with Fourier Transform Infrared (FTIR) analyses, and its surface was negatively charged according to the zeta potential analysis. More interestingly, BAC was found to have a good cephalexin adsorption capacity, 85 mg/g. Both Langmuir isotherm and pseudo-second-order kinetics models fitted very well to the experimental data, with R^2 of 0.9647 and 0.999, respectively, thus showing a good correlation between theoretical curves and experimental points. Thus, establishing that BAC is an effective reducing agent for antibiotic micropollutants within an aqueous environment. The same test was carried out on real time hospital samples and positive results were obtained.

Keywords: activated carbon, adsorption capacity, bamboo scraps, biowaste, cephalexin removal

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OP3.2-13

ASSESSMENT OF GROUNDWATER QUALITY IN BANGALORE RURAL DISTRICT: A DECADAL ANALYSIS

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ABSTRACT

This research investigates the suitability of dug well water for drinking in Bangalore Rural district, Karnataka India. It uses secondary data collected over ten years (2015-2024) from the Central Ground Water Board (CGWB), Bangalore and primary data obtained from the well location points. The study examines important water quality parameters like pH, electrical conductivity, calcium, magnesium, sodium, potassium, CO3, HCO3, SO4, chloride, fluoride, NO3, total dissolved solids, and total hardness at 3 different sites. The parameters were compared against the standards in BIS 10500:2012 to check the water quality. A Water Quality Index (WQI) was calculated using the Weighted Arithmetic Index method for the parameters. This approach took into account how much each factor mattered. The WQI scores were grouped into five grades: A (excellent, 0-25), B (good, 26-50), C (poor, 51-75), D (very poor, 76-100), and E (unfit for drinking, >100). The study checks how WQI grades change over time for better or worse, and tries to identify the potential causes of the changes. From the findings, most of the stations (above 50%) exhibited a WQI grade C. The probable cause can be due to the regions being agriculture sites for silk culture, and industrialization. The research underscores the need for effective water management strategies to mitigate the impact of human activities on water quality and promote sustainable agricultural practices in the study area.

Keywords: Bangalore rural, weighted arithmetic index method, water management strategies, water quality index

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OP3.2-14

SOURCES OF NOISE POLLUTION AND EFFECTIVE MEASURES FOR NOISE ATTENUATION

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ABSTRACT

Noise pollution is a growing concern in urban areas due to rapid industrialization and urbanization. Key sources of noise pollution include vehicular traffic, construction, and public events. This report explores the impact of noise pollution, sources, observed levels in different environments, and effective attenuation measures.Noise pollution stems from both industrial and non-industrial sources. Industrial noise primarily originates from heavy machinery, while non-industrial sources include traffic, public gatherings, and construction. The study observed significant noise levels in Bengaluru, with construction equipment and traffic exceeding safe limits. Public spaces like hospitals and quiet zones are also affected, showing elevated noise levels (e.g., 65 dBA in hospitals).Noise pollution adversely affects human health, causing hypertension, sleep disturbances, hearing loss, and cognitive impairments, especially in children. Prolonged exposure can lead to severe health issues, including psychiatric disorders. It also impacts vegetation, animal behavior, and structural integrity of buildings.This study tested the effectiveness of noise barriers made from recycled thatched leaves. Barriers were installed in high-noise areas, such as traffic zones and construction sites, resulting in noise reduction of 6-12%. Additional control measures include strategic planning of construction activities, limiting exposure duration, and enforcing regulated quiet zones.The findings confirm that noise pollution levels often exceed prescribed limits. Barriers, like those made from recycled materials, offer a practical solution. However, broader implementation of statutory noise control measures and public awareness is essential to mitigate the long-term effects of noise pollution on human health and the environment. This study introduces noise barriers made from thatched leaves, formed into enclosures, as a potential solution. While each type of barrier has its own advantages and limitations, they generally reduce noise by 5% to 15%. Over 3,000 noise measurements were collected in various zones on a single day, forming the basis of a noise prediction model developed to forecast noise levels and guide future noise reduction strategies. Using recycled waste material as localized noise barriers offers a practical solution when substantial noise reduction is required.

Keywords— noise, construction noise, noise pollution, noise control, noise attenuation

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OP3.2-15

MECHANOCHEMICAL ACTIVATION OF NATURAL BENTONITE FOR PRODUCING NANOPOROUS BENTONITE BY USING BALL MILLING AND EXTRUSION PROCESSES FOR THE REMOVAL OF CATIONIC DYES FROM WASTEWATER

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ABSTRACT:

Industries utilizing dyes, including textile, paper, plastic, and food sectors, are among the largest producers of wastewater. The textile industry alone discharges approximately 100 tons of dyes into water streams annually. This discharge of polluted water with dyes causes significant risks to the health of local residents, environment, fertile lands and ecosystems. Therefore, effective treatment wastewater contaminated with dyes is a top priority. Adsorption is a highly efficient method for color removal due to its cost-effectiveness, simplicity, and resistance to toxic substances. Natural bentonite is widely used as an adsorbent because of its excellent efficiency in removing organic compounds. However, synthetic dyes cannot be efficiently removed by natural bentonite, necessitating the improvement of low-grade bentonites through activation, a common practice in the bentonite industry. The aim of this research is to develop a method for activating sodium bentonite with an alkali solution and to use extrusion and ball milling techniques to evaluate the effects of mechanochemical activation on the efficiency and rate of dye removal from wastewater. Activation parameters such as soda and moisture contents, aging time, and temperature during the extrusion process, along with time, rotational speed, and ball-to-powder mass ratio during the ball milling process, will be analyzed using response surface methodology (RSM). The significance of these independent variables and their interactions will be tested by blending the obtained powder with dye-containing wastewater and evaluating adsorption via spectrometry. As changes in the properties of activated bentonite are reflected in the extrusion and ball milling processes, controlling the processing factors is crucial for optimizing the product properties.

Keywords: Bentonite, Alkali activation, Extrusion, Ball milling, Dyes, Wastewater.

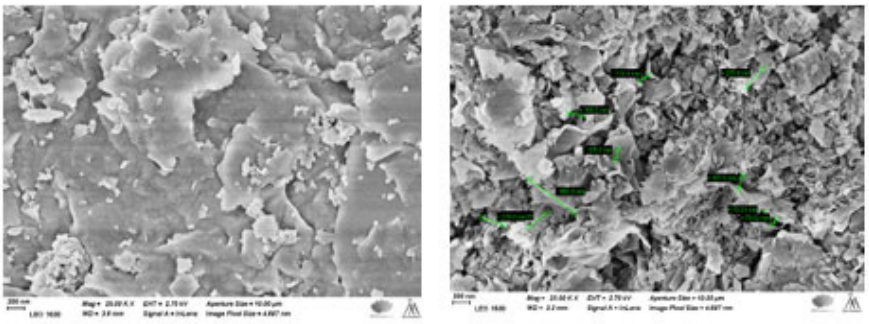

Fig.1. ***SEM analysis of (a) Natural bentonite, (b) Activated bentonite.***

POSTER PRESENTATION

POSTER PRESENTATION

PP2-1

ANALYSIS OF ARSENIC IN TEETH DUE TO PASSIVE SMOKING AND EFFECT OF MAGNETITEIRON-OXIDE NANOPARTICLES IN ITS REMOVAL: AN IN-VIVOSTUDY

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ABSTRACT

Smoking is a warning threat to life and Cigarettes contain over 600 ingredients and releases over 7000 chemicals, out of which69 are known to be carcinogenic. Arsenic being highly toxic, the International Agency for Research on Cancer (IARC) classifies it as a Group-I carcinogen, especially in Second hand or Passive Smoking. Research studies in the past has limited focus only on Arsenic content in Smokers and Non-smokers and none have aimed on its removal from human tissues. Hence, this study emphasized mainly on the objective of Arsenic content in Teeth of Passive Smokers and its removal from it using Magnetite Iron-oxide nanoparticles. Thirty extracted teeth from patients were divided into three groups of ten teeth each as Non-smokers Group (Control Group), Passive Smokers Group and Smokers Group. The Arsenic content in each tooth sample was assessed using Inductively Coupled Plasma Mass Optical Emission Spectroscopy (ICP -OES). The samples showed elemental concentrations of 0.05 – 0.12 ppm for Control Group, 0.72 – 1.08 ppm for Passive Smokers and 0.84 – 1.69 ppm for Smokers respectively, which showed marked reduction in concentration of 0.02 – 0.03 ppm for Control Group, 0.15 – 0.23 ppm for Passive Smokers and 0.27 – 0.31 ppm for Smokers, after addition of Magnetite Iron-oxide nanoparticles and re-evaluation. Present study concluded that, higher levels of Arsenic exposure was associated even with teeth of Passive Smokers and showed its reduction in concentrations after addition of nanoparticles. This result can be used by further in-vivo studies and government agencies to implement some pre-cautionary measures to control and reduce long-term exposure to arsenic especially in Passive Smokers which may cause Cancers of the Lungs, Bladder, etc and to maintain sustainability of Human Health.

Keywords: Arsenic, Carcinogenesis, ICP - OES, Nano Particles, Passive Smoking, Teeth

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PP2-2

MITIGATING POLLUTION USING BIOSURFACTANTS AND NANOTECHNOLOGY

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ABSTRACT

The introduction of harmful substances into the natural environment, causing adverse effects. These contaminants can be in the form of chemicals, waste products, noise, heat, or light, and they can originate from various sources, including industrial activities, agriculture, transportation, and urban development. Pollution can affect air, water, soil, and living organisms, leading to environmental degradation and health problems for humans and other species. Environmental degradation stemming from pollution has emerged as one of the most critical challenges of the 21st century, necessitating innovative approaches for remediation. Increasingly, researchers are turning to biosurfactants as surface-active compounds produced by microorganisms as promising agents for mitigating the adverse effects of pollutants. Traditional remediation techniques often deal with inefficiencies, time consumption, and high costs, prompting the exploration of nanotechnology and biosurfactants as a transformative solution. These biologically-derived substances offer several advantages over traditional chemical surfactants, notably their biodegradability, low toxicity, and effectiveness across a range of environmental conditions. The strategic incorporation of biosurfactants into existing pollution remediation frameworks could materially enhance the efficacy of current methods. By offering increased surface area and reactivity, nanoscale materials can target and degrade hazardous substances more effectively than their bulk counterparts. This study aims to elucidate the synergistic potential of integrating these two approaches, examining their combined application can lead to more efficient pollution management strategies. The ultimate goal of this study is to provide a comprehensive understanding of how these biocompatible agents can be systematically utilized to address pollution challenges, thereby fostering a sustainable environment for future.

Keywords: Biosurfactants, Environmental pollution, Nanotechnology, Pollution management, Synergistic effects.

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PP2-3

COMPREHENSIVE ASSESSMENT AND RISK ANALYSIS OF EMERGING CONTAMINANTS IN KEY URBAN AREAS OF KARNATAKA, INDIA

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ABSTRACT

The release of pharmaceuticals, personal care products, and plastics has necessitated their wide-scale use, creating a further environmental hazard by allowing the direct discharge of pollutants into freshwater and marine systems. This work would present and increase awareness on the implications that the polluters have on the water supply system is paramount to the scientific fraternity and the public. Our investigation centered on the dispersal of contaminants of emerging concern at 28 sites in two highly populated cities, Bengaluru and Mysuru, of the State of Karnataka, India. While focusing our work on four specific compounds: Paracetamol, Amoxicillin, Caffeine, and Ciprofloxacin, we have analyzed the presence of all these compounds in water as well as sediment samples. Three compounds were present in sediment deposits. The highest concentration in water was experienced with the release of Ciprofloxacin at ranges from 0.11 to 15.71 µg/L while Amoxicillin ranged between 0.04 to 0.78 µg/L. Ciprofloxacin also dominated in sediment samples, ranging from 0.15 to 0.93 µg/Kg. All the CECs have been identified with a high degree of risk quotient, thus indicating a significant toxicological threat to the ecosystem, public health, and socio-economic well-being of Bengaluru and Mysuru both in the short and long term. That would necessitate a collaborative effort among scientists, policymakers, and the community at large.

Keywords: emerging pollutants, environmental risk, PNEC, RQ standards, wastewater.

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PP2-4

VALIDATION OF QUECHERS METHOD FOR DETERMINATION OF ORGANOPHOSPHORUS RESIDUES IN GRAPES USING GC-FTD

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ABSTRACT

Pesticides are applied in grapes for the management of various pests and diseases which leads to presence of residues. In the present study,the QuEChERS method (Anastassiadeset al., 2003) was validated for simultaneous determination of 14 organophosphorus residues ingrapefruits as per SANTE guidelines. The method involved ethyl acetateas an extraction solvent and dispersive SPE clean-upmethod with PSA and magnesium sulfate and residues were determined by gas chromatography coupled to Flame photometricdetector. The analytical method was linear with R^2 0.999, LOQ 0.01mg $kg^{-1}$with 74-118 % recovery and less than 20 % RSD which complies with SANTE requirements. The validated method can be used for monitoring residues of selected pesticides in fresh grape samples.

Key words: GC-FTD, Grapes, method validation, QuEChERS, organophosphorus residues

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PP2-5

CONTAMINANTS IN CONSERVATION: ECOLOGICAL IMPACTS OF ENDOCRINEDISRUPTING CHEMICALS IN HAIDERPUR RAMSAR SITE

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ABSTRACT

Wetlands are critical ecosystems that support biodiversity, regulate water quality, and provide essential ecosystem services. The increasing prevalence of emerging contaminants particularly Endocrine-Disrupting Chemicals (EDCs) in protected wetlands poses a significant threat to Global biodiversity. Among EDCs, phthalic esters (PAEs), commonly known as phthalates, are of particular concern due to their widespread use as plasticizers in cosmetics, food packaging, and building materials. recognized as endocrine disruptors, cause reproductive and developmental disruptions in aquatic organisms, posing significant risks to biodiversity and ecosystem health.(1,2)

This study presents the first comprehensive assessment of phthalic ester contamination in the Haiderpur Wetland, a 6,908-hectare Ramsar site in Uttar Pradesh, India, investigating their potential impacts on ecosystem integrity (3). Surface water samples collected during the pre-monsoon season of 2021 were analysed using liquid chromatography-mass spectrometry to quantify six priorities estrogenic PAEs. Results revealed a concerning contamination trend, with Bis(2-ethylhexyl) phthalate dominating at 10.97–167.97 ng/L, followed by Di-n-butyl phthalate (1.26–5.23 ng/L), Diethyl phthalate (0.04–1.47 ng/L), Butyl benzyl phthalate (0.11–0.35 ng/L), Dimethyl phthalate (<DL (Below detection Limit)–0.20 ng/L), and Di-n-octyl phthalate (<DL–0.12 ng/L). These levels indicate significant contamination from urban/rural catchments, and agricultural runoff, potentially threatening the site's aquatic diversity.

This research provides crucial baseline data for conservation managers and policymakers, emphasising the necessity of implementing comprehensive pollution control measures to preserve the ecological integrity of this internationally recognized wetland. Future studies should focus on seasonal variations in phthalate concentrations and their bioaccumulation patterns in the local food web to better understand long-term ecosystem impacts.

Keywords: Emerging Contaminants, EndocrineDisruptors, Ecological Impacts, Haiderpur Ramsar site, Phthalates

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PP2-6

EMERGING ENDOCRINE DISRUPTING CHEMICALS IN FISH: A PRELIMINARY ASSESSMENT OF THEIR OCCURRENCE IN THE UPPER GANGA RIVER

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ABSTRACT

Endocrine-disrupting chemicals (EDCs) pose a significant threat to aquatic ecosystems worldwide, potentially disrupting reproductive cycles, altering growth patterns, and impacting population dynamics of various species[1]. Despite their known ecological impacts, data on EDC contamination in protected riverine systems of India remains limited. This study investigates the bioaccumulation potential of five priority EDCs—Ibuprofen, Estrone (E1), Estradiol (E2), Estriol (E3), Diethylstilbestrol(DES), EE2, Triclosan (TCS), and Bisphenol A (BPA)—in fish populations from the Upper Ganga River, a critical ecological corridor that includes the Brijghat-Narora Ramsar site.

81 individuals belonging to 16 species were collected during 2023 from Bijnor to Narora, with a focus on species prevalent in these areas. The samples were prepared by QUECHERs method and target EDCs quantified using liquid chromatography-mass spectrometry (LC-MS). The results indicate a substantial occurrence of bioaccumulation for the selected EDCs within the following range: TCS(7.741-66.851ng/g),Ibuprofen (0.596 ng/g), E3(0.579-0.654ng/g),BPA (0.080-1.172 ng/g), E1(0.018-0.058ng/g).The contamination profiles exhibited distinct spatial variations between the two sampling sites, likely reflecting differences in local land-use development, agricultural settlements. and industrial activities.

Our research provides crucial baseline data for conservation managers and policymakers, emphasizing the necessity of implementing comprehensive monitoring programs and stricter regulations on chemical discharge. The study underscores the critical importance of protecting this unique riverine ecosystem, which not only supports exceptional biodiversity but also provides essential ecosystem services to millions of people in the Indo-Gangetic plains.

Keywords: Emerging contaminants,Endocrine Disrupting Chemicals, Upper Ganga River, Ramsar Site, Bioaccumulation

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PP2-7

QUANTIFICATION AND ECOLOGICAL RISK ASSESSMENT OF ESTROGENIC PLASTIC ADDITIVES IN A TOURIST-INFLUENCED NAINITAL LAKE

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ABSTRACT

Freshwater ecosystems, particularly lakes, serve as critical habitats supporting a diverse array of flora and fauna and provide essential ecosystem services to surrounding communities. Nainital Lake, a high-altitude Himalayan Lake, was investigated for six estrogenic plastic additives (e-PAs) belonging tophthalic acid esters (PAEs) This study provides the first evidence of the occurrence, distribution, and ecological risk of PAEs in Nainital Lake.

Twelve surface water samples were analyzed for six PAEs. The extraction was performed using Solid Phase Extraction, and the quantification of target e-PAs was performed using Ultra–High–Performance Liquid Chromatography Tandem Mass Spectrometry.
The distribution profile of PAEs revealed the following contamination profile in the following order: Bis(2-ethylhexyl) phthalate (10.97–167.97 ng/L) > Di-n-butyl phthalate (1.26–5.23 ng/L) > Diethyl phthalate (0.04–1.47 ng/L) > Butyl benzyl phthalate (0.11–0.35 ng/L) > Dimethyl phthalate (< DL–0.20 ng/L) > Di-n-octyl phthalate (< DL ng/L). The potential sources include inadequate plastic waste management, personal care products, boating materials, recreational equipment, household and hotels wastewater, and discarded food packaging associated with high tourist activity and local settlements. Ecological risk assessment indicated a high risk associated with more than one PAEs at all of the sites surveyed, underscoring the potential threat these pollutants pose to aquatic life and ecological integrity. The presence of PAEs in Nainital Lake, particularly Bis(2-ethylhexyl) phthalate at elevated levels, highlights the lake's vulnerability to anthropogenic pollution. The high ecological risk associated with these compounds suggests an urgent need to address pollution sources, particularly those related to tourism and waste management. Additionally, routine monitoring of PAEs and other contaminants of emerging concern should be established to track contamination trends and inform mitigation efforts.

Keywords: Estrogenic plastic additives, Ecological risk, Nainital lake, Phthalic acid esters, Tourism

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