



National Seminar
on
Trends in Green Chemistry and Sustainable Development
(TGCSD-2024)

(February 20-21, 2024)

Organised by
Department of Chemistry
in collaboration with
IQAC, Magadh Mahila College,
Patna University, Patna, Bihar



&

Indian Science Congress Association (ISCA), Patna
Chapter



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Message

I am pleased to extend my warmest greetings to all participants for the upcoming National Seminar on Green Chemistry and Sustainable Development, organized by The Department of Chemistry and IQAC, Magadh Mahila College on Feb 20-21, 2024 in collaboration with Indian Science Congress Association, Patna Chapter, Bihar.

In today's world, the need for sustainable practices and environmentally friendly solutions has never been more pressing. As stewards of education and innovation, it is incumbent upon us to lead by example and champion initiatives that promote the harmonious coexistence of humanity and nature. The National Seminar on Green Chemistry and Sustainable Development embodies our commitment to fostering dialogue, sharing knowledge, and catalysing actionable solutions that contribute to a greener and more sustainable future.

I hope that all members of our academic community will actively participate in this seminar and seize the opportunity to deepen their understanding of green chemistry concepts and their practical applications.

I congratulate the organising committee, faculty and supporting staffs of the Magadh Mahila College for organising this seminar and wish its grand success.

RSinha
16.02.2024
Krishna Chandra Sinha
Vice Chancellor

Message From the Principal



I am delighted to announce that the Department of Chemistry and IQAC, Magadh Mahila College is organising a National Seminar on Trends in Green Chemistry and Sustainable Development, on Feb 20-21, 2024 in collaboration with Indian Science Congress Association, Patna chapter. This seminar promises to be an enlightening and enriching experience, focusing on the pivotal role of green chemistry in shaping a sustainable future for our planet.

The seminar features distinguished speakers and experts from various fields, who will share their insights and knowledge on the latest advancements in green chemistry and its implications for sustainable development. Through keynote addresses, panel discussions, and interactive sessions, participants will have the opportunity to explore innovative approaches, technologies, and practices aimed at mitigating environmental degradation and promoting eco-friendly solutions.

The present seminar is targeted to provide a platform for all of us to deepen our understanding of green chemistry principles and their application across diverse industries and disciplines. I encourage all students, faculty members, and staff to participate actively in this seminar, as it presents a unique opportunity to expand our knowledge, foster collaboration, and inspire collective action towards a greener and more sustainable future. Let us come together to make this seminar a resounding success and a catalyst for positive change.

I wish the organisers a great success and congratulate them for creating a platform for live discussion on such a relevant and important issue. Thank you for your attention, and I look forward to your enthusiastic participation.

Namita K

Prof. Namita Kumari
Principal
Magadh Mahila College

**Message from the Convenor, Indian Science Congress Association (ISCA),
Patna Chapter**



Esteemed Participants,

It is with great pleasure and enthusiasm that I, Sheo Satya Prakash, Convenor of Indian Science Congress Association, Patna Chapter, Bihar, extend my warmest welcome to each of you to the National Seminar on Trends in Green Chemistry and Sustainable Development.

In today's rapidly evolving world, the transition to green energy and sustainable development practices is not just an option; it is an imperative. Climate change, resource depletion, and environmental degradation pose profound challenges that require urgent and concerted action. As such, this seminar serves as a vital platform for knowledge exchange and promoting meaningful changes. Throughout this seminar, I inspire you to engross actively and explore innovative approaches to address the pressing issues facing our planet.

I, on behalf of Indian Science Congress association, Patna Chapter, extend my gratitude to the organizers, speakers, and participants for their invaluable contributions to this important discourse. Your dedication and passion are essential in advancing our shared vision of a world where green energy and sustainable development thrive. Thank you all for your participation.

A handwritten signature in black ink, appearing to read 'SSP'.

**Prof. Sheo Satya Prakash
Convenor
Indian Science Congress Association,
Patna Chapter, Bihar**

Message from the Convenor



I am delighted to say that the National Seminar on Trends in Green Chemistry and Sustainable Development (TGCSD-2024), is being organised by Department of Chemistry, at Magadh Mahila College in collaboration with IQAC MMC and Indian Science Congress Association Patna Chapter. As the Convenor of this significant event, I am elated to welcome you all to join us in meaningful discussions and collaborations in the realm of sustainable chemistry.

The aim of organising this seminar is to bring together researchers working in academia and other scientific organisations, practitioner's and faculty members from across the nation to exchange knowledge, ideas, and best practices in advancing green chemistry principles and promoting sustainable development. By providing a platform for dialogue and networking, we aspire to catalyse innovative solutions to address the pressing environmental challenges of our time.

Throughout the conference, participants will have the opportunity to engage in keynote presentations, panel discussions, interactive sessions, and poster sessions covering a diverse range of topics, including but not limited to: Renewable, Affordable and Clean energy, Green Synthesis, Catalysis for Sustainability, Biodegradable and Smart materials, Biotechnology, Materials for environmental sustainability, Click chemistry, Pollution Prevention and remediation. In addition to the academic exposure, we will get ample opportunities for networking to facilitate meaningful connections and collaborations among participants. Your presence will not only enhance the conference experience but also contribute to building a vibrant community committed to sustainability.

I owe my gratitude to our dynamic Principal, Prof. Namita Kumari for her constant support and guidance. I am also thankful to Prof. Sheo Satya Prakash, Convenor Indian Science Congress Association, Patna Chapter for collaborating with us for this event. My Sincere thanks to Prof. Tripti Gangwar of Dept of Chemistry, AN college & Advisor IQAC, Magadh Mahila College for her valuable suggestions. I am grateful to the members of organising committee and faculty members of all science departments for their constant support and cooperation. Finally, I seek your cooperation to make this seminar a successful and memorable event. Thanking you and welcoming you once again for this two-day National seminar

Dr. Amrita Prasad
Assistant Professor Chemistry

Message from the Organising Secretary



It is with great pleasure we extend our warmest welcome for seminar on "Trends in Green Chemistry and Sustainable Development." This pivotal event aims to delve into the intersection of science, innovation, and environmental stewardship, with a focus on promoting sustainable practices for a greener future.

Our seminar will feature distinguished speakers and experts from various fields, offering insights into the latest advancements, challenges, and opportunities in green chemistry and sustainable development. Through interactive discussions, presentations, and networking sessions, we aim to develop collaboration and inspire collective action towards building a more sustainable world.

Together, let us explore innovative solutions, share best practices, and chart a course towards a more sustainable and resilient world. We look forward to your participation and contributions to this significant event.

A handwritten signature in blue ink that reads "Sujata Kumari". The signature is written in a cursive style.

Dr. Sujata Kumari
Assist. Professor, Zoology

ORGANISING TEAM

Chief Patron:	Prof. K. C. Sinha Vice Chancellor, Patna University
Patron:	Prof. Namita Kumari Principal, Magadh Mahila College
Chairpersons:	Prof. Sheo Satya Prakash (ISCA Convener, Patna Chapter) Prof. Dhyanendra Kumar (Nominee/Advisor ISCA, Patna Chapter) Dr. Usha Kumari (HOD Chemistry, MMC, Patna) Prof. Pushpalata Kumari (Coordinator IQAC, MMC, Patna)
Convener:	Dr. Amrita Prasad (Dept. of Chemistry, MMC, Patna)
Organising Secretary:	Dr. Sujata Kumari (Dept. of Zoology, MMC, Patna)
Treasurer:	Dr. Surendra Kumar Prasad (Dept of Botany, MMC, Patna)

ADVISORY COMMITTEE

1. **Prof. Tripti Gangwar** (Dept. of Chemistry, AN College, Patna/Advisor IQAC, MMC)
2. **Prof. Seema Sharma** (HOD, PG Dept of Physics, Patliputra University Patna)
3. **Prof. Shailendra Kumar** (HOD, PG Dept of Chemistry, Patna University)
4. **Dr. Shyam Deo Yadav** (Dept. of Chemistry, MMC, Patna)
5. **Dr. Pushpanjali Khare** (Dept. of Botany, MMC, Patna)
6. **Dr. Mridula Renu Sinha** (HOD Zoology, MMC, Patna)
7. **Dr. Priti Mishra** (HOD Physics, MMC, Patna)
8. **Dr. Binay Kumar** (HOD Maths, MMC, Patna)
9. **Dr Madhu Kumari Gupta** (Dept. of Chemistry, MMC, Patna)

Programmes Schedule

20th February 2024 (Day 1)

Session	Time	Programme
On spot Registration & Distribution of Kit	10:00 am – 10:30 am	
Inaugural Session	10:30 am - 11:30 am	
Technical Session 1 Session Chair: Prof Shailendra Kumar Co-Chair: Prof Sheo Satya Prakash	Invited Talks	
	11:30 am - 12:10 pm	Keynote Lecture by Dr. Subrata Das Dept. of Chemistry, NIT Patna
	12:10 pm – 12:50 pm	Dr. Deewan Akram, Dept. of Chemistry, Munger University
	12:50 pm -1:30 pm	Dr. Vikas Kumar, Department of Zoology, Sri Guru Gobind Singh College, PPU
Lunch	01:30 pm - 02:30 pm	
Technical Sessions 2 Session Chair: Dr. Surendra Kumar Prasad Co-Chair: Dr. Amrita Prasad	02:30 pm - 04:30 pm	Oral presentations by Participants

21st February 2024 (Day 2)

Sessions	Time	Programme
Technical Session 3 Session Chair: Dr. Pushpanjali Khare	Keynote Lecture /Invited Talks	
	10:30 am - 11:30 am	Keynote Lecture by Prof. Vinod Kumar Tiwari. Dept. of Chemistry, Institute of Science, BHU
	11:30 am - 12:10 pm	Prof. Lokman H. Choudhury Dept. of Chemistry, IIT Patna
	12:10 pm – 12:50 pm	Dr. Tasneem Parvin Dept. of Chemistry, NIT Patna
	12:50 pm - 01:30 pm	Prof. Himanshu Shekhar Dept. of Chemistry, VKSU
Lunch	01:30 pm - 02:30 pm	
Technical Session 4 Session Chair: Dr. Usha Kumari Co-chair: Dr. Sujata Kumari Judges for Poster Presentation: Prof Tripti Gangwar Dr Tasneem Parvin Dr. Mridula Renu Sinha	02:30 pm - 03:30 pm	Oral Presentations by participants Parallel Poster Presentations
Valedictory	03:30 pm - 04:30 pm	Chief Guest: Prof Tripti Gangwar, Dept. of Chemistry, AN College, Patliputra University

Keynote Speaker

1. Professor Vinod Kumar Tiwari
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Email: Tiwari_chem@yahoo.co.in; Vinod.Tiwari@bhu.ac.in
2. Dr Subrata Das
Department of Chemistry, National Institute of Technology Patna, Bihar 800005, India,
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Invited Talks

1. Prof. Lokman H. Choudhury
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2. Dr Deewan Akram
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4. Prof. Himanshu Shekhar
Dept. of Chemistry, Veer Kuwar Singh University, Ara, Bihar- 802301, India.
5. Dr. Tasneem Parvin
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Click Chemistry'- A Nobel Prize Reaction: The Growing Impact in Glycoscience

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Just after the discovery of 'Click Chemistry' by two independent scientists K B Sharpless and Morten Meldal in 2002, this modular reaction is considered as one of the most reliable protocols and widely explored in various emerging fields.¹ It just says click - and the molecules are coupled together through triazole as biologically imperative linker. This protocol is reached to a highest recognition i.e. 'Nobel Prize in Chemistry for the Year-2022' awarded to Carolyn R. Bertozzi, Karl Barry Sharpless, and Morten J. Meldal for 'the development of click chemistry and biorthogonal chemistry'. Both Sharpless and Meldal have laid the foundation for the functional form – Click Chemistry – where two different molecular building blocks linked together quickly, efficiently and moreover with excellent regioselectivity. Carolyn R Bertozzi has engaged this modular tool to a new dimension through using it in living organisms,² a perception widely explored in chemical biology and great impact in drug discovery and development. A clear understanding of the role of carbohydrate in a number of important biological events has led to an increased demand for the sugar-based molecules for their complete chemical, biological, and pharmacological investigations. Through utilizing this regioselective triazole forming CuAAC 'Click Chemistry', tremendous efforts have been made during the last 20 years to furnish diverse range of the desired triazole-appended molecular architectures (Fig. 1). In this context, synthesis of a broad range of simple to complex glycoconjugates achieved in my laboratory³⁻¹⁰ will be presented in great detail.

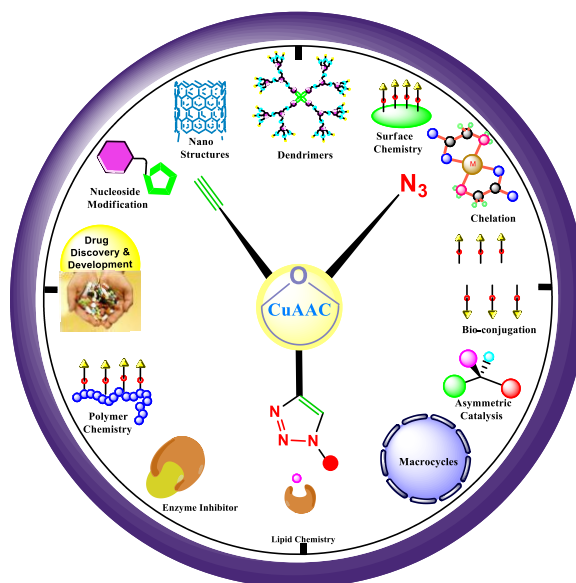


Figure 1: Click mediated Glycoconjugated 1,2,3-triazoles and their growing applications

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Technological Aspect of Visible Light Driven Organic Transformations

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ABSTRACT

Visible light-driven organic transformations have become very widespread due to their energy efficiency, process simplicity, and high selectivity. Since photoreactions occur in a wide range of wavelengths and conditions, designing a specific reactor is very strenuous and challenging. Hence, different reactor types are required to meet the different demands of photoreactions, but suited scale-up strategies do not yet exist for relevant reactor types. Crucial links for the scale-up process are still missing. Ideally, a scale-up process should be performed within the same type of reactor, ensuring comparable reaction conditions. But lab-based organic photochemical experimentation reaction takes place on a very small scale with a small batch reactor and light assembly. After successful experimentation, a scale-up of the reaction is needed. To date, there is no reactor that can operate in a bottom-up approach, from laboratory experiments to large scales.

To resolve these issues, a falling film looping photoreactor was developed that can be scaled by one order of magnitude (**Figure 1**). Laboratory-scale reactions were successfully transferred to a larger scale with comparable efficiency. The falling film looping photoreactor concept can be used for both optimization of photoreactions and scale-up. The versatility of the developed reactor concept was demonstrated using two benchmark reactions as examples. For both reactions, significant acceleration of the reaction rates and improvement in productivity were realized. Moreover, the presented photoreactor is easy to handle, photonicallly characterized and documented in a state-of-the-art fashion to ensure reproducibility of the concept. The simple yet successful scale-up strategy indicates that falling film photoreactors add significant value to the scale-up toolbox for photochemical reactions.

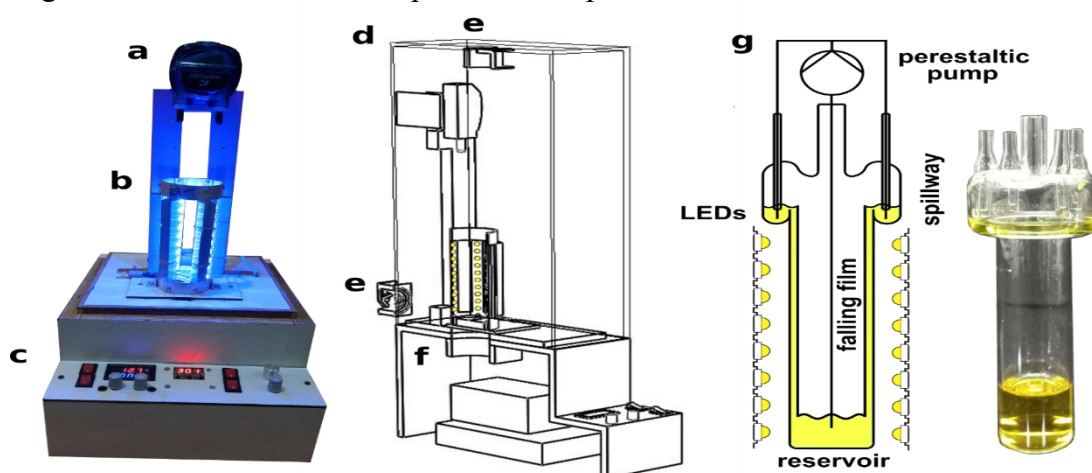


Figure 1: Falling film looping photoreactor setup consisting of a peristaltic pump (a), irradiation module (b), control unit (c), reactor casing (d), fans (e), magnetic stirrer (f) and photoreactor glassware with spillway and working principle of the falling film looping photoreactor (g).

References

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- [2] C. C. Le, M. K. Wismer, Z. C. Shi, R. Zhang, D. V. Conway, G. Li, P. Vachal, I. W. Davies, D. W. C. MacMillan, *ACS Cent. Sci.* **2017**, 3, 647–653.

Harmonizing Innovation and Sustainability: Green Chemistry Strategies in Small and Macromolecular Synthesis

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ABSTRACT

Ecofriendly synthesis is one of the hot topics in the field of chemical science. Therefore, the design and development of cost and step economic methods using ecofriendly starting materials, catalysts, solvents as well as reaction conditions for the synthesis of important small molecules as well as polymers have gained considerable interest in organic synthesis. Considering the importance and virtues of light mediated reactions, pot atom and step economic reactions and catalytic reactions in terms of green chemistry, we are working towards developing new methods and strategies employing them for the preparation of medicinally important hybrid molecules as well as novel polymers having application in chemo sensing and environmental remediation. This presentation will delve into our recent advancements in light-mediated reactions, domino reactions, C-H activation, and multicomponent polymerization using the concept of Green Chemistry.

References:

1. (a) Bhaumick, P.; Kumar, R.; Acharya, S. S.; Parvin, T.; Choudhury, L. H.* Multicomponent Synthesis of Fluorescent Thiazole–Indole Hybrids and Thiazole-Based Novel Polymers. *J. Org. Chem.* **2022**, *87*, 11399-11413. (b) Jana, A.; Ali, D.; Bhaumick, P.; Choudhury, L. H.* Sc(OTf)₃-Mediated One-Pot Synthesis of Coumarin-Fused Furans: A Thiol-Dependent Reaction for the Easy Access of 2-Phenyl-4H-furo[3,2-c]chromen-4-ones. *J. Org. Chem.* **2022**, *87*, 7763-7777. (c) Acharya, S. S.; Bhaumick, P.; Kumar, R.; Choudhury, L. H.* Iodine-Catalyzed Multicomponent Synthesis of Highly Fluorescent Pyrimidine-Linked Imidazopyridines. *ACS Omega* **2022**, *7*, 18660-18670.
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Recent Advances in Vegetable Oil based eco-friendly coating materials

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ABSTRACT

Vegetable oils (VO) constitute Mother Nature's most abundant, low cost, non-toxic, non-depletable, biodegradable family yielding materials that are capable of competing with fossil fuel derived petro-based products [1]. The outstanding feature of VO is their unique chemical structure having unsaturation sites, epoxies, hydroxyls, esters, and other functional groups along with inherent fluidity characteristics [1-2]. These enable them to undergo various chemical transformations producing low molecular weight polymeric materials with versatile applications in the field of coatings [1-3]. In this presentation, we will briefly be described important VO derived materials such as Polyols, Organic-Inorganic hybrid, polymer nanocomposites, along with their preparation, characterization and applications as protective coatings.

KEYWORDS: Vegetable oils, Eco-friendly, Renewable resources, Coatings

References: -

1. E.Sharmin, F.Zafar, Deewan Akram, M.Alam, S.Ahmad, *Industrial Crops and Products*, 76 (2015) 215-229
2. Deewan Akram, E.Sharmin, S.Ahmad, *Progress in Organic Coatings*, 108 (2017) 1-14
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Computer assisted drug designing: an in-silico approach of drug development

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An emerging technology, Computer Assisted Drug Design (CADD) accelerates the drug development by making use of the accumulated information of existing drugs and diseases, combined with inter-disciplinary inputs from other fields. This technology extensively uses mathematical models and simulation tools based on the evaluation of potential risks from drug safety and the experimental design of new trials. The drug is most commonly an organic small molecule which activates or inhibits the function of a biomolecule such as a protein which in turn results in a therapeutic benefit to the patient. In the most basic sense, drug design involves design of small molecules that are complementary in shape and charge to the biomolecular target to which they interact and therefore will bind to it. In CADD, computational tools and softwares are used to simulate drug receptor interactions. Fast expansion in this area has been made possible by advances in software and hardware computational power and sophistication, identification of molecular targets, and an increasing database of publicly available target protein structures. CADD is being utilized to identify hits (active drug candidates), select leads (most likely candidates for further evaluation), and optimize leads i.e. transform biologically active compounds into suitable drugs by improving their physicochemical, pharmaceutical, ADMET/PK (pharmacokinetic) properties. There are two major approaches in CADD: 1) Structure based drug design and screening 2) Ligand based drug design and screening.

Innovations in Green Organic Synthesis towards Sustainable Solutions

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ABSTRACT

With growing concerns about environmental impact and resource depletion, there is an urgent need for the development of greener alternatives in chemical synthesis.¹ The quest for sustainability in organic synthesis encompasses a range of strategies aimed at minimizing waste generation, reducing energy consumption, and utilizing atom-economical transformations. In this direction one-pot multicomponent reactions wherein maximum atom contributes to the final product, offer a pathway towards a more sustainable future in organic synthesis by maximizing efficiency and minimizing by-products. The talk will highlight some of our recent innovation in green organic synthesis by multicomponent reactions.²

References

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Removal of Cd (II) using Silica Powder as Adsorbent: Kinetic and Thermodynamic Studies.

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The main aim of the present piece of the work is to evaluate the capacity of silica for Cd (II) adsorption and study the influence of adsorption isotherms, kinetics and thermodynamics of the adsorption processes. In this investigation very low cost, eco-friendly and easily available adsorbent was used for the removal of Cd²⁺ from aqueous solution. Condition for the maximum removal, capacity of adsorbent and characteristics of the adsorption process was monitored. The Langmuir and Freundlich isotherms model were investigated in linear plot. R² value in the plots for both isotherms have been found 0.994 favour both isotherm model. Adsorption mechanism was highlighted using experimental data which was well fitted by the pseudo second order kinetic model. Thermodynamics of the adsorption suggest the process is exothermic and spontaneous.

Selected Abstracts

Liquid-assisted Mechanochemical Synthesis, Crystallographic, Hirshfeld Surface and Theoretical study for Nonlinear Optical (NLO) Properties of Novel Copper complexes: Bis(2,9-dimethyl-1,10-phenanthroline)-copper perchlorate and Bromidobis(1,10-phenanthroline)-copper

Ruchika Jaryal, Shamshad Ahmad Khan*

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ABSTRACT

The two novel Cu (I) complexes, [Cu(dmp) 2]ClO 4 with 2,9-dimethylphenanthroline (dmp) and [Cu(phen) 2 Br] with 1,10-phenanthroline (phen) were synthesized by liquid assisted grinding (LAG) method followed by heating. Complexes were characterized by using SC-XRD, FT-IR and UV-Visible spectroscopic techniques. The complex (1) [Cu(dmp) 2]ClO 4 crystallized in the Orthorhombic with the space group P 21 21 21, a = 11.9229(2) Å, b = 12.4823(3) Å, c = 18.2499(3) Å and Complex (2) [Cu(phen) 2 Br] crystallized in the Monoclinic with the space group C2/c, a = 23.247(5) Å, b = 30.731 (6) Å, c = 7.5317(15) Å and $\beta = 97.677(6)^\circ$. The FMOs study based on DFT showed the complex (2) has high value of chemical softness and more easily polarized compare to complex (1). The HOMO-LUMO energy gap in complex (2) is small compared to complex (1) due to which there is easier intramolecular charge transfer (ICT) in complex (2) which support the higher third order NLO (γ) response of the complex (2). The statistical calculations for Pearson correlation coefficient (r) and the P values showed that the selected level of theory is appropriate for the theoretical calculations of the complexes. Theoretical calculation showed that both the complexes have higher third order NLO response compared to prototypical urea.

Keywords: Liquid assisted grinding (LAG), intramolecular charge-transfer (ICT), Pearson correlation coefficient (r), Nonlinear optical (NLO) response.

A Survey of effects of the Anthropogenic pollution in the Gandak river water and its fish biodiversity

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ABSTRACT

Increasing human population puts intense pressure on the river for food, feed and earnings. Also using rivers as their household dustbin and the living aquatic creatures also. These are termed as anthropogenic pollution (are directly associated with the decline of river water quality and the fish biodiversity) and become an issue of increasing scientific concern. It not only affects the river ecosystem but also the rotation into the food web. The present survey was undertaken in Gandak river (Bihar) at Hajipur from August 2022 to September 2023. Bihar is a land of river and a huge population resides at the bank of the rivers. But still they are being polluted for all self comfort, River Gandak is also not deprived of these. The survey concentrated on the water quality, fish biodiversity and their IUCN status in particular seasons. A total of 39 individual fish species were identified that belonged to 18 families, 29 genus and 39 species. The Cyprinidae family (61.11%) was dominating followed by the Bagridae family (27.78%). 79.4% are LC, 10.25% are VU, 5.12% are NT and 5.12% are EN. Physicochemical parameters such as Temperature, pH, TDS, DO, BOD, COD, conductivity, Total Hardness, phosphate, sulphate, chloride of different seasons were analysed that showed variations in river water quality and fish availability. Industrial activities are less but anthropogenic activities are very active in these areas. Therefore, all these data will be helpful in the future to study and further research in the Gandak river with respect to water quality and preservation, conservation for the fish biodiversity of river Gandak.

Keywords- Gandak River, fish biodiversity, physicochemical parameters, anthropogenic activity.

Green Technology and Its Effect On The Modern World

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ABSTRACT

Green technology is a term that describes a form of technology that is deemed eco- friendly due to its manufacturing process or supply chain. Green Technology `s mission is to protect the earth and in some situations, also to undo previous environmental harm. Excessive use of pesticides andover- exploitation of energy ,among other Factors, have resulted in a crescendo of the green house effect ,disrupted habitats ,and global warming in the last two decades , prompting the development of green technologies. Green energy seems to be the only shining knight in shining armour who can save world when the planet`s natural resources run out .The current study has explained about the history of technology and green technology . Green technology initiatives objectives in different spaces of civilization, and its effects on different sectors . Alternative energy sources, biodegradable materials , recycling and the construction of sustainable buildings are all aided by environmental technology .It also contributes greatly to carbon reduction, global warming mitigation and natural resource preservation. Green Technology encompasses a vast variety of gadgets , allowing people to be more concerned about the environment in their real experiences. Hence in this future this technology has always come up with better solutions and implemented in very efficient ways. The shift to green technology should help to stabilize global movements toward improving people`s well-being and social prosperity thereby reducing environmental concerns.

Keywords - Food, Green, Nanotechnology, Resource, Technology.

Study of Removal Efficiency, Kinetic and Thermodynamic behavior of Adsorption of Cd (II) using Silica Powder as Adsorbent

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ABSTRACT

The adsorption efficiency of Cd (II) from water using silica powder through batch experiment was studied at different temperature i. e, 298, 303, 308 and 313 K. The effect of adsorbate dose, adsorbent dose, agitation speed and pH on the removal of Cd (II) from water was also investigated and predicted the optimum condition for the maximum removal of Cd (II) solution of initial concentration 2.5 mg/l at equilibrium time 60-minute, pH: 6, adsorbent dose 50 mg silica in 50 ml of stock solution and agitation speed at 240 rpm. On increasing temperature increased removal of Cd (II) was found for a short duration. The contact time of batch adsorption experiment for maximum removal of contaminant was the special feature of the present piece of work. The Langmuir and Freundlich isotherms models were investigated in a linear plot. R^2 values in the plots for both isotherms are 0.994 which favors both isotherm models. The absorption mechanism was highlighted using experimental data which was fitted by the pseudo second-order kinetic model. Thermodynamics of the adsorption suggests the process to be exothermic and spontaneous.

Keywords: Cadmium, Silica, adsorption capacity, pH, Agitation speed, isotherm, kinetics, thermodynamics.

Exploring the Morphological Diversity, Cultural Significance, and Multifunctional Utility of *Clitoria ternatea* (Aprajita, Butterfly Pea)

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ABSTRACT

Clitoria ternatea, (C.T) commonly known as Aprajita or Butterfly Pea, is a plant of profound significance, encompassing diverse morphological attributes, cultural relevance, and multifunctional utility. Belonging to the family Fabaceae, *Clitoria ternatea* presents an array of morphological features, including its perennial twining herbaceous growth, characterized by elliptic leaves, striking blue flowers with various colour variations, and linear, compressed fruit pods. Beyond its botanical attributes, *Clitoria ternatea* holds deep cultural significance across different regions, known by various names and utilized in a multitude of rituals, ceremonies, and traditional practices. However, the plant's significance extends far beyond cultural contexts, as its flowers, leaves, roots, and seeds offer versatile applications across diverse domains. Culturally, *Clitoria ternatea* holds a prominent place, being revered and utilized in various rituals and ceremonies. Known by different names such as Aprajita, Butterfly Pea, and others, the plant is integrated into cultural practices worldwide, symbolizing beauty, spirituality, and prosperity. Its vibrant blue flowers adorn religious offerings, ceremonies, and decorations, signifying purity, devotion, and auspiciousness. Furthermore, *Clitoria ternatea* is deeply ingrained in traditional medicine systems, where it is utilized for its purported medicinal properties, including its ability to enhance memory, promote relaxation, and alleviate stress.

In addition to its cultural and medicinal significance, *Clitoria ternatea* offers a plethora of practical applications. Its flowers are used as a natural food colouring agent, imparting vibrant blue hues to various culinary creations, beverages, and desserts. The leaves and roots of *Clitoria ternatea* possess astringent properties and are utilized in traditional skincare formulations to promote skin health and combat various dermatological conditions. Furthermore, the plant's seeds contain essential amino acids and other bioactive compounds, offering potential health benefits and culinary uses. Moreover, *Clitoria ternatea* has garnered attention for its potential environmental benefits, particularly its ability to improve soil fertility through nitrogen fixation. As a leguminous plant, *Clitoria ternatea* forms symbiotic relationships with nitrogen-fixing bacteria, enriching the soil and enhancing agricultural productivity. This ecological role underscores the plant's importance in sustainable agriculture and ecosystem restoration efforts.

Keywords: *Clitoria ternatea*, Aprajita, Butterfly Pea, Morphological Diversity, Cultural Significance, Multifunctional Utility, Traditional Medicine, Environmental Benefits, Phytochemistry, Therapeutic Applications

Histopathological manifestation in fish Exposed to microplastics

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ABSTRACT

Plastic pollution is the accumulation of plastic objects and particles in environment that adversely affects wildlife habitat and human. The microplastics are commonly defined as bearing 5mm or less in size. The present investigation was undertaken the histopathological alteration in fish exposed to microplastics. The gold fish, *Carassius auratus*, weight $20g \pm 0.25g$, one group kept for control and other were fed with microplastics (0.5g, less than 500μ in size) contaminated feed Gordan's diet for 30 days. Clinical inspection reveal presence of microplastis in buccopharyngeal region and gill chamber of treated. The treated fish showed significant histopathological alteration like edematous patches in muscle and clumping of gill lamellae and edematous tips. Histopathological studies suggested that intestine and stomach were the most affected organs in response to microplastics. No detectable alterations could be marked in liver, kidney, pyloric caeca and ovary.

Keywords: *Carassius auratus*, histopathology, microplastics, plastic pollution, water pollution.

Synthesis, Characterization and Properties of CoO nanoparticles

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ABSTRACT

Cobalt Oxide nanoparticles (NPs) was synthesized through combustion technique and characterized by using UV-Visible, XRD, EDX, XPS, SEM and TEM investigation. These studies confirmed the nature of particles, crystallite size, purity, phase, valence state and optical band gap of the synthesized nanoparticles. The crystallite size of CoO NPs was determined 35±5 nm by Debye Scherrer equation using the pattern of the peak of XRD. Moreover, the nano grain size with uniform distribution and hexagonal shape of these nanoparticles were observed from SEM and TEM studies. The binding structure and optical absorption gap of CoO NPs were investigated by using XPS analysis and UV-Visible spectroscopy. The optical density of the nanoparticles determined through adsorption band gap energy was 2.0 eV which may be due to jumping electrons between d band of Co 2+ and the conduction band of CoO. The M-H hysteresis curve at two different temperatures 5K and 300K with selective applied magnetic field confirmed the ferromagnetic character of the synthesized nanoparticles.

Keywords: CoO NPs, XRD, SEM, TEM, XPS, UV-Vis, Combustion synthesis, Magnetic property.

Potential Fish Parasitic In Fish Flesh And Its Effect On Human Health

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Fish culture is one of the fastest growing sectors of the economy in the area of food concern and demand for fish flashes continuously increasing. Fish flesh is a valuable source as nutritional value and especially essential fatty acids and high quality proteins which are present in optimum quantities for people needs. So, this is the key cause for increasing demand for fish flash and its fish culture. On the other aspect, there are serious safety concerns related to the consumption of raw fish meat due to the presence of parasitic hazards. Because of all the mentioned facts, good knowledge and management of parasitic hazards associated with the consumption of fish meat is of major health and economic significance.

The image of fish as a healthy food is the main reason for increasing demand for fish meat but there are serious safety concerns related to the presence of parasitic hazards in fish meat. The main goals of this paper are to describe the most important parasitic hazards in fish meat, to indicate the need for adequate preparation of fish meat and to increase public awareness of the risks associated with consumption of fish containing viable infectious parasitic hazards. Avoiding consumption of raw or poorly cooked fish is the best preventive measure to avoid infection by fish borne parasites. Parasitic infections can affect a large number of fish species, especially in countries where untreated human and animal waste is used as fish feed in fish production. There are a moderate number of these parasites which have been reported in humans, but only a few cause serious diseases. Nematodes and trematodes are the most important while cestodes and acanthocephalans have been reported from humans on rare occasions.

Comparative study of 5-methyl-1,2,3,4-tetrahydroquinoxaline and 6-methyl-1,2,3,4-tetrahydroquinoxaline using general characteristics

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ABSTRACT

The present study includes the comparative study of 5-methyl-1,2,3,4-tetrahydroquinoxaline and 6-methyl-1,2,3,4-tetrahydroquinoxaline using photophysical properties. The two organic heterocyclic compounds were synthesized 5-methyl-1,2,3,4-tetrahydroquinoxaline and 6-methyl-1,2,3,4-tetrahydroquinoxaline. To monitor the purity of the products and the composition of the reaction mixtures we used thin layer chromatography, and isolated and purified the products by column chromatography. Then using nuclear magnetic resonance (NMR) and mass spectrometry (MS) identified the substances. The several parameters were taken i.e. IR, UV and NMR for the photophysical characterization. The spectroscopy analyses (NMR, MS and X-ray diffraction) enabled a complete characterization and established the correct stereochemistry for the tetrahydroquinoxaline ring.

Keywords: 5-methyl & 6-methyl-1,2,3,4-tetrahydroquinoxaline, 6-methyl-1,2,3,4-tetrahydroquinoxaline heterocyclic compound, NMR, column chromatography.

Water Pollution

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ABSTRACT

Water pollution owing to industrial, pharmaceutical, and municipal activities has become a crucial problem to human beings and the ecosystem environment. Several methods, including biodegradation, electro coagulation, coronation, ultra filtration membrane, and adsorption have been used to treat pollutant. This chapter focuses on the adsorption design for wastewater treatment, removal of pharmaceutical, virus, aromatic sulfur, and carbon dioxide. Breakthrough curves of pollutants are reviewed under different fixed-bed conditions, including initial drug concentration, volumetric flow rate, and bed length. The review also discusses the various research articles which include the absorption of various gases using different types of materials. The chapter reviews various articles which have an advance technique for the removal of environmental pollutant and such techniques are the encouragement to the industry to commercialize those methods. Water pollution is one of most rapidly growing problems occurring today. It is responsible for more than million deaths worldwide. The Industrial Revolution was the catalyst that sparked several types of pollution, air, water, and noise, to become more apparent in our society because of the developments of factories, trains, and cars. Rivers were getting polluted by sewage and the air by carbon monoxide and lead. This pushed the government to take affirmative action against pollution by creating the Pollution Prevention Act and 1972 Clean water Act. Several other acts were made to help clean the environment. Simple solutions to combat water pollution includes, carpooling, ending the use of pesticides and fertilizers, and stop littering. Water pollution occurs when harmful substances often chemicals or microorganisms contaminate a stream, river, lake, ocean, aquifer, or other body of water, degrading water quality and rendering it toxic to humans or the environment. Water is uniquely vulnerable to pollution.

Keyword- Water pollution, industrial, pharmaceutical, environment, carpooling

***De novo* designing, structural verification and *in vitro*, *in silico* bio-potential elucidation of novel metal complexes.**

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ABSTRACT

Monometallic metal complex series of general formula $[M(L^a)].Cl_2$ (where, L^a = Ligand, M = Cu(II), Ni(II), Co(II) or Zn(II)) was synthesized with potent lone pair donating moiety (L^a) yielded by the condensation reaction between synthetic diamine and chloro derivative of benzoic acid. Structural verification of synthesized compounds was fulfilled by elemental analysis, molar conductivity and magnetic moment measurements as well as spectral techniques *viz.* IR, UV-visible, ¹H NMR, ¹³C NMR, ESR and ESI mass spectrometry. Density functional theory (DFT) calculation was carried out for detail studies of molecular structure, and to analyze the experimental IR and UV-visible spectrum peaks. Analytic and spectroscopic data favored 1:2 electrolytic nature of complexes and tetra-dentate coordination fashion of (L^a) which creates square planar environment around divalent metal ion. Antimicrobial studies of compounds against bacterial strain/s *S. aureus*, *B. subtilis*, *E. coli*, *S. typhi* and fungal strains *A. niger*, *A. flavus*, *C. albicans*, *C. parapsilosis* were performed *in vitro* which provide results in favour of enhanced potential of designed complexes than free ligand (L^a) and the findings of biological potential was further supported by *in silico* studies.

Keywords: Antibacterial; Antifungal; Coordination compounds; DFT; Molecular docking.

Assessing Particulate Matter Levels and Health Implications near Construction Sites: A Case Study in Patna District, Bihar, India

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ABSTRACT

Outdoor air pollution presents a significant hazard to public health, contributing to millions of premature deaths worldwide each year. This impact is particularly pronounced in regions such as Southeast Asia and the Western Pacific, where 91% of the global pollution burden is concentrated. Small particulate matter, especially those measuring below 2.5 microns (PM_{2.5}), pose heightened risks, exacerbating respiratory and cardiovascular conditions. Research conducted in the vicinity of construction sites in Patna district, Bihar, India, aimed to evaluate particulate matter concentrations and their implications. Monitoring PM₁₀, PM_{2.5}, and PM₁ mass and number concentrations revealed notably elevated levels, especially during nighttime, suggesting a potential association with emissions from nearby construction sites. Additionally, analysis of particle size distribution emphasized the prevalence of smaller particles (0.35–0.68 μm), which pose significant health hazards. The study also examined the impact of meteorological factors, such as wind speed and direction, on PM concentrations, illustrating a correlation between stagnant conditions and increased pollutant levels. Strategies for enhancing the efficiency of pollution control equipment were discussed, highlighting the importance of proper design, installation, operation, and maintenance practices. In conclusion, the study underscores the considerable impact of construction site emissions on ambient air quality and public health. The implementation of effective pollution control measures is essential to mitigate these adverse effects and safeguard public health near construction sites.

Keywords: Premature deaths, Particulate matter (PM), Outdoor air pollution, Meteorological factors

Interaction of ovulen and 2, 3, 7, 8-tetrachlorodibenzo-*p*-dioxine (TCDD) on morphology, histology and histochemistry of testes in chicken

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ABSTRACT

The interaction of ovulen and 2,3,7,8-tetrachlorodibenzo-*p*-dioxin (TCDD) on chicken rooster was studied to assess their combined role in the male reproductive organ. 20 male chickens 7 weeks' old were divided into 4 groups (5 chickens in each group). Control group received only olive oil 0.5 ml/Kg, 2nd group is treated with 1 mg/kg ovulen in olive oil injection on days 1, 2 and 3 days, 3rd group is treated with 50 µg/Kg TCDD on day 4 only, for day 1, 2 and 3 this group was treated with olive oil 0.5 ml/Kg, 4th group was treated with both ovulen and TCDD, dose of ovulen was 1mg/Kg while dose of TCDD was 50 µg/Kg. Birds were kept for an additional 10 days. On day 14, all roosters were weighed and killed. Length and height of comb was measured immediately after death. Testes were dissected out and weighed, their external morphology was observed. Section of testes was prepared and stained for histological and histochemical study. Body weight significantly increased in 2nd group, while weight gain was insignificant in 3rd and 4th group in comparison to control group. Comb height and length was significantly reduced in 2nd and 4th group but colour of comb was found to be paler in 3rd and 4th group but not in 2nd group. Weight of testes was significantly reduced in all three groups in comparison to control groups. Histology of testes was more malformed in 2nd group in comparison to 3rd and 4th group but malformation was significant in all three groups in comparison to control group. Histochemical staining demonstrate decrease in protein and lipid content in all three groups. Degeneration of RNA was more significant in 4th group in comparison to 2nd and 3rd group while degradation of DNA was observed in 3rd and 4th group only.

Keywords: Chicken rooster, ovulen, 2,3,7,8-tetrachlorodibenzo-*p*-dioxin (TCDD), testes

Studies on Hydrogeochemistry and Human Health Risks of Groundwater in Hazaribag City, Jharkhand, India

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ABSTRACT

In the present paper, the groundwater quality of the selected places of Hazaribag City in Jharkhand, India, has been reported. In this connection results of the analyses of different physicochemical variables, including pH, electrical conductivity (EC), total dissolved solids (TDS), temperature, cations (Ca^{2+} , Mg^{2+} , Na^+ , K^+), anions (CO_3^{2-} , HCO_3^- , Cl^- , F^- , SO_4^{2-} , NO_3^-) and trace metals (Mn, Fe, Pb, Cr, Zn, Al, As) have been described. According to the Schoeller's diagram, the major cations, anions, and Heavy metals in the samples are in the order $\text{Ca}^{2+} > \text{Na}^+ > \text{Mg}^{2+} > \text{K}^+$, $\text{HCO}_3^- > \text{Cl}^- > \text{SO}_4^{2-}$, $> \text{NO}_3^-$ and $\text{Zn} > \text{Fe} > \text{Mn} > \text{Al} > \text{Cr} > \text{As} > \text{Pb}$ respectively. The Gibbs Plot indicates that the rock-water interaction mechanism is dominant, although the Piper plot demonstrates that groundwater samples are the mixed regions of $\text{Ca}^{2+} - \text{Mg}^{2+} - \text{Cl}^- - \text{SO}_4^{2-}$ and $\text{Ca}^{2+} - \text{Mg}^{2+} - \text{HCO}_3^-$ type reflecting the prevalence of anthropogenic influence. According to the Durov plot, 9.37% of groundwater samples exhibit association with dolomite or ion-exchange clay, 53.13% shows normal dissolution or mixing, and the rest 37.5 % reverse ion-exchange of sodium and chloride type water. Groundwater in Hazaribag City is supersaturated with calcite, dolomite, and gypsum, while most of the samples are nearly at equilibrium with anhydrite. Conversely, all 32 groundwater samples are undersaturated with halite. The water quality index (WQI) shows that 9% of the samples of groundwater are good, 6% poor, 13% very poor, and the rest 72% are unfit for drinking. Positive correlations were observed among all water quality indices and heavy metals. The presence of heavy metals significantly contributed to non-carcinogenic health risks for both adults and children, following the order of $\text{Cr} > \text{As} > \text{Fe} > \text{Pb} > \text{Mn} > \text{Zn} > \text{Al}$.

Butylated hydroxy toluene (BHT) impact on the of kidney of swiss albino mice.

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ABSTRACT

Butylated hydroxy toluene (BHT) is a derivative of cresol an aromatic organic compound. It is a common food additive used as an antioxidant. It is extensively used in oil, chewing gum, dried potato flakes and nuts. Food antioxidants are added to prevent rancidity, browning and developing black spot, which results due to oxidative changes. BHT functions by interrupting the free radical chain mechanism involved in lipid oxidation. The present study aimed to investigate the possible effects of toxicity of BHT on the histological parameters of kidney of Swiss albino mice. The doses of 75 mg/kg bw and 150 mg/kg bw were administered daily for 60 days. Histopathological examination showed marked dose related increase in the incidence and severity of toxic nephrosis as indicated by several tubular lesions (distal and proximal tubular dilatation and cysts). On the basis of these findings the study suggests that butylated hydroxy toluene (BHT) has direct toxic effects on the kidney.

Keywords: BHT, Swiss albino mice, Histopathology, Kidney, Degeneration

Assessing the Production of Biodiesel from Microalgae Under Varying Nutrient and Abiotic Conditions

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The growing demand for biofuels has spurred a critical search for alternative, non-food sources of biomass suitable for conversion into biodiesel and other transportation fuels. Algae, found abundantly across diverse ecosystems, encompass a vast array of species. Among these, unicellular microalgae emerge as standout organisms for their rapid growth and efficient photosynthesis. Given adequate sunlight, water, carbon dioxide, and nutrients, they can complete their growth cycle within a few days. Microalgae surpass all other commercial oil-producing crops in terms of lipid content, comprising as much as 80% of their dry biomass weight. In contrast, agricultural oil crops such as soybean and palm oil, commonly utilized for biodiesel production, exhibit comparatively lower oil contents, constituting only 5% of their total biomass. *Chlorella*, specifically chosen as a test organism, holds significant promise for biodiesel production due to its rapid growth and ease of cultivation, despite its relatively modest lipid content ranging from 14% to 30% of dry biomass weight under standard growth conditions.

Abiotic stress, such as changes in temperature, light intensity, pH levels, and salinity, can impact microalgae and their ability to produce lipids. These stressors disrupt the normal functioning of microalgae, prompting them to adapt and produce various compounds as a survival mechanism. Among these compounds are lipids, which are essential for energy storage and play a crucial role in biodiesel production. Understanding the effects of abiotic stress on lipid production in microalgae is vital for optimising biofuel production processes and developing sustainable energy solutions.

Estimating the diverse nutrient components present in algae necessitates the utilization of various simple biochemical methods to assess substances such as carbohydrates, proteins, lipids, vitamins, and minerals. This analytical approach aids in comprehending the nutritional composition of algae and elucidating their potential applications across diverse fields.

Materials for Environmental Sustainability: Climate Change and Sustainable Building

Materials

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ABSTRACT

In today's rapidly changing world, the significance of accurate weather forecasts cannot be overstated. The subject of sustainable development is very relevant and has gained global attention, especially with the obvious effects of environmental destruction on climate change and the awareness created. To address these compelling environmental concerns, it is crucial to focus on the development and use of materials that promote environmental sustainability. Urgent changes are required in energy saving, emissions control, production and application of materials, use of renewable resources, and recycling and reuse of building materials.

This study provides an overview of the materials used in environmental sustainability, their importance in addressing these challenges and the importance of adopting sustainable materials to reduce the greenhouse gases (GHGs) for addressing the problem of climate change. The work aims to help the decision makers locally and internationally to reduce the building's CO₂ emissions in the project design phase.

Keywords: Sustainable material, Project design phase, Environmental Sustainability, Greenhouse Gases, Climate change.

Comparative study of Alkaloids & Flavonoids in selected species of *Ocimum* in and around of Munger District

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ABSTRACT

The district of Munger located in the Eastern part of Bihar, India, is hemmed among the Ganga River in the North, Bhagalpur District in the East, Lakhisarai District in the West and the Jamui District in the South. It is located between 24⁰30' and 25⁰N Latitude and between 86⁰30' and 87⁰ East Longitude. *Ocimum* Species generally known as Tulsi, is an herbaceous perennial belongs to family Lamiaceae and is considered one of the most important sources of herbal medicine.

Present work in the comparative study of Alkaloids and Flavonoids in four species of *Ocimum* like *O. sanctum*, *O. tenuifolium*, *O. basilicum* and *O. gratissimum*. It was observed that highest content of alkaloids present in *O. sanctum* (*Rama Tulsi*) as per Gravimetric and highest content of Flavonoids present in *O. tenuifolium* (*Shyama Tulsi*) as per Aluminum Chloride Method through Standard Curve.

Alkaloids and Flavonoids are secondary metabolites that are found in plants, fruits and seeds, responsible for the color, fragrance and flavor characteristics in plants flavonoids perform many functions like regulating cell growth, attracting pollinators insect and protecting against biotic and abiotic stresses. Whereas alkaloids protect plants from predators and regulate their growth.

Keywords: *Alkaloid, Flavonoid, Ocimum, Metabolites*

Consequence of the environment on ageing: A cross-disciplinary analysis

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ABSTRACT

Ageing is studied to be an inevitable and irreversible cellular process because of slow and continuous loss of physiological integration and functions. It is also a major risk factor for greater frequencies of chronic illnesses like immune-senescence, metabolic, neurodegenerative and cardiovascular diseases. Ageing emerges from the programmed cellular processes at both the level of genetics and epigenetics that are activated by stress causing programmed cell death. It is crucial that development of novel preventative and therapeutic strategies should be introduced to inhibit ageing and lessen the occurrence of age-related diseases. Age-related diseases arise as the accumulation of toxic damaged constituents of cell takes place, which can be cleared by the autophagic process. There are several autophagy inducers, and polyamines, particularly spermidine, are one such potential inducer. Although ageing is unavoidable, could be altered through cellular and genetic interventions, medications, preferred lifestyle and environmental conditions. It has been demonstrated that spermidine is crucial for extending survival times, and aberrant alterations in spermidine levels are linked to both ageing and the onset of disease. In *D. discoideum* strict regulation of polyamine levels homeostasis can prolong longevity. Identification of various genes, homology modelling and inhibitor/s docking are done by *in-silico* study. Therefore, further studies are wanting to understand that how modulation of spermidine effects aging and to unravel its potential therapeutic applications in age related diseases.

Keywords: Ageing, *D. discoideum*, autophagy, polyamine, spermidine.

Recent Scenario of Chromium Contamination in India

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ABSTRACT

Chromium pollution has become a significant environmental issue in India due to its harmful impact on both human health and the ecosystem. The toxic nature of hexavalent chromium can lead to both cancerous and non-cancerous health problems. The use of chromium compounds poses a major challenge in developing countries like India. Throughout the country, groundwater in nearly 718 districts has been found to be contaminated with heavy metals, including chromium. One of the highest concentrations of chromium recorded in India was 33.80 mg/L in Kanpur, Kama, Uttar Pradesh, which is 676 times higher than the set limits for these substances. Other regions severely affected by chromium contamination include West Bengal, Tamil Nadu, Bihar, and Odisha. Various methods such as solvent extraction, adsorption, chemical reduction, and bio-remediation have been extensively studied and assessed to eliminate hazardous chromium from polluted water. Additionally, treatment techniques like chemical precipitation, electrocoagulation, ion exchange, electro dialysis, and membrane separation are available for removing chromium from wastewater. The review also highlights the regions severely affected due to chromium contamination and reveals the research gaps. The information provided here is intended to raise awareness about the severity of chromium contamination in industrial belts and the urgent need for effective management strategies.

Modern Trends in Pest Management against Litchi Pests (*Litchi chinensis*, Sonn.) in Bihar.

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ABSTRACT

Litchi (*Litchi chinensis*) is a delicious juicy fruit of excellent quality. Botanically it belongs to Sapindaceae family. In Bihar litchi is grown only in some specific area of North Bihar. Litchi fruits mature in the months of May and June. This fruit is attacked by Litchi mite (*Aceria litchi* Keifer) litchi fruit borer (*Conopomorpha cramerella*) and Litchi leaf roller (*Dudua aprobola* Meyer) is one of the most destructive and highly bad impacts in the production in Bihar. The litchi leaf roller is another damaging pests causing severe damage of litchi foliage as the litchi fruit are mostly utilized in raw conditions, they are more contaminated with plant protection and chemicals thus the management plan realize on bio-rational approaches to restricted the bad impact of these litchi pest by the means of all integrating cultural, mechanical and by applying botanical supported by required based application of insecticide, like (Sulphur- 0.5%, Kelthane- 19.6EC and Imidachlopid-18.9% SL). The changing dynamics of pests litchi pests and infestation may become a hindrance to profitable litchi cultivation and will have socio-economic impact on litchi growing areas.

Keywords: Litchi chinensis, litchi pest, insecticides, Sulphur, Kelthane, Pest management.

Green Synthesis of gold nanoparticles using plant Extract

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ABSTRACT

Green chemistry, also known as sustainable chemistry, is a new field that encourages the design and development of methods using principles that reduces the use and generation of toxic chemicals. Green chemistry is a concept rather than a new science. It is a revolutionary and emerging technology for eco-friendly processes. The existing methods of nanoparticle production are found to be expensive and employ chemicals that are potentially harmful to the environment, which demands the development of “greener” protocols. Herein we describe the synthesis of gold nanoparticles using plant extracts, which offers an efficient, cost effective, and ecofriendly method for production of nanoparticles. The generated AuNPs were characterized by scanning electron microscope, X-ray diffraction, Atomic Force microscopy, and UV-visible spectroscopy. The chemicals present in the aqueous leaf extract acted as an effective reducing and stabilising agent.

Key words – Nanoparticle, Green synthesis, Biosynthesis, Biocomponent.

Isolation and Identification of Aeromycoflora in the Outdoor Environment of PMCH Hospital, Patna, Bihar

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ABSTRACT

Airborne microfungus propagules are found in large numbers in outdoor environments and are widely distributed in nature. The source of such airborne fungal spores is the substrate at the ground level. Air monitoring both indoors and outdoors, has helped to locate the source, its identification, concentration and seasonal variation. The number and type of spore depends on the source of contamination. The viability of these airborne spores depends on environmental parameters like humidity and temperature and the ability of resistance to the physical environment. Present study was to evaluate the prevalent species of aeromycoflora in the outdoor environment of PMCH, Hospital Patna (Bihar). Air sample was collected for two years within the interval of two months by means of gravitational settling method via petri dishes with Potato Dextrose Agar (PDA) culture media and Burkard air sampler method. The exposed petriplates were brought into the lab and incubated at room temperature. After the end of incubation period the colonies were counted and identified with help of microscopic slide and available published literatures. A population of 2268 fungal colonies falls under 18 genera and 26 species have been confined by culture exposed method. The most frequent species showed by *Aspergillus flavus*, *A. niger*, *Cladosporium*, *Penicillium* sp., *Mucor*, *Rhizopus*.

Keywords : Aeromycoflora, outdoor, Hospital, Fungal spores

Chalcone based Imidazol Derivatives as Anticancer Agents

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ABSTRACT

Cancer is the world's biggest global health concern. The prevalence and mortality rates of cancer remain high despite significant progress in cancer therapy. The search for more effective, as well as less toxic treatment methods for cancer cell lines is at the focus of current studies. Many chalcone and its imidazole derivatives target 'cancer-specific' which allow the targeting of cancer cell lines, while normal cells are spared. Several chalcones were synthesized with 2-substituted benzimidazolyl chalcones in-vitro cytotoxicity against various human cell lines.

A huge number of chalcone based imidazole derivatives and their presence being favorable for anticancer activity. Azoles are important pharmacophores for the identification of new anticancer agents. Some azole derivatives (cefatrizin, carboxyamidotriazole, and AZD8835) are used clinically or are in clinical trials for the treatment of various cancers. Hybridization of chalcones with azoles is considered to be an important way to identify new anticancer agents. The mechanism of action and cellular targets behind the toxicity were pursued for the most toxic compounds.

Chalcone based imidazole compounds show anticancer activity against HepG2, HCT116, and A549 cell lines. The antiproliferative activity of the imidazole-chalcone was assessed on some human cancer cell lines including A549 (epithelial cells), MCF-7, MCF-7/MX (mitoxantrone resistant human breast cancer cells), and HEPG2. Imidazole-chalcone derivatives exhibited more cytotoxicity on A549 cancer cells. N-substituted benzimidazole derivatives bearing an alkyl chain and a nitrogen-containing 5- or 6-membered ring enhanced the cytotoxic effects on human breast adenocarcinoma (MCF-7) and human ovarian carcinoma (OVCAR-3) cell lines.

Pollution Prevention and Remediation

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Pollution prevention protects the environment by conserving and protecting natural resources while strengthening economic growth through more efficient production in industry and less need for households, businesses and communities to handle waste. Pollution prevention is any practice that stops pollution at its source before it is created. Pollution prevention strengthens economic growth through greater efficiency in industry production and by reducing the need for households, businesses and communities to handle waste. These practices also conserve and protect natural resources while simultaneously preventing health problems and environmental damage caused by pollution. Once pollution is created, remediation efforts are needed. Remediation technology includes thermal desorption, excavation or dredging, bioremediation and soil vapour extraction, among other technologies. There are significant opportunities for industry to reduce or prevent pollution at the source through cost-effective changes in production, operation and raw materials use. Such changes offer industry substantial savings in reduced raw materials, pollution control and liability costs as well as help protect the environment and reduce risks to worker health and safety.

Source reduction is fundamentally different and more desirable than waste management and pollution control. The environmental Protection Agency needs to address the historical lack of attention to source reduction. As a first step in preventing pollution through source reduction, the Environmental Protection Agency must establish a source reduction program which collects and disseminates information, provides financial assistance to states and implements the other activities.

Keywords: conserve, bioremediation, waste management

Toxicological Effects of Cadmium contaminated soil and remediation : A review

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ABSTRACT

The quality of soil, water, their inhabitants, the associated biodiversity, and human health may be seriously threatened by Cadmium (Cd) toxicity that results from unchecked industrialization, unsustainable urbanisation, intense farming techniques, etc. When Cadmium is discharged in environment, from various anthropogenic and natural sources, it eventually gets bio-accumulated into the soil and starts showing its effect on different component of environment. This contamination requires a sustainable and environment friendly way for its treatment. The moderate to highly Cadmium contaminated soil can be stabilised and treated by the introduction of organic amendments which is a majorly cost-effective and environmentally benign method. The organic wastes produced throughout the world can be used as conditioners to enhance the quality of the soil and as a source of nutrients. This article reviews the sources of Cadmium contamination, its adverse impacts on soil, bioavailability of Cadmium heavy metal, and risk to human health and life. The aim of the study is to provide treatment for soil contaminated with Cadmium in environment friendly way. This article will find guide scholars regarding the procedures and approaches for cleaning up soil contaminated with cadmium.

Keywords: Cadmium, Pollution, Bio-accumulation, Remediation

Pollution Prevention and Remediation Fluorosis: Causes, Prevention and Control

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ABSTRACT

Fluorosis is a serious health problem caused by accumulation of fluoride chemical in human body above acceptable limit of 1.0 ppm (BIS: IS 10500:2012) common health disorders include Dental Fluorosis, Skeletal Fluorosis and Non-Skeletal Fluorosis.

Fluoride can reach human body through natural sources- water and soil and also through food stuffs, toothpaste etc. However, drinking water extracted ground water aquifers is the most common source of fluoride intake in human body. Bihar is one among the 17 states of India where fluorosis endemicity has been reported in 11 districts of Bihar, 3812 wards of which have been found to have visible cases of fluorosis in large number of their population due to high level of fluoride concentration in their drinking water sources. In 2008, Government of India adopted “National Programme for Prevention and Control of Fluorosis (NPPCF) with the goal and objective to prevent and control fluorosis cases in the country in phased manner. Centre for Fluorosis Research (CFR) is a research wing of wing of A.N. College, Patna, Bihar (India). It provides a platform to Scientists, Researchers, Medical Professionals and Philanthropic organizations who are genuinely working for wish to be associated with the noble cause of fight against fluorosis. Since, its inception in 2006, C.F.R. has travelled long with its mission of social service and has achieved notable milestones.

Keywords: Fluorosis, Fluorosis endemic Bihar districts, NPPCF, Centre for Fluorosis Research, Integrated Fluorosis Mitigation.

Application of Nanomaterials for Wastewater Treatment

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ABSTRACT

Out of the total wastewater of the Earth only 20% is properly treated. According to the UN report of 2016, in developing countries only 30% wastewater is discharged with proper treatment. Modification in nanomaterials have increased the use of nanotechnology in wastewater treatment. Materials having at least one of the dimension less than 100 nm is termed as nanomaterial. Nanomaterial possesses active surface sites, reduced size, large surface area to volume ratio, strong solution, high reactivity. The excess small size of Nanomaterial, if used directly may pose difficulties in separation and reuse. Thus developing Nanocomposite is solution for these, which minimize release of Nanomaterials while maintaining their high reactivity.

Wastewater from various industries such as handicraft, paper, sugar cotton textiles releases various pollutants such as heavy metal ion and nutrient, organic pollutants (dyes, oils and phenols), these could be mutagenic and carcinogenic which is dangerous for human as well as aquatic life. Thus, treatment of wastewater is a very serious concern. Among several methods chemical oxidation, ion exchange, coagulation extraction, adsorption, chemical precipitation, reverse osmosis the most favourable and renewable method is adsorption because of it's economic, feasible and sustainable characteristics.

There are various forms of Nanomaterials used in water treatment like, Carbon based nanomaterials in which Graphene is used as Nanomaterial. Graphene is an ideal 2-D material and single atom layer of Graphite. It consists of excellent thermal and electrical conductivity. Graphene Oxide can adsorb Pb, Zn, Cu, Cd, Hg As. Carbon nanotube can adsorb organic compounds such as Polycyclic aromatic hydrocarbons, Phenolic compounds. Metal and metal oxide nanoparticles are used in various fields as adsorbent, Goethite for Cu, F, Hematite for Pb, Cd, Cu, Maghemite for Cr, Cu, Ni. Water pollution is a global issue. A direct impact on human beings is observed when polluted water impacts whole living beings.

Keywords: Wastewater, pollution, nanomaterials, industries, adsorption.

Water Pollution Prevention and Remediation Through Carbon Composites

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ABSTRACT

The most essential resource for life on Earth is water. As we know, it is fundamental to life on Earth. In spite of that, in recent scenario water pollution problem causes a major risk to ecosystems and human health due to domestic waste, industrial effluents, use of insecticides and pesticides, application of detergents and fertilizers, demanding new approaches to prevention and remediation. There is no problem in the world which cannot be solved. Immediately take necessary steps, in instance before it is too late. Water pollution is a significant issue that requires careful management. Treatment of toxic substances, avoiding petroleum-based substances, and using algae and water vegetation are essential. For the prevention of pollution waste disposal should be done outside the city, using biodegradable garbage for crop production. As well, scientific experiments can transform pollutants into useful items. Water should be germ-free using chlorine tablets and iodine, and sewage should be disposed of in designated pits. Recycled water can be used for fertilizers and irrigation, and sewage treatment plans should be established. Moreover, Carbon composites, with their unique physicochemical properties and environmental compatibility, are promising materials for addressing water pollution. They can be used in industrial wastewater treatment, agricultural runoff mitigation, and urban storm water management. Carbon composites, like functionalized carbon nanotubes and graphene-based composites, efficiently remove organic pollutants, heavy metals, and emerging contaminants, enhancing water treatment efficiency and minimizing energy consumption. These composites are crucial in environmental remediation strategies, acting as effective sorbents for pollutants. They can be integrated with advanced oxidation processes to enhance pollutant degradation and mineralization in contaminated water bodies. Composite-based photocatalysts and electrochemical sensors provide real-time monitoring and precise control. Carbon complex technologies offer environment friendly, scalability and cost-effectiveness for segregated water treatment systems in regions with limited resources, advocating sustainable development and protecting the environment. As a result, we can work together to maintain the environment clean, ensuring the health of the water bodies, plants, animals, and people that rely on it and making the world a better place to live.

Keywords: water pollution, human health, carbon composites, prevention, remediation, environment.

**Effect of Polystyrene Microplastic on Performance of Liver in a Freshwater Fish
*Heteropneustes fossilis***

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ABSTRACT

Pollution of the aquatic environment by microplastics (MPs) is one of the most serious environmental issues throughout the world. MPs are produced due to breakdown of plastics by physical, chemical or biological actions into the environment. Due to their small dimension (<5mm), ubiquitous and persistent nature, microplastic particles are representing a significant threat to ecosystem as they can enter into food chain. This study aims to investigate effect of Polystyrene MPs on performance of liver in a fresh water fish *Heteropneustes fossilis*. For this purpose, acclimatized test fishes were exposed to three different concentration of Polystyrene MPs (16,36 and 64µg/L) for 30 days. Blood samples were taken from test fish and liver function test was done. The result showed that level of Bilirubin, Alanine transaminase (ALT)/Serum glutamic-pyruvic transaminase (SGPT), Aspartate transaminase (AST)/Serum glutamic-oxaloacetic transaminase (SGOT), Alkaline phosphatase (ALP) increases as there was increase in dosing concentration of Polystyrene MPs. There was decrease in level of total protein (Albumin and Globulin (A/G ratio) with increase in concentration of Polystyrene MPs. Hepatic damages were also seen on increasing level of Polystyrene. Alteration in hepatological parameters affect growth and development of fish and ultimately to energy reserve and nutritional quality of fish indicated potential risk in development of fish health and raise significant concern about aquatic ecosystem and food safety due to microplastic pollution. Since fish is an important source of protein for humans, and the accumulation and toxic effect of the MPs in fish deserve special attention.

Keywords: Polystyrene, Pollution, Ubiquitous, Potential, Persistent, Hepatological

Fermentative Biotic Production of Ergot Alkaloids: Optimization, Submerged Fermentation, and Impact on Toxicity

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ABSTRACT

The present study focuses on the fermentative biotic production of ergot alkaloids. The objectives of the study include the collection of cheap and easily available sugary raw materials as a source for its bioconversion to ergot alkaloids in the presence of ergot alkaloids producing microbes, optimization of sugary raw materials concentration, pH, temperature, and incubation period, study the preparation of culture and production medium for ergot alkaloids fermentation process, study the efficiency of different useful molecules on ergot alkaloids fermentation process, and estimation of ergot alkaloids formed and sugary raw materials left unfermented. The materials and methods used in the study include the fermentation process and analytical techniques. The results of the study include the impact of different carbohydrates, nitrogen sources, and precursors on the production of ergot alkaloids, as well as the changes in toxic alkaloids during fermentation. The study also evaluated the potential of submerged fermentation (SmF) technique, which is known to simulate natural growth of micro-organisms but was never evaluated earlier for the production of ergot alkaloids. The fermented broth was withdrawn from the production medium after 8, 9, 10, 12, 14, and 16 days of incubation period, and the ergot alkaloids contents were estimated using a photoelectric colorimeter. The results were expressed in terms of Ergotamine tartarate, and the mean of the duplicate colorimeter Klett readings obtained as a result was used to calculate the ergot alkaloids contents of the aliquot by reference to a straight calibration curve relating colorimeter Klett readings and known concentration of standard sample of ergotamine tartarate. The study provides valuable information related to the production of ergot alkaloids by fermentation methods, the impact of different carbohydrates and nitrogen sources on alkaloid production, and the changes in toxic alkaloids during fermentation. The study also highlights the potential of submerged fermentation (SmF) technique for the production of ergot alkaloids.

Keywords: Ergot alkaloids, Fermentation, Submerged fermentation, Optimization, Ergot producing microbes, and Ergotamine tartarate.

Brief Review on Cadmium Bioaccumulation in Aquatic Animals: A Concern For The Environment

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ABSTRACT

Pollutants in the environment pose significant risks to the organisms inhabiting our planet. These substances adversely affect the well-being of both livestock and humans, encompassing heavy metals, pesticides, and more. Cadmium and its compounds stand out as prevalent environmental toxins capable of accumulating and persisting within organisms, leading to various biological alterations in aquatic ecosystems. It is imperative to monitor the levels of toxic metals in aquatic environments, particularly among fish, to safeguard public health. Cadmium (Cd) is recognized as one of the most harmful transition elements and a significant industrial peril, primarily emanating from battery manufacturing, electroplating, pigment production, plastics manufacturing, and fertilizer industries. The dissemination of Cd in the environment has escalated in recent decades owing to its extensive industrial application. Cadmium exerts numerous cellular effects. It initiates the activation of certain proto-oncogenes, impedes the DNA repair mechanism, and modifies the functioning of various enzymes associated with responses to oxidative stress (Waisberg et al., 2003; Giaginis et al., 2006). Several studies have underscored the potential involvement of active oxygen species and free radicals as mediators in Cd-induced genotoxicity (Hartwig, 1994; Beyersmann and Hechtenberg, 1997). Moreover, Cadmium exhibits cytotoxic, carcinogenic, and mutagenic effects in test organisms (Monteiro et al., 2007; Cambier et al., 2010). Several field investigations have demonstrated diverse levels of contamination in aquatic ecosystems, either through direct or indirect Cadmium (Cd) inputs (Hutton, 1983; Guinee et al., 1999). Therefore, it is essential to ensure proper water treatment before it flows into natural water sources. Heavy metals such as Cadmium require appropriate treatment measures as it can disrupt to whole food chain by accumulating into the aquatic animals.

Keywords: Pollutants, Environment, Aquatic, bioaccumulation, Cadmium

Green Synthesis and Thermodynamics Properties of Solid Dispersions of Benzimidazole –B. Naphthol Binary Drug System

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ABSTRACT

With view to synthesize and characterize the enhanced pharmaceutical properties of the solid-liquid dispersions of binary drug system through green chemical technique the present communication have been undertaken for detailed investigation of thermodynamic and interfacial properties of benzimidazole (BI) and β . naphthol (β N) binary eutectic and non-eutectic drug dispersions. Eutectic solid dispersion was observed at 0.657 mole fraction of β . naphthol (β N) and at melting temperature $C.^{\circ}90$ Thermodynamic quantities; Partial and Integral excess Gibbs energy (gE), excess enthalpy (hE), excess entropy (sE) of eutectic and non-eutectic dispersions were determined with the help of activity coefficient data. The negative deviation from ideal behavior has been seen in the system which refers stronger association between unlike molecules during formation of binary GM) refers the mixing for all eutectic and non-eutectic dispersions Δ_{mix} . The negative value of Gibbs free energy of mixing (Δ_{mix}), solid-liquid interfacial Δ_{is} spontaneous. The solid-liquid interfacial characteristics i.e., entropy of fusion per unit volume, roughness parameter (α), grain boundary energy and roughness parameter (α) of eutectic and non-eutectic solid σ energy (dispersions have been reported. The size of critical nucleus at different undercoolings has been found in nanoscale, which may be a big significance in pharmaceutical world. The value of roughness parameter, $\alpha > 2$ was observed which manifests the faceted and irregular growth leads in the system.

Keywords: SLE, Mixing and excess thermodynamic functions, thermal stability, Interfacial energy, Driving force of nucleation, Critical radius.

Comparative study of Alkaloids & Flavonoids in selected species of Ocimum in and around of Munger District

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ABSTRACT

The District of Munger located in the Eastern part of Bihar, India, is hemmed among the Ganga River in the North, Bhagalpur District in the East, Lakhisarai District in the West and the Jamui District in the South. It is located between 24⁰30' and 25⁰N Latitude and between 86⁰30' and 87⁰ East Longitude. Ocimum Species generally known as Tulsi, is an herbaceous perennial belongs to family Lamiaceae and is considered one of the most important sources of herbal medicine. Present work in the comparative study of Alkaloids and Flavonoids in four species of Ocimum like *O. sanctum*, *O. tenuifolium*, *O. basilicum* and *O. gratissimum*. It was observed that highest content of alkaloids present in *O. sanctum* (*Rama Tulsi*) as per Gravimetric and highest content of Flavonoids present in *O. tenuifolium* (*Shyama Tulsi*) as per Aluminum Chloride Method through Standard Curve. Alkaloids and Flavonoids are secondary metabolites that are found in plants, fruits and seeds, responsible for the color, fragrance and flavor characteristics in plants flavonoids perform many functions like regulating cell growth, attracting pollinators insect and protecting against biotic and abiotic stresses. Whereas alkaloids protect plants from predators and regulate their growth.

Keywords : Alkaloid, Flavonoid, Ocimum, Metabolites

Solvent Effect of Aquo-Glycerol Reaction media on the Food

Additive Efficiency of Cinnamate Ester

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ABSTRACT

The main extraction products of cinnamon plants is cinnamic acid, which is widely used as food additive in the form of flavorings, synthetic indigo and also as certain pharmaceutical. It is also used as a precursor for perfume industry and also as a sweetener aspartame. In order to highlight the valuable use of cinnamic acid the kinetics of alkali catalysed solvolysis of cinnamate ester in aquo trihydric alcohol (glycerol) reaction media has been studied. The number of water molecules associated with the activated complex were found decreasing from 1.407 to 0.25 with increasing temperature from 20°C to 40°C and from this it was inferred that in water-glycerol media, structure of water is being changed from its bulky form to its dense form and the mechanistic pathways of the reaction is changed from unimolecular to bimolecular in presence of glycerol (protic solvent) in the reaction media.

Keywords: Trihydric Alcohol, Cinnamon plant, Extraction, mechanism Bulky and dense form of water, unimolecular and bimolecular mechanism Food Additive flavorings.

Click Synthesis of Aniline Tagged 1,4-Disubstituted Triazoles and their Biological Applications

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ABSTRACT

The multiplication of novel emergent pathogens causing transmittable diseases has put an enormous burden not only on world economies but also on their civic health which vary according to the environmental, ecological and socio-economic factors. Also, resistance to the existing drugs has become a serious concern globally, and therefore, contemporary diagnostic and therapeutic parameters are required to cope up with such diseases. 1,4-Disubstituted 1,2,3-triazoles synthesis via a multicomponent reaction has generated numerous compounds of biological interest in an efficient manner. Copper(I)-catalyzed azide-alkyne cycloaddition (CuAAC) reaction has become one of the leading click chemistry methodologies for synthesis of 1,2,3-triazoles. A series of amide tagged 1,4-disubstituted 1,2,3-triazole has been designed and synthesized in good yield through Cu (I) catalyzed click chemistry strategy. This abstract summarizes the recent ongoing work on the regioselective synthesis of aniline tagged 1,4-disubstituted 1,2,3-triazoles via copper-catalyzed multicomponent reactions.

A Kinetic Study of the Effect of Aquo-Ethanol Reaction Media on the Medicinal Efficiency of the Product of Alkali Catalyses Hydrolysis of Heavy Caprylate

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ABSTRACT

The hydrolysis product of caprylate ester is caprylic acid and it possesses medicinal uses. It has been found helpful in managing yeast infections, skin condition digestive disorders and high cholesterol. In order to highlight the medicinal uses of caprylic acid the kinetic study of the solvent effect of a dipolar aprotic solvent on the alkali catalysed hydrolysis of butyl caprylate has been studied in water-ethanol media having varying concentration of ethanol (from 20 to 80% v/v). The rate of the reaction was found depleting with gradual addition of the organic content (ethanol) of the reaction media. Out of the three thermodynamic activation parameters of the reaction namely ΔH^* , ΔG^* and ΔS^* values, ΔG^* values were found to be enhanced with simultaneous depletion in ΔH^* and ΔS^* values when more and more ethanol is added in the reaction media. From this observation, it has been inferred that the said reaction is enthalpy dominating and entropy controlled. From the plots of ΔH^* against ΔS^* , the iso-kinetic Temperature of the reaction has been evaluated from the slope of the plot. The numerical value of the kinetic temperature of the reaction has been found to be 285.0. From this evaluated value of iso-kinetic temperature, which is less than 300, it has been inferred that there is weak but appreciable solvent-solute interaction in the reaction media in presence of ethanol in it.

Keywords: Dipolar-protic, Activation parameters, solvent-solute Interaction, Iso-kinetic temperature, Medicinal properties.

**Study of Inhibition of Corrosion of Aluminium in acid medium by Benzotriazole
using potential polarization measurements**

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ABSTRACT

Aluminium has a remarkable industrial importance as material for engineering technology. The resistance of aluminium against Corrosion in acid media can be attributed to a rapidly formed Compact, Strongly adherent Protective oxide film on its Surface. Therefore, aluminium has been known to exhibit widely different electrochemical properties in different aqueous electrolytes, such that aluminium and its alloys are widely used in many industries such as chemical batteries, pipes and reaction vessels. The widely used HCl acid solution in this medium, which has induced a great deal of research on aluminium. So, the best method for metal protection from corrosion is the use of effective organic inhibitor containing hetero atoms such as (N,O,S) or structures containing pair of electrons on the central atom in their molecules. The adsorption of this inhibitor on metal surface depends on PZC. Physisorption and chemisorption are the principal types of interaction between adsorbate and adsorbent. The corrosion inhibition of aluminium by BTA was studied by electrochemical measurements. The inhibition efficiency of Benzotriazole in 0.25 M HCl solution increases with increasing its Concentration. The inhibitor acts as a mixed type inhibitor. The adsorption of the inhibitor obeys the Frumkin and Langmuir adsorption isotherms.

Advancing Renewable Energy for Affordability and Sustainability

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ABSTRACT

The transition towards renewable energy sources is pivotal in addressing the dual challenges of climate change and energy accessibility. This abstract explores the significance of renewable, affordable, and sustainable energy solutions in the contemporary energy landscape. Renewable energy, derived from natural resources such as sunlight, wind, and water, presents a viable alternative to conventional fossil fuels due to its abundance, sustainability, and environmental benefits. One of the primary advantages of renewable energy lies in its affordability. Technological advancements and economies of scale have led to significant cost reductions in renewable energy generation, making it increasingly competitive with traditional energy sources. Furthermore, the decentralization of renewable energy infrastructure enables communities to produce their own energy, reducing dependence on centralized power grids and enhancing energy security. In addition to affordability, renewable energy offers unparalleled sustainability benefits. Unlike finite fossil fuels, renewable resources are replenishable and have minimal environmental impact. By harnessing renewable energy, societies can mitigate greenhouse gas emissions, reduce air and water pollution, and preserve natural ecosystems. Moreover, the adoption of renewable energy technologies stimulates innovation, creates jobs, and fosters economic development. However, challenges remain in the widespread adoption of renewable energy, including intermittency, grid integration, and initial investment costs. Addressing these challenges requires continued research, policy support, and international collaboration. Governments, businesses, and individuals must prioritize investments in renewable energy infrastructure, promote energy efficiency, and incentivize sustainable practices. In conclusion, the pursuit of renewable, affordable, and sustainable energy is essential for mitigating climate change, enhancing energy security, and fostering economic prosperity. By embracing renewable energy solutions, societies can build a more resilient and equitable energy future for generations to come.

Understanding the role of environmental risk factors for cancer

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Cancer is uncontrolled growth and division of abnormal cells. It is a leading cause of death worldwide. Cancer occur due to the accumulation of many genetic and epigenetic changes within the cell, expressed in the accumulation of chromosomal or molecular aberrations, which leads to genetic instability. It is difficult to assess the validity of individual aetiological factors, but it can be concluded that interaction of various risk factors has the largest contribution to the cancer development. Environmental, exogenous and endogenous factors as well as individual factors, including genetic predisposition contribute to the development of cancer. Epidemiological research on the development of malignant tumors has focused over the years on the determinants of environmental and genetic factors of cancer incidence and mortality rate. According to current state of knowledge, 80–90% of malignant tumors are caused by external environmental factors (carcinogens). Studies have proved that the main factors responsible for the development of malignant neoplasia among humans are environmental factors arising from human behaviour. It has been confirmed that smoking, excessive alcohol consumption, diet, and reproductive behaviour are important for the development of malignant neoplasia in the human population. In the present study, we developed an approach to estimate the environmental burden of cancer and applied it to Patna, Bihar. The purpose was to identify environmental carcinogens with the greatest impact on cancer burden to support evidence-based decision making.

Studies on the Effect of Dielectric Properties of Aquo-EG Reaction media on the catalysed Solvolysis of Alkaloid Nicotinate.

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ABSTRACT

Alkaloid nicotinate and its compounds like nicotinic acid, nicotinamide and nicotines are the extraction products of the plant Tobacco. Though nicotinate is a poisonous alkaloid but in agriculture it is widely used as insecticide to get more and more yield of desired crops. The main hydrolysis products of the ester nicotinate is nicotinic acid and it is also known as niacin. For human being it is used as a medicine popularly known as Vitamin 'B' complex. Deficiency of nicotinic acid causes the disease "Pellegra" in human. Good sources of nicotinic acid are liver, ground nuts and sun flower meals. Now-a-days nicotinic acid is manufactured on commercial basis by adoption principles of kinetic study of the catalysed solvolysis of nicotinate ester in aquo-organic co-solvent reaction media. Hence in-order to highlight the effect of different solvents for producing good yield of nicotinic acid it has been planned to study the kinetics of alkali catalysed hydrolysis of nicotinate ester in different aquo-dipolar solvent systems possessing no any harmful side effects.

Keywords: Dielectric properties Ionising solvent, Alkaloid Nicotinic acid, Niacin, Vitamin B Complex, Solvation and Desolvation, Entropy Controlled.

Effect of Water t-butanol Solvent Systems on the Solvolysis of Caprate Ester

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ABSTRACT

The kinetic study of solvent effect of tertiary butanol was carried out on the Mechanistic pathway, thermodynamic Activation parameters, Activation energy and Iso-Kinetic temperatures of the alkali catalysed hydrolysis of Ethyl Caprate in water-t-butanol media of varying composition ranging from 20% to 80% of t-butanol and at five different temperatures ranging from 20 to 40 °C. With gradual addition of t-butanol to the reaction media, enthalpy of activation (ΔH) and entropy of activation (ΔS^*) were found decreasing with simultaneous increase in free energy of activation (ΔG^*). On the basis of this observation, it has been inferred that the entropy of activation depletes to greater extent than enthalpy of activation and initial state of the reaction is desolvated more than the transition state. The iso-composition activation energy values of the reaction were found to be depleted from 108.05 kJ/mol to 70.26 kJ/mol with increasing concentration of t-butanol in the reaction media. From this depletion, it has been confirmed that the initial state of the reaction is desolvated and its transition state is solvated.

Keywords: Caprate Ester, Thermodynamics, Activation Parameters Iso-kinetic temperature, Transition State, Barclay-Butler Rule, Enthalpy Stimulator, Entropy controlled.

Studies on the Effect of Aquo-Glycerol Reaction Media on the Mechanistic Pathways of Alkali Catalyzed Hydrolysis of Butyl Caprylate

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ABSTRACT

It has been reported by the researchers of the kinetic field that the esters of the heavy acid having longer carbon chain like caprylate and its hydrolysis products (caprylic acid) possess a variety of medicinal uses, hence it has been proposed to study the kinetics of alkali catalyzed hydrolysis of Butyl caprylate in different aquo-organic solvent (glycerol) reaction media.

For establishing the mechanistic pathways of the reaction the number of water molecules of the reaction media involved in the formation of the activated complex of the reaction were found to decrease from 1.354 to 0.222, and therefore in light of the Robertson et. Al.¹ it has been concluded that in presence glycerol the mechanistic pathway of the reaction is changed from unimolecular to bimolecular.

Keywords: Mechanistic pathways, Solvent System, Solvation number, unimolecular and Bimolecular mechanism.

**Studies on the solvent effect of aquo-aprotic solvent systems on the
kinetics of hydrolysis of valerate ester**

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ABSTRACT

The solvent effect of an Aprotic Solvent on the kinetics of alkali catalysed solvolysis of propyl valerate was studied in water-acetone media of varying composition ranging from 20 to 80% of acetone in the reaction media at different temperatures varying from 20 to 40°C. The rate of the reaction was found to decrease with increasing proportion of the acetone at all the temperatures. It was observed that the values of activation energy (Iso-composition) go on decreasing with gradual addition of the organic co-solvent. variation in rate and isocomposition activation energy of the reaction, it is inferred that effect of change in dielectric constant values and selective solvation of reactants are responsible for depletion in rate while solvation and desolvation of the Transition and the initial states respectively are the causes for depletion in the values of isocomposition activation energy of the reaction.

Keywords: Aprotic solvent, Mechanism. Activation Energy, Iso-composition and Isodielectric Solvation number, Bulky and dense form of water, Unimolecular and Bimolecula

Relative Study of Physico-Chemical Water Quality Parameters of Different Kunds of Rajgir Hot Spring

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ABSTRACT

A hot spring is a natural source of hot water. It is heated by the Earth's geothermal gradient. The high temperature of hot spring water is because of the geothermal energy, exothermic reactions and disintegration of radioactive elements. It emerges on the Earth's surface through cracks or fissures in the rocks. Its water contains excessive amount of sulphur and minerals. The hot water is supposed to come from Saptaparni cave, situated on top of the hills. The relative study of physico-chemical parameters such as temperature, pH, electrical conductivity (EC), total hardness (TH) as CaCO_3 , total dissolved solid (TDS), magnesium (Mg^{++}), calcium (Ca^{++}), chloride (Cl^-), sulphate (SO_4^{2-}) etc. of water samples from different Kunds at Rajgir has been carried out. The relative trends of water quality parameters of different Kunds are as follows

Temperature	:	Vishwamitra Kund > Brahma Kund > Makhdum Kund
pH	:	Vishwamitra Kund \approx Brahma Kund > Makhdum Kund
Electrical Conductivity	:	Brahma Kund > Vishwamitra Kund > Makhdum Kund
Total Hardness	:	Brahma Kund > Vishwamitra Kund > Makhdum Kund
Total Dissolved Solid	:	Brahma Kund > Vishwamitra Kund > Makhdum Kund
Mg^{++}	:	Brahma Kund > Vishwamitra Kund > Makhdum Kund
Ca^{++}	:	Brahma Kund > Vishwamitra Kund > Makhdum Kund
Cl^-	:	Brahma Kund > Vishwamitra Kund > Makhdum Kund
SO_4^{--}	:	Vishwamitra Kund > Brahma Kund > Makhdum Kund

All the water quality parameters are in the permissible limit, hence are considered to be acceptable for domestic use.

Composition of Chlorophyll in Spinacia Oleracea (Spinach) with the help of Paper Chromatography

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ABSTRACT

In the present scenario there are various uses of partition chromatography such as pharmaceutical industry, food & beverage, separation. For the experimental study, the green leaves of SPINACIA OLERACEA in grind(mixture) form. Here the moving and stationary phase can be separated with the help of Whatman paper. Here analysis of unknown substance is carried out mainly by the flow of solvent and specially designed filter paper i.e. Whatman paper. The absorption cellulose layers in filter paper contain moisture which act as a stationary phase. Organic solvent or buffer as used as mobile phase. Over the experiment we can analyze the R_f value of the green plant.

Keywords: Absorption, Separation, Paper chromatography, Whatman paper.

Pulsatile Gas-Liquid Taylor Flow: A CFD Study

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ABSTRACT

In several gas-liquid applications, the flow is not steady and subjected to oscillator behaviour. Flow and heat transfer in the slug flow regime subjected to a pulsatile flow has been studied for different frequencies ranging between 1-100 rad s⁻¹. The effect of oscillations on the bubble velocity, wall shear stress, pressure drop and Nusselt number has been studied. The simulations have been performed in a frame of reference moving with the bubble with a sinusoidally varying flow at the domain inlet. While there is no appreciable change in the bubble shape, the film thickness oscillates continuously with time. The bubble velocity oscillates sinusoidally in phase with the two-phase velocity specified at the inlet. The Nusselt number is observed to increase more than that for steady flow at low frequencies but at higher frequencies, the Nusselt number decreases.

In this study, gas-liquid flow in a microchannel of 1mm diameter, length of the channel is 10mm. Simulation have been performed using a CFD commercial software code ANSYS fluent for hydrodynamics and heat transfer of pulsatile Taylor flow.

Key Points: CFD, Pulsatile Taylor Flow, Pressure Drop, Nusselt Number

Stone mining: Threat to *Pila globosa* during dormant period in Sahebganj district of Jharkhand

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ABSTRACT

The abiotic factors of environments such as temperature, water availability, food scarcity, and environmental pollutants like herbicides, pesticides, metals impose severe impacts on ectotherms than in endotherms because temperature influences the physiology of the ectotherms more than the endotherms. *Pila globosa* is an ectothermic mollusc adapted in water as well as on land and prefers areas with a large amount of aquatic vegetation. It remains dormant for months during winter and extreme summer season. During dormant stage, it may be highly sensitive even to mild exposure to low-dose pollutants and other environmental extremities. 09 ponds were selected for study. 3 ponds were selected whose location was 3 Km away from the stone mining site, 3 were from the vicinity of the rock mining site and 3 ponds were created out of stone mining activities. *Pila globosa* abundance was calculated before and after dormant period in all 9 ponds. Many *Pila globosa* did not emerge active after dormant period from the pond that are in vicinity of the mining site or created out of mining. Close examination revealed that they died within their shell. In the next dormant season, some *Pila globosa* from each pond were marked on their shell and left in the same pond. It was observed that about 50% of the animal died from the pond that were in vicinity of the mining sites and 15% of the animal died from the pond that were created out of mining activities, only 2% mortality of the marked snails were observed from the ponds that were located away from the mining site. This study was conducted for 3 years. These observation revealed thar mining activities has negative impact on *Pila globosa*. This may be due to decrease in aquatic vegetation. The other cause may be elevated carbohydrate and fat metabolism in response of stress created by stone mining.

Keywords: *Pila globosa*, Stone mining, abundance

An Economical and Eco-Efficient Ammonium Chloride Promoted Friedländer Condensation: A Study of Microwave-Assisted Versus Conventional Heating.

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ABSTRACT

Quinolines and their derivatives is a privileged scaffold for the development of new drugs,[1] many biologically active natural products, especially alkaloids,[2–3] as well as in material science.[4] The Friedländer condensation is a common synthetic route in organic chemistry for the synthesis of polysubstituted quinolines and polycyclic quinolines. However, majorities of the procedures of Friedländer condensation reported so far suffer from one or more drawbacks like often expensive, toxic and harmful metal catalyst systems, the necessity of oxidizing media and/or extremely acidic and drastic reaction conditions [5]. We have employed an innovative approach to the Friedländer condensation, focusing on both economic viability and eco-efficiency utilizing ammonium chloride as an acid-and metal-free catalyst and CH₃CN-H₂O as the benign reaction medium in conventional heating at 80–90°C. The method is easy, low-cost and environmentally friendly. Ammonium chloride is easily available, non-toxic, inexpensive, and, most importantly, effortlessly separated from the reaction mixture, making the reaction functionally simple. We also extended this strategy to the synthesis of substituted quinoline derivatives under microwave irradiation (Anton Paar Monowave 300 microwave Reactor) at 160°C temperature. Microwave irradiation methods show improvement in time and yield over conventional heating methods. The present process provides a comparative study of microwave irradiation versus the conventional heating method. The use of Ammonium chloride as safe promoter not only lowers reagent costs but also follows to green chemistry principles [6], by minimising waste and environmental impact. Microwave-assisted heating not only accelerates Friedländer condensation but also reduces energy consumption, making it a more environmentally friendly alternative to traditional heating [7]. The use of microwave-assisted heating and the incorporation of ammonium chloride as a promoter offer an exciting prospect for the development of more eco-efficient and economical synthetic processes, contributing to the advancement of green chemistry principles in the field of organic synthesis.

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Energy- Alternative Resources And Conservation

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ABSTRACT

The capacity to do work is referred to as energy. The energy serves as the input in a process, whereas the output is the work. Energy may be considered as a form of matter which is interconvertible. Energy is needed in almost every facet of our life. Man uses energy for agriculture, industry, transport, communication, cooking, comforts, and war preparations. The development of the country highly depends on the continuous supply of energy.

Keywords: Wood energy, Fossil fuels, Solar energy, Atomic energy, Biogas energy

**An Ecological Assessment Of Physicochemical Qualities Of River Water Sone In
Relation To Declining Fish Production In Koilwar , Near Ara, In Bhojpur, District Of
Bihar.**

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ABSTRACT

Water pollution is a significant threat to aquatic ecosystems worldwide, with detrimental impacts on fish production and biodiversity. This study investigates the relationship between water pollution and declining fish production, focusing on the River Sone in Bihar as a case study. Physicochemical parameters, habitat characteristics, and fish populations were assessed to identify key factors contributing to the decline in fish production. Water quality analysis revealed elevated levels of pollutants such as suspended solids, turbidity, nutrients, and heavy metals, exceeding recommended thresholds for aquatic health. Habitat degradation, including habitat loss, altered flow dynamics, and sedimentation, further exacerbated the decline in fish populations by reducing spawning grounds, disrupting migration routes, and impairing food availability. Biological monitoring indicated decreased fish abundance, species richness, and diversity, reflecting the ecological consequences of water pollution on fish communities. Historical data analysis and stakeholder engagement provided insights into the long-term trends in fish production and identified potential anthropogenic drivers of pollution, including industrial discharge, agricultural runoff, and sand mining activities. The findings underscore the urgent need for integrated management approaches to address water pollution and mitigate its impacts on fish production, emphasizing the importance of sustainable resource management and pollution control measures to safeguard freshwater ecosystems and support sustainable fisheries.

Keywords: Physicochemical parameters, fish populations, Biodiversity Habitat degradation

Adverse effects of pollution and its remedies

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ABSTRACT

Pollution has become our global issue. It affects our ecosystem both biotic or abiotic. It includes water, air and soil pollution. Pollution occurs naturally and manmade. Overpopulation also plays a role in pollution due to increases of consumption and demand. Our safety also plays a role in pollution due to the use of nuclear weapons. Harmful gasses emitted from it affect human health and the biosphere. In the course of development we established a number of chemical industries. It damages our soil quality and harmful gasses spread in the environment affect human health and food qualities. Government started initiatives to control and remedy pollution.

The Effect of Water on the Ultra Centrifugal Stability of Non-aqueous Emulsion.

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ABSTRACT

The stability of benzene in ethylene glycol non-aqueous emulsion stabilised with sodium dioctyl sulphosuccinate has been determined quantitatively employing an ultracentrifuge at 25,980 rpm. The influence of water on the ultracentrifugal stability of emulsion has been found out. On ultracentrifugation, by the addition of water, the rate of separation of benzene from the emulsion decreases, i.e. the stability of the emulsion increases and the ultracentrifugal stability of aqueous emulsions is found to be greater than that of non-aqueous emulsion.

Industrial Air Pollution

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ABSTRACT

This research presentation delves into the multifaceted issue of industrial air pollution, examining its origins, effects, and potential solutions. It explores the diverse sources of industrial emissions, ranging from manufacturing processes to energy production, and discusses their detrimental effects on air quality and public health. Moreover, the presentation evaluates current regulatory frameworks and technological interventions aimed at mitigating industrial pollution. Additionally, it highlights the challenges faced in implementing pollution control measures and explores innovative strategies to overcome these hurdles. By synthesizing research findings and practical insights, this presentation aims to foster a deeper understanding of industrial air pollution and inspire efforts towards sustainable solutions.