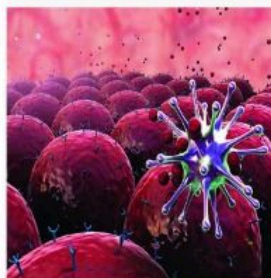


UGC Sponsored National Seminar on
**RECENT ADVANCES IN TOXICOLOGY,
IMMUNOLOGY AND BIODIVERSITY**
(NSRATIB - 2025)

SOUVENIR

29th - 30th JANUARY, 2025



NAAC A+

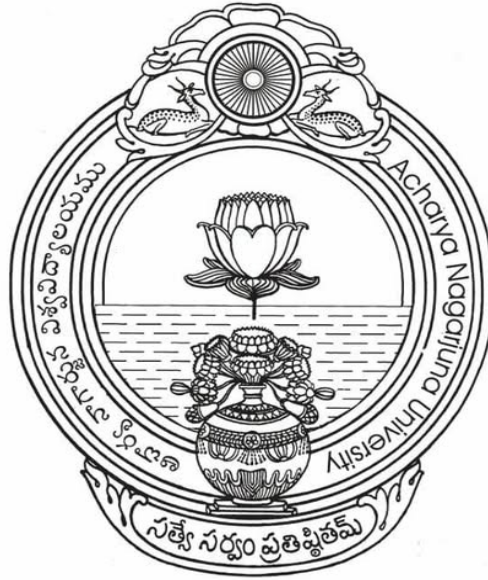
Organized by
DEPARTMENT OF ZOOLOGY & AQUACULTURE
ACHARYA NAGARJUNA UNIVERSITY
Nagarjuna Nagar - 522510, Guntur Dist., A.P. INDIA



ज्ञान-विद्यान विमुक्तये

**UGC-Sponsored
National Seminar
On
Recent Advances in Toxicology,
Immunology, and Biodiversity
(January 29th – 30th, 2025)**

ABSTRACTS



Department of Zoology & Aquaculture

Acharya Nagarjuna University
Nagarjuna Nagar – 522510
Andhra Pradesh, India.

FOREWORD

It is with immense pleasure that we host the UGC-Sponsored National Seminar on "**Recent Advances in Toxicology, Immunology, and Biodiversity**," an initiative dedicated to addressing crucial issues and fostering advancements in these diverse yet interconnected domains of life sciences. This seminar underscores the pressing need for scientific exploration and collaboration to unravel the complexities of our ecosystems, combat global challenges, and propel innovative research for societal benefit. The study of Toxicology unveils the intricate relationship between environmental pollutants and their impact on organisms and ecosystems. With toxicants increasingly threatening aquatic systems, laboratory and field research is imperative to unravel the mechanisms of toxicity and to propose sustainable solutions. These insights are essential for protecting biodiversity, ensuring ecosystem health, and securing the balance of life on Earth.

In the field of Immunology, significant strides have been made in understanding host defense mechanisms, immune responses, and molecular pathways critical for combating ailments. The post-pandemic era emphasizes the need to explore nutritional and genetic factors that enhance immunity, paving the way for breakthroughs in disease prevention and treatment. Immunology thus stands at the forefront of safeguarding human health and well-being. Biodiversity conservation remains vital to sustaining life on the planet. Protecting the variety of species and ecosystems is not merely an ecological necessity but a moral obligation to preserve nature's richness for future generations. By integrating molecular taxonomy, bioinformatics, and biotechnology, biodiversity research continues to unveil new perspectives for conservation and sustainable management.

This seminar serves as a golden opportunity for scientists, researchers, and young minds to converge, exchange ideas, and contribute to a greener, healthier, and more sustainable future. It acts as a catalyst for igniting scientific curiosity, fostering innovation, and disseminating groundbreaking achievements to the broader community.

We extend our heartfelt gratitude to the participants, resource persons, and supporters of this seminar. May this event inspire collaboration and innovation, laying the groundwork for a future marked by scientific excellence and environmental harmony.

Prof. M.Jagadish Naik
Organizing Secretary

Prof. P. Padmavathi
Seminar Co- Director

Prof. V. Venkata Rathnamma
Seminar Director



ACHARYA NAGARJUNA UNIVERSITY

Nagarjuna Nagar, Guntur – 522510, Guntur Dist., A.P, INDIA

NAAC – ‘A+’ GRADE



VICE-CHANCELLOR’S MESSAGE

It’s a great pleasure that I extend my heartfelt congratulations to the Department of Zoology and Aquaculture, Acharya Nagarjuna University for organizing the seminar on 'Recent Advances in Toxicology, Immunology, and Biodiversity.' Your commitment to advancing knowledge and fostering interdisciplinary research is truly commendable. This seminar serves as a platform for enriching dialogue, and I am confident that it will contribute significantly to the academic and scientific community. I applaud the department’s efforts and wish all the participants a successful and insightful experience.

I congratulate the director of seminar and wish the seminar a grand success.

K. Gangadhara Rao
25.1.25

Vice-chancellor
(Prof. K. Gangadhara Rao)



ACHARYA NAGARJUNA UNIVERSITY

Nagarjuna Nagar, Guntur – 522510, Guntur Dist., A.P, INDIA

NAAC – ‘A+’ GRADE

RECTOR’S MESSAGE



It's my great pleasure to congratulate the Department of Zoology and Aquaculture, Acharya Nagarjuna University on organizing the seminar on “Recent Advances in Toxicology, Immunology, and Biodiversity” on 29th to 30th January, 2025. This initiative highlights the department's dedication to advancing research and promoting knowledge exchange in crucial areas of science. I commend their efforts in bringing together experts to discuss these pressing topics, and I am confident that this seminar will lead to valuable insights and collaborative opportunities. Wishing the department continued success in all their endeavors.

I convey my good wishes for the success of national seminar.

Rector
(Prof. K. Ratna Shiela Mani)



ACHARYA NAGARJUNA UNIVERSITY

Nagarjuna Nagar, Guntur – 522510, Guntur Dist., A.P, INDIA

NAAC – 'A+' GRADE

REGISTRAR'S MESSAGE



I extend my sincere congratulations to the Department of Zoology and Aquaculture for organizing the seminar on 'Recent Advances in Toxicology, Immunology, and Biodiversity.' This event reflects the department's dedication to advancing scientific research and fostering academic excellence. Such initiatives play a crucial role in promoting knowledge sharing and collaboration. I am confident that this seminar will provide valuable insights and contribute to further progress in these important fields. Best wishes for a successful and impactful seminar.

I also hope that this seminar provides an opportunity to the young students & Research Scholars to interact with the eminent personalities. I am sure that discussion and deliberation will help the young researchers in designing and execution of quality research.

I congratulate the Director of the Seminar Prof. V. Venkata Ratnamma and the entire team for organizing this seminar.

Best Wishes!

Registrar
(Prof. G. Simhachalam)

PROFILE

The Department of Zoology was established in 1967 and holds the distinction of being the first in India to introduce Limnology as a specialization. Over the years, the department has made significant contributions to the field of basic Limnology through diverse research initiatives. While specializing in Biodiversity, the department has extensively studied freshwater animal groups in the lower deltaic region of the River Krishna. With the rapid expansion of aquaculture in the coastal districts of Andhra Pradesh, which fall within the University's jurisdiction, the department has broadened its research scope to meet the needs of fish farmers. Other key research areas include Toxicology, Immunology, and the emerging field of Stygobiology. To address these growing demands, the department proposes to introduce a specialization in Applied Limnology. This initiative aims to not only expand research activities but also support local fish farmers effectively.

Thrust Areas

Immunology: Study of pathways involved in natural and acquired immune mechanisms in disease progression. Research on diseases like malaria, diabetes, cancer, and autism using small animal models. Assays for antibody and cell-mediated immune responses in experimental animals. Investigating the role of nutrition in enhancing immune health, considering the current shifts in food habits and lifestyles.

Aquatic Toxicology: A regionally relevant theme designed to assist aquaculture farmers as part of a lab-to-land program. Toxicological studies and environmental impact assessments in the coastal districts of Andhra Pradesh.

Biodiversity: Research on zooplankton, benthos, and fish biodiversity. Taxonomic studies on parasitic helminths, nematodes, and acanthocephalans.

Aquaculture: Exploration of recent advancements in aquaculture management. Studies focusing on fish and prawn culture production systems, including water quality, nutrition, feed, and disease management. Addressing environmental issues in aquaculture production systems.

Research Contributions (2003-2024)

Research Papers Published: 650

Average Impact Factor: 2.512

Books Published: 51

M.Phils Awarded: 111

Ph.D. Awarded: 200

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Vice-Chancellor (I/c), ANU

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Prof. V. Venkata Rathnamma
Professor & Head
Dept. of Zoology & Aquaculture, ANU

Seminar Co- Director:

Prof. P. Padmavathi, Dept. of Zoology & Aquaculture, ANU

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Dr. A. Aswartha Narayana

A. Gopal

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M. Sudhendra Babu

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M. Sudhendra Babu

K. Pavani

A. Keerthana

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T. Rahul Sandeep

K. Pavani

Ch. Nikitha

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Prof. M. Jagadish Naik

A. Dileep Babu

B. Mohan Krishna

R. Sai Vamsi

B. Harshavardhini

M. Satya Priyanka

M.P. Julie

Certificate committee

Prof. V. Venkata Ratnamma

Dr. A. Aswartha Narayana

A. Gopal

P. Dedeepya

G. Sri Teja

D.C. Sindhu Sree

M. Venkata Sai Kumar

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B.V.L Aradhya Sharma

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K. Sandhya Rani

B. Sankar

B.V.L Aradhya Sharma

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Sasi Kiran,

Vijay,

Manohar,

Bhasha,

Rajesh,

Meravali,

Hema sundar,

Rakesh,

Jhon satwik,

Sharmila,

Glory,
Mounika,
Sravani
Dinesh,
Anil,
Ramu,
Prasanth,
Bheeshma,
Palleti.Jyotsna
Geddam.Anusha
Arasada.sri poojitha
Tholapu Ratna Kumari,
Sunny babu,
Syamul,
Akhilesh,
Muskan,
Kusuma
Madhuri,
Jay Kiran,
Greesmitha,
Sokshitha,
Indhu,

Harini,
Sai Sravani,
Greesma,
Kusuma,
Dhaksayani.
Ramu,
Teja,
Vakdhana Babu,
Sai Ganesh,
Vijay
Anantha Lakshmi
Sasi kiran
Venkatesh
Abhinav
Jahnvi
David
Durga Prasad
Subba Lakshmi
Manikanta
Jaya kiran
Parnika
Dinesh

INVITED LECTURES

IMMUNOCOMPROMISED

Dr. R. Rama Krishna,

Professor and HoD,

Department of Pulmonology,

NRI Medical College,

Chinnakakani,

Guntur District

Abstract:

Immunodeficient person is one who is susceptible to infections. Defence mechanisms of the body are impaired leading to recurrent microbial infections and sometimes enhanced susceptibility to malignancies. There is an enhanced susceptibility to infections from organisms that have little native virulence. Immuno deficient state can occur from congenital or acquired immunological abnormalities in humoral and cell mediated immunity. Defective humoral immunity can occur because of congenital abnormalities or nutritional defects or hypoproteinemic states. In addition leukocyte abnormalities, enzyme deficiencies, neutropenia, compliment component abnormalities can result in increased susceptibilities to bacterial, viral and fungal pathogens. Defective cell mediated immunity can occur because of HIV AIDS and defective T lymphocyte activity. Prolonged corticosteroid therapy, immune suppressive drug therapy as in the treatment of organ transplantation can result in defective cell mediated immunity and increased susceptibility to infections. Cutaneous infections, diabetes mellitus, chronic renal failure, indwelling catheters can enhance the susceptibility of patients to infections. High degree of suspicion is necessary in treating infections in a compromised hosts as relatively innocuous organisms can cause serious infections and death.

TOXIC IMPACTS OF PLASTIC DEBRIS ON AQUATIC BIODIVERSITY

Prof. M. BHASKAR, Ph.D.

DIVISION OF ANIMAL BIOTECHNOLOGY,

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Plastic is a wonder material that we use for everything and the most harmful debris, because it does not lead to break down in nature and takes 100's of years to foul up and cause damage to countless generations of marine life. The first plastic was invented in 1862 by Alexander Parkes. The production of plastic is growing about 9% annually, 80% of thermoplastics and 20% of thermoset plastic wastes are generated in India. The use of plastics in India is 3 kg per person per year. It causes serious health problems to humans such as cell damage, birth defects, cancer and lung diseases. In 2022, the global cost of plastic related health effects was estimated to 100 billion dollars per year. India is a major contributor to plastic pollution, with a large amount of plastic waste ending up in landfills, oceans and water bodies. This waste can have severe environmental and health consequences. Aquatic fishes are appropriate indicators for aquatic biodiversity because their enormous variety reflects a wide range of environmental conditions. Plastics are likely to hit us so severely than climatic change or global warming. Examination of trends in freshwater fish and fauna from different parts of the world indicate that most fauna are in serious decline and in need of immediate protection. To tackle these challenges, we must first understand how plastic is detrimental to aquatic biodiversity. The major impacts of plastic on aquatic biodiversity are particularly due to the difficulty of its removal from the environment once they enter the ecosystem. Bacterial strains such as *Pseudomonas aeruginosa*, *Bacillus megaterium*, *Rhodococcus ruber*, *Ideonella sakaiensis*, may break down or melt the thermoplastics and polyethylene terephthalate (PET). Let's join into the fight for ending plastic pollution by 2040 and together we will make a difference in creating awareness for a plastic free society in the future.

EXPLORING SOIL MICROBIAL DIVERSITY IN PULICAT LAKE WITH EMPHASIS ON HEAVY METAL ACCUMULATION AND ANTIMICROBIAL RESISTANCE.

M. Rajasekhar

Department of Zoology, S.V. University, Tirupati. A.P. India.517502

The significance of microbial communities in soil ecosystems has been brought to light by recent studies on heavy metal contamination and the rise of antimicrobial resistance (AMR). Research has demonstrated that, the interplay between environmental contaminants and microbial diversity plays a significant role in determining the success of bioremediation initiatives and the health of ecosystems especially in ecologically delicate areas like Pulicat Lake. This study focusses on the chemical properties, microbial diversity, and antimicrobial resistance (AMR) profiles of soil samples collected from Pulicat Lake. Using auger boring techniques, soil samples were taken at various places and depths (1, 5, and 10 feet). The samples were analysed with the following instruments the Elico CM80, Inductively Coupled Plasma Optical Emission Spectroscopy (ICP-OES) and Atomic Absorption Spectroscopy (AAS), to determine their salinity, pH, heavy metal levels and micronutrient concentrations respectively. Quantification of the concentrations of heavy metals, such as Co, Cr, Cu, Fe, Mn, Mo, and Zn, showed significant variations across soil depths. The isolation of bacterial strains cultivated under various pH and temperature conditions require microbiological analysis. Methyl Red, Voges-Proskauer, and Catalase tests were among the biochemical tests conducted, and pure cultures were examined for antibiotic sensitivity to Norfloxacin, Ampicillin, Streptomycin, and Gentamicin. Strong resistance mechanisms to beta-lactams, aminoglycosides, and tetracyclines were revealed by the presence of several AMR genes, such as blaTEM, aacC, and tet35. Important species including *Pseudomonas aeruginosa* and *Bacillus subtilis* were found through metagenomic sequencing of the microbial population, highlighting their possible role in bioremediation, particularly in heavy metal detoxification. The ecological roles of bacteria, viruses, fungi, and archaea were highlighted by Sankey and Krona plots, which demonstrated the diversity of microbial species. Microbial communities are essential for metabolic and environmental adaptation pathways, according to the KEGG orthology study. The results emphasise the microbial diversities ecological importance in Pulicat Lake as well as the possible risks linked to heavy metal deposition and genes associated with antibiotic resistance, invites alarming efforts for further monitoring and management.

Keywords: Pulicat Lake, Heavy Metals, Antimicrobial Resistance, Microbial Diversity, Bioremediation, Soil Analysis, Metagenomics.

BIODIVERSITY OF BUTTERFLIES - RECENT CONSERVATION STRATEGIES IN THE VEGETATION'S OF SOUTHERN ANDHRA PRADESH

Dr. S. P. Venkata Ramana**

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In insect world diversity is immense. Among insects butterflies which are both useful as pollinators and as indicators of changing environment stand apart. Insects dominate the earth species wise and population number wise and it has been found that more than 75% of the faunal diversity is that of insects. The biodiversity of insects is immense and the coleopterans constitute more than 3, 50,000 species, largest among class insecta followed only by 1, 50,000 species of Lepidoptera which include 17,000 species of butterflies and rest are moths. Butterflies are beautiful and everyone enjoys watching a graceful butterfly drift through the air. They are at the bottom of the food chain. Butterflies are good examples of Insect-Plant Interactions. India is one of the 17 "mega diverse" countries of the world and it is host to a spectacular number of butterflies: approximately 1,800 species and subspecies. About 15-20% of these are endemic to the Indian Region, which makes this an especially important region for butterfly diversity and conservation. In spite of these vast numbers, their very existence is under threat. Butterflies and moths which depend on varied habitats of trees, crops and orchards are facing sure extinction due to various factors both man-made and natural. There are about 1,800 species of butterflies of which more than 250 species can be observed in different locations in the Eastern Ghats of Southern Andhra Pradesh; among these many are rare and endangered species which are also endemic to Eastern Ghats. Recently there is a growing interest in setting up of butterfly parks and gardens which needs to be encouraged for protecting and presenting the butterflies and to impart education, entertainment and to create awareness of the species diversity and importance. Also there is an urgent need to prepare a proper inventory including that of flora on which they depend so that these valuable species can be protected and preserved in their identified hotspots.

REGULATORY ROLES OF RNAS AND RNA MODIFICATIONS

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Abstract:

The post-transcriptional modifications of RNA nucleotides were well known for decades, but the exact positions of the modifications and their physiological functions were poorly understood until recently. The modifications in mRNAs represent a critical layer in the regulation of gene expression. Chemical modifications in abundantly found non-coding RNAs namely, rRNA and tRNA, were identified long back before more than half a century (Stacey, 1965), and these RNAs consist of more than 160 modified nucleotides (Boccaletto et al., 2018). In the last decade, increased number of modifications were identified and characterized in less abundant species of RNA such as, mRNAs and long non-coding RNAs (lncRNA). All these modifications are collectively termed as epitranscriptome, including, N⁶-methyladenosine (m⁶A) that accounts for 80% of RNA methylation modifications. At the same time, several other modifications of RNA, such as m¹A, m⁵C, m³C, pseudouridine (Ψ) and m⁷G have also been demonstrated to be involved in cancer and drug resistance, but the detailed molecular mechanisms involved are not clearly understood. Advanced techniques, like high-throughput next-generation sequencing (NGS) and nanopore-based mapping, were useful to map the position of these modifications with single nucleotide accuracy, and genetic screens could uncover the "writer", "reader", "eraser" proteins, which help to install, interpret and remove such modifications, respectively. The new technologies and methods allow identification, transcriptome-wide mapping, and functional characterization of a growing number of RNA modifications, that provide perception into the biology of these marks. The post-transcriptional modifications have an important role during animal development, highlighting how these discoveries can affect multiple aspects of development from fertilization to differentiation in many species.

Key words: Posttranscriptional regulation, RNA modifications; RNA modifying genes; m⁶A; epitranscriptome.

SUSTAINABLE DEVELOPMENT FOR FUTURE

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ABSTRACT

Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs. Sustainable Development ties together concern for the carrying capacity of natural systems with the social challenges faced by humanity. The concept of Sustainable Development has in the past most often been broken into three constituent parts: Environmental sustainability, Economic Sustainability and sociopolitical Sustainability. Green Development is generally differentiated from Sustainable Development in that Green development prioritizes what its proponents consider to be environmental sustainability over economic and cultural considerations. Proponents of Sustainable Development argue that it provides a context to improve overall sustainability where cutting edge Green Development is unattainable. Inclusive green growth is the pathway to Sustainable Development. It is the only way to reconcile the rapid growth required to bring developing countries to the level of prosperity which they aspire, meet the needs of the more than nearly 1 billion people still living in poverty, and fulfill the imperative requirement of a better Global Environment. Causes of environmental degradation is by deforestation desertification pollution acid rain global warming. Impact of environmental degradation is done by Global Climate Change, Decreased Food Production, Reduced Biological Diversity, Health Problems, Damaged Property, Economics Costs. Reduced biological diversity changes in temperature, human actions such as deforestation – plants and animals die – may lead to extinction. Plants with valuable medicinal properties lost before they are discovered. Stewardship an attitude that recognizes that we do not own earth, but are responsible for looking after it. From the use of fish resources to how schools and offices are organized and run. Governments or international ‘watchdog’ organizations are responsible. Three pillars of sustainability are a powerful tool for defining the Sustainable Development problem. This consists of three parameters: Economic, Social, and Environmental pillars.

Key words: Sustainable development, Health problems, Green development, Economics costs; Environmental pillars.

MOLECULAR IDENTIFICATION, TYPING AND TRACKING OF VIBRIO HARVEYI IN AQUACULTURE SYSTEMS: CURRENT METHODS IN ANDHRA PRADESH

Dr. P.VEERA BRAMHACHARI

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Vibrio harveyi is an economically significant pathogen for the aquaculture industry and methods to identify, type and track *V. harveyi*-related populations are therefore of interest. Due to phenotypic similarities and genome plasticity, traditional phenotypic identification and typing methods are not always able to resolve *V. harveyi* from closely related species. This review provides an overview and evaluation of molecular methods currently used to identify and type *V. harveyi* related species in taxonomic and epidemiological studies and presents prospects and challenges for developing molecular methods for direct detection of *V. harveyi* in complex samples. Pathogenicity of *V. harveyi* has been related to a number of factors including secretion of extracellular products (ECP) containing substances such as proteases, haemolysins, and lipases, lipopolysaccharide, and a bacteriocin-like substance. Due to the economic importance of *V. harveyi* infections, there is considerable interest in methods to identify, type and track *V. harveyi*-related populations associated with marine reared animals. Identification of *V. harveyi* strains can be a challenging task since species within the Harveyi clade (*V. harveyi*, *Vibrio campbellii*, *Vibrio alginolyticus*, *Vibrio rotiferianus*, *Vibrio parahaemolyticus*, *Vibrio mytili* and *Vibrio natriegens*) have a very high degree of both genetic and phenotypic similarity. Bacterial typing systems detect differences in the phenotypic or genotypic characteristics of strains, and based on their resolution power can be used to distinguish genera, species or strains. Bacterial typing systems therefore form the basis for the integration of bacterial taxonomy and epidemiology. Pathogen tracking is relevant for epidemiological studies concerned with the ecology and natural history of a disease; or with planning, monitoring and assessment of disease control programs. Methods for pathogen tracking include identification and typing methods as well as methods for direct detection and quantification of the relevant organism in environmental samples. This paper presents and evaluates current methods for identification and typing of *V. harveyi* related species and discusses prospects and challenges for developing molecular methods for direct detection of *V. harveyi* in complex samples. which covered in detail the epizootics of *V. harveyi* mediated vibriosis, traditional methods for *V. harveyi* identification, the different virulence factors of *V. harveyi*, and also discussed epidemiology and possible control measures for commercial aquaculture hatcheries.

FROM NATURE TO NURTURE: ELEVATING SHRIMP GUT HEALTH WITH NEOLAMARCKIA CADAMBA PECTIN

Dr. N.S. Sampath Kumar

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The application of prebiotics in shrimp aquaculture has gained significant attention in recent years, as they offer a promising approach to improve gut health and overall well-being of shrimp. Pectin, a polysaccharide with prebiotic potential, has been explored as a viable option to enhance shrimp gut health. However, traditional sources of pectin, such as citrus peels and apple pomace, are unable to meet the increasing demand for this valuable compound. In this study, we investigated the fruit peel of *Neolamarckiacadamba* as a novel source of pectin, optimizing its extraction process using CCD-RSM. The maximum yield of 15.89% (w/w) was achieved under optimal conditions of pH 2.05, 90°C, and a duration of 60 minutes. Structural characterization of the extracted pectin was conducted using FTIR Spectroscopy, Mass Spectroscopy, and NMR analysis. Enzymatic hydrolysis of the extracted pectin yielded three distinct molecular size fractions: <3 kDa, 3–10 kDa, and >10 kDa. These fractions were further analyzed using FTIR, HPLC, and MALDI-TOF-MS to elucidate their physicochemical properties. Notably, the <3 kDa fraction exhibited a richer composition of galacturonic acid and glucose, while the >10 kDa fraction contained rhamnose and arabinose. When evaluated for their prebiotic potential in shrimp gut health, the <3 kDa fraction significantly enhanced the growth of beneficial microbiota, such as *Lactobacillus* sp. in the shrimp gut, while inhibiting the growth of pathogenic bacteria, such as *E. coli*. The <3 kDa fraction also demonstrated a higher prebiotic index, indicating its potential to modulate the shrimp gut microbiome and improve overall gut health. Comprising oligomers from the rhamnogalacturonan region and arabino-oligosaccharides with a degree of polymerization between two and five, the <3 kDa fraction shows great promise as a prebiotic supplement in shrimp aquaculture, offering a novel approach to enhance gut health, boost immune function, and promote sustainable shrimp production.

Key words: Gut health; Shrimp culture, Prebiotic; *N.cadamba*

Harnessing Cyanobacteria for Auxin Production: A Step Towards Sustainable Agricultural Practices and Biodiversity Conservation

Dr. Anjani Devi Chintagunta

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ABSTRACT

Cyanobacteria, essential photosynthetic microorganisms in topsoil, play vital roles in preventing soil erosion, carbon and nitrogen fixation, and influencing soil hydrology. They produce numerous bioactive compounds, including lipopeptides, fatty acids, toxins, carotenoids, vitamins, and plant growth regulators. To evaluate their potential as plant growth promoters, soil samples from native paddy fields were collected, and cyanobacterial strains were isolated. Identification was performed using a polyphasic approach, encompassing 16S rRNA gene sequencing, phylogenetic analysis, and morphological and ecological assessments.

Microscopic examination revealed heterocytes and continuous akinetes, while transmission electron microscopy confirmed well-organized photosynthetic structures and nutrient storage mechanisms. Phylogenetic analysis authenticated the isolate as *Aliinostoc* sp., capable of synthesizing an auxin-like compound under varying tryptophan concentrations. This compound, identified as indole-3-acetic acid (IAA) through thin layer chromatography (TLC) and Fourier-transform infrared spectroscopy (FT-IR), was quantified at 126.26 ± 1.42 µg/mL using high-performance liquid chromatography (HPLC). Further, the paddy seeds were treated with the cyanobacterial extract containing IAA to evaluate the plant growth-promoting ability. *In vitro* experiments demonstrated that paddy seeds treated with the extracts achieved a germination rate of 95.55%, with significant root elongation (10.55 cm) and maximum shoot growth (7.24 cm) on 12th day. Additionally, enhancements in chlorophyll content (3.17 mg/g), fresh weight (0.63 g), dry weight (0.07 g), and total nitrogen content (0.70%) were recorded. These findings underscore the auxin-producing capacity of *Aliinostoc* sp. and its efficacy in promoting seed germination, root development, and overall plant growth for sustainable paddy cultivation.

Key words: *Aliinostoc* sp. Auxin, Cyanobacteria, IAA, Polyphasic approach, phylogenetic analysis, 16S rRNA gene sequencing.

TOXICOLOGY

T-01

**Toxic Effects of Endosulfan and Fenvalerate
on Behavioral changes in the Fresh water fish
*Labeo rohita***

Dr.K.SUNEETHA* and Dr.K.VEERAAIAH

Department of Biochemistry, Acharya nagarjuna
university*

Department of Zoology, Acharya nagarjuna
university

Abstract:

Endosulfan is an organochlorine insecticide widely used in agriculture to control pests on fruits, vegetables, tea and non food crops such as tobacco and cotton. Fenvalerate is one of the pyrethroid insecticide and most widely used in agricultural crops such as cotton, paddy, jowar, maize, soyabean, tomato, lady's finger, cauliflower, tobacco and tea. But the use of these insecticides also tend to affect the biology of non-target species along with pests. The present study was conducted to evaluate the toxic effect of pesticides Endosulfan(EC-35%) and Fenvalerate (EC-20%), on freshwater fish *Labeorohita*. The behavioral changes were seen in the present investigation, the surfacing phenomenon of fish observed under Endosulfan and Fenvalerate exposure. The control group shows the normal behavior during the whole experiment. Thus the behavioral changes of the fish under insecticidal stress may have deleterious effects of making the fish fall an

easy prey in their natural habitat and may affect the stability of the population. In the present study it was observed that the effect of Fenvalerate on fish *Labeorohita* was more pronounced than Endosulfan.

Key Words- Endosulfan, Fenvalerate and
Labeorohita.

T-02

**Azoxystrobin Exposure in *Ctenopharyngodon
idella*: Behavioral, Morphological, and
Ecological Implications**

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Abstract:

Azoxystrobin (AZ), a widely used strobilurin fungicide, has raised growing concerns due to its potential impact on aquatic ecosystems. Despite its extensive application, the sublethal effects of AZ on non-target aquatic organisms, particularly commercially important fish species, remain underexplored. This study investigates the behavioral and morphological changes induced

by AZ exposure in *Ctenopharyngodon idella* (grass carp), a vital species in global aquaculture. The research evaluates acute toxicity and sublethal impacts of AZ during the early life stages of *C. idella* under controlled laboratory conditions. Behavioral assessments revealed swimming irregularities and feeding inhibition, while morphological analysis identified significant histopathological changes, including epithelial hyperplasia in gills, hepatocellular degeneration, and glycogen depletion. Antioxidant enzyme activity assays demonstrated oxidative stress, with increased catalase (CAT) and peroxidase (POD) activity, decreased superoxide dismutase (SOD) activity, and the upregulation of the stress-related gene HSP70. The LC50 value for juveniles was determined to be 0.549 mg/L, indicating moderate acute toxicity. Long-term AZ exposure further disrupted mitochondrial dynamics, impaired immune recovery, and increased susceptibility to viral infections, which could potentially amplify the risk of disease outbreaks in aquaculture systems. These findings underscore the ecological risks associated with azoxystrobin residues in aquatic environments, including behavioral dysfunction, oxidative damage, and immunosuppression in fish. The study highlights the need for enhanced regulatory measures and the development of alternative, eco-friendly fungicides to mitigate these risks.

Keywords: azoxystrobin, *Ctenopharyngodon idella*, oxidative stress, behavioral changes, histopathology, immunosuppression.

T-03

An Ecosystem Perspective on the Effects of Toxin Biomagnification on Butterfly Populations

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Abstract

Ecosystems, especially butterfly populations, are at serious risk from biomagnification, the process by which the concentration of toxicants rises in organisms at higher trophic levels. This study looks at how harmful substances, such as heavy metals and persistent organic pollutants, build up in the food chain and eventually impact butterflies, they are important pollinators and markers of the health of the ecosystem. Due to their sensitivity to environmental changes, butterflies are an essential component in evaluating the effects of biomagnification. Numerous pathways, such as industrial discharges, air deposition, and agricultural

runoff, allow toxins to reach ecosystems. By being consumed by higher-level predators like butterflies, these compounds become more concentrated as they build up in lower trophic levels, including plants and herbivores. In butterfly populations, the physiological impacts of these toxicants may result in decreased reproductive success, stunted growth, and elevated mortality. The interdependence of trophic levels is further demonstrated by the fact that disturbance of butterfly populations can have a domino impact on plant pollination and ecosystem stability. This study emphasizes how crucial it is to track and reduce toxicant exposure in environments in order to save butterfly species and preserve biodiversity.

Keywords: Pollinators, Biomagnification, Toxicants, Butterflies, Ecosystem Health, Environmental Impact, and Biodiversity.

T-04

Toxicological Effects of Custodia Fungicide on *Catlacatla* and its biochemical changes

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Abstract

The increasing use of fungicides in aquatic ecosystems has raised concerns about their

potential toxicological effects on aquatic organisms. This study investigates the toxicological effects of Custodia, a commonly used fungicide, on *Catlacatla*, a commercially important freshwater fish. The primary objective was to evaluate the biochemical changes induced by exposure to Custodia and assess its impact on the health of *C. catla*. Fish were exposed to varying concentrations of Custodia for 24, 48, 96 hours, and various biochemical parameters, including serum protein levels, liver enzymes (ALT, AST), oxidative stress markers (malondialdehyde, glutathione), and antioxidant enzyme activity (superoxide dismutase, catalase), were analyzed. Results showed significant alterations in these biochemical parameters, indicating oxidative stress, cellular damage, and liver dysfunction. The study also observed dose-dependent changes in the behavior and survival rates of the fish. The findings suggest that Custodia fungicide exerts toxic effects on *C. catla*, causing biochemical disturbances that could negatively impact the health and survival of the species. This research highlights the need for further investigation into the environmental impact of fungicides on aquatic life and calls for better regulatory measures in their usage to mitigate ecosystem damage.

Keywords: Biochemical changes ,Fungicide, Adama custodia, *Catlacatla*.

T-05

“Studies on Attenuation of Phthalate Induced Haematopoietic, Hepatic, Renal and Reproductive Toxicity by Phyto materials, Vitamins and Minerals in a Rat Model.”

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Phthalates, especially Di-(2-ethylhexyl) phthalate (DEHP), are ubiquitous environmental pollutants and their harmful effects on a variety of organ systems are well-documented in the literature, given their wide distribution in the environment. Consistent evidence has been obtained from the studies about the disturbance of endocrine homeostasis and the oxidative stress induced by DEHP exposure in different tissues through changed biochemical parameters, histopathological damage and hormonal imbalance that result in systemic toxicity. This study investigates the protective role of Phyto materials, vitamins, and minerals against DEHP-induced toxicity in a rat model, building upon existing evidence of their antioxidative and anti-inflammatory properties. Adult Wistar rats were treated with DEHP at environmentally relevant doses with a subset treated with plant-based bioactive compounds (polyphenols and flavonoids-rich) combined with antioxidant

vitamin (C and E), trace minerals (selenium, zinc). In accordance with previous research findings, DEHP exposure led to major disturbances of haematological parameters, increased hepatic enzyme activity (ALT, AST), renal function upsets (urea, creatinine) and reproductive disorders (sperm quality and testosterone). Histological evaluations confirmed widespread tissue damage across targeted organs. Co-treatment with the chosen Phyto materials, vitamins, and minerals showed marked attenuation of these effects. These interventions lowered oxidative stress indicators (malondialdehyde (MDA) and Reactive Oxygen Species (ROS), increased endogenous antioxidant defence (SOD, GSH) and inhibited pro-inflammatory cytokines (TNF- α , IL-6). The studies indicates that antioxidants and bioactive substances can prevent DEHP-induced damage through redox balance and inflammatory pathway modulation.

Keywords:DEHP , oxidative stress, Phyto-materials, vitamins, minerals, endocrine disruption,

hepato-toxicity, renal-toxicity, reproductive-toxicity.

T-06

IMPACT OF TOXICANTS ON AQUATIC ORGANISMS

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ABSTRACT:

Aquatic ecosystems are facing unprecedented threats from toxicants, which are compromising the health and well-being of aquatic organisms. Toxicants including pesticides, heavy metals, industrial effluents and plastics are polluting aquatic environments, leading to bioaccumulation, biomagnifications, and toxicity in aquatic organisms. This review aims to synthesize the current state of knowledge on the impact of toxicants on aquatic organisms, highlighting the mechanisms of toxicity, effects on biodiversity and potential risks to human health. The review reveals that toxicants can alter the physiology, behavior, and ecology of aquatic organisms, leading to changes in population dynamics, community composition, and ecosystem function. Exposure to toxicants can also result in the development of resistance, tolerance, and adaptation in aquatic organisms, which can have far-reaching consequences for ecosystem health and resilience. Furthermore, the review highlights the need for a holistic approach to understanding the impact of toxicants on aquatic organisms, incorporating multiple disciplines, including ecology, toxicology, physiology, and chemistry. The development of effective management strategies, including pollution reduction, remediation, and

conservation, is critical to mitigating the impacts of toxicants on aquatic organisms and maintaining the health and integrity of aquatic ecosystems. Overall, this review emphasizes the urgent need for continued research, monitoring, and management of toxicants in aquatic environments to protect the health and well-being of aquatic organisms and ecosystems.

T-07

Determination of LC₅₀ and Behavioural Studies of Freshwater Fish *Catlacatla* (Hamilton) Exposed to Ethion (50% EC)

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Abstract:

Farmers used different types of pesticides to increase crop production by preventing crop diseases. But in addition to usage, the concentration of pesticides used and the frequency of their application are increasing globally. The aim of this study was to investigate Ethion (50% EC) an Organophosphate pesticide, toxicity and its effect on behavioral changes in

Catlacatla (Indian major carp). It is an insecticide, miticide and termiticide. For 96h-LC₅₀ determination, Fish were acclimatized for 7 days to 15 days in laboratory conditions. The 96h-

LC₅₀ was calculated based on the fish mortality and the values of *Catlacatla* exposed to Ethion (50% EC) for 24 h (4.9 µg/l), for 48 h (4.2 µg/l), for 72 h (3.5 µg/l), and for 96 hrs (2.8 µg/l). The results of the present study indicated that Ethion is toxic to fish even for a short-term exposure and low doses.

Key Words: *Catlacatla*, Ethion (50% EC), LC₅₀, Toxicity evaluation, behavioral studies.

T-08

Toxicity effects of Nitrite on hematological changes of freshwater fish *Labeorohita* (Hamilton)

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Abstract

Aquatic Toxicology is the study of the effects of environmental pollutants on aquatic organisms. The contamination of surface water to effects on the growth, survival rate of aquatic animals. Different concentrations of nitrites are present in many types of waste water and numerous studies have found them to be toxic to aquatic organisms, especially fish species. The most important functions of blood are the supply of oxygen and nutrients (including glucose,

amino acids, and fatty acids) to cell tissues, removal of wastes. Nitrite, an intermediate in the oxidation of ammonium to nitrate, changes hemoglobin to methemoglobin, which does not carry oxygen; nitrite may thus cause anoxia in fish *Labeorohita* (Hamilton). The nitrite toxicity to fish, which shows that the ratio of the 24-hr LC₅₀ (concentration lethal to half of the test organisms in 24 h) to the 96-h LC₅₀ has a median value of 1.05 toxicity tests of differing duration can therefore be standardized to a common duration. Fish concentrate nitrite in fresh water. Nitrite toxicity is exacerbated by low oxygen concentrations because nitrite reduces the oxygen-carrying capacity of the blood. Present evidence suggests that *Labeorohita* fish is most sensitive to nitrite.

Key words: Nitrite, Oxygen, Hemoglobin, Methemoglobin, Toxicity.

T-09

Assessment of Toxicity of different pesticides to fish: An overview

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ABSTRACT

At present, different pesticides are used by the farmers for the control of different pests. The pesticides are classified by the chemistry of the pesticide like organochlorines,

organophosphates, carbamates and synthetic pyrethroids. Basing on the target pest they are classified as insecticides ,fungicides, herbicides ,rodenticides, piscicides etc .But all these pesticides are carried to the nearby water bodies through surface runoff; leading and showing their impact on non-target aquatic organisms causing loss of biodiversity, leading to depletion of food resource for the higher organisms, several biochemical alterations and less fit for survival. Hence in the present study an attempt has been made to study the above pesticides and their lethal concentration levels to the fish.

Keywords – Pesticides, Biodiversity, lethal concentration level.

T-10

**Impact of Toxicants on Aquatic Organisms:
Behavioral, Morphological, and Ecological
Implications**

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Abstract:

Aquatic ecosystems are increasingly threatened by toxicants such as pesticides, heavy metals, and industrial pollutants, which disrupt the
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health and behavior of aquatic organisms. These pollutants cause oxidative stress, impair immune function, and damage vital organs, posing ecological and economic challenges. Despite significant research, gaps remain in understanding the sublethal, long-term effects of emerging toxicants, particularly their impacts on behavior, physiology, and genetics. This study evaluates the effects of toxicants on aquatic organisms, focusing on behavioral changes, oxidative stress biomarkers, and histopathological damage. Laboratory experiments exposed representative aquatic species to environmentally relevant toxicant concentrations. Behavioral abnormalities, such as altered swimming and feeding patterns, were recorded, while histological and molecular analyses revealed oxidative imbalance, organ damage, and cellular apoptosis. Key biomarkers included increased catalase (CAT) and peroxidase (POD) activity, reduced superoxide dismutase (SOD) levels, and upregulation of stress-related genes. The findings highlight toxicants' potential to cause population declines and biodiversity loss through behavioral and physiological impairments. This underscores the urgent need for stricter pollutant regulations and eco-friendly alternatives. Future studies should explore the combined effects of toxicants and their broader ecosystem impacts.

Keywords: aquatic toxicology, oxidative stress, behavioral changes, histopathology, environmental pollution

T-11

**Impact of Toxicity on Aquatic Organisms: A
Growing Concern**

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ABSTRACT

The release of toxic substances into aquatic ecosystems poses a significant threat to the health and survival of aquatic organisms. This review highlights the impact of toxicity on aquatic organisms, including fish, invertebrates, and microorganisms. Toxic substances, such as heavy metals, pesticides, and industrial pollutants, can cause oxidative stress, DNA damage, and disruption of physiological processes, leading to reduced growth rates, reproductive success, and increased mortality. Furthermore, toxic substances can accumulate in aquatic organisms and bio magnify through the food chain leading to the damage of biodiversity posing risks to human health. This review emphasizes the need for continued research on the impacts of toxicity of xenobiotic chemicals on aquatic organisms and the development of effective strategies for mitigating these impacts.

Keywords: Aquatic toxicity, Oxidative stress,
Bio magnification, Aquatic organisms.

T-12

**Toxicological Impacts of Adama Custodia
Fungicide: Chemical Composition and Effects
of Azoxystrobin and Tebucanazole on
*Catlacatla***

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Abstract:

The fungicide Adama Custodia, which is frequently used in agricultural techniques to prevent fungal diseases in crops, contains the active chemicals tebucanazole and azoxystrobin. The chemical makeup of Adama Custodia is examined in this paper, along with the toxicity of its constituent parts to fish species, which are important markers of the health of aquatic ecosystems. While the triazole chemical tebucanazole inhibits the formation of sterols, the broad-spectrum strobilurin fungicide azostrobin interferes with the mitochondrial respiration of fungus. The lethal concentration (LC50) of both azoxystrobin and tebucanazole on a few chosen fish species, including common freshwater and marine types, was determined by

toxicological evaluations utilizing conventional bioassays. The findings showed that fish populations experienced considerable behavioral changes, physiological stress, and higher mortality rates as a result of exposure to both substances. Because of their distinct mechanisms of action and environmental persistence, tebucanazole showed a greater toxicity threshold with LC50 values between 5 and 10 mg/L, whereas azoxystrobin's LC50 values ranged from 0.5 to 1.5 mg/L. These results underline the necessity of cautious management techniques to lessen the effects of these chemicals on aquatic life and draw attention to the possible hazards connected to the use of Adama Custodia in agricultural settings. In order to minimize damage to non-target animals in aquatic habitats and investigate the long-term ecological effects of fungicide discharge, more research is necessary.

Keywords: Adama Custodia, Fungicide, Azoxystrobin, Tebucanazole, Toxicity, Fish, Aquatic Ecosystems, Environmental Impact.

T-13

Antimicrobial susceptibility of emerging fish pathogens from *Labeorohita* and *Glossogobius giuris* of YSR Kadapa District, Andhra Pradesh, India

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Abstract:

Bacterial infections are quite common among fishes and the irrational use of antimicrobials in aquaculture fish industry has become a routine to treat diseases. However, there is a risk of developing antimicrobial resistant strains (AMR) which pose a serious threat to human, animal and environment. The current study examines the presence of disease causing pathogens in fish and humans from the retail *Labeorohita* and *Glossogobius giuris* fish samples of YSR Kadapa, Andhra Pradesh. The main goals were to investigate the antimicrobial susceptibility profile of these bacteria and evaluate the potential risk they pose in terms of antibacterial resistance. Three gram negative bacterial strains i.e., *Providencia vermicola*, *Proteus mirabilis*, *Acinetobacter junii* and one gram negative bacterial strain, *Enterobacter cloacae* were isolated from the skin surfaces of *L. rohita* and *G. giuris* respectively and confirmed by morphological, biochemical characterization and 16s rRNA sequencing. Eleven broad spectrum antibiotics were used against these four isolated pathogens to test their antimicrobial resistance (AMR) by CLSI method. The results indicated that isolated bacterial strains from *L. rohita*, and *G. giuris* possess high pathogenic potential and they show a high percentage of antimicrobial resistance to colistin (100%), amoxicillin (94.5%), oxacillin (70%), methicillin

and tetracyclin (50%) however, they show a high percentage of antimicrobial susceptibility to ofloxacin (98%), cefuroxime (87%), chloramphenicol (70%), cefatoxime (68%). The results suggest the reduction in the indiscriminate usage of antibiotics to reduce the antimicrobial resistant strains in fishes and thus, potentially improve public health.

Keywords: Antimicrobial resistance, fish pathogens of *Labeorohita*, *G. giuris*, fish markets of YSR Kadapa district, Andhra Pradesh.

T-14

Studies on the λ -cyhalothrin 2.5%EC induced toxicity on the total oxygen consumption and behavioural changes in *Cyprinus carpio* L.

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ABSTRACT

A large number of pesticides are being used since green revolution for the conservation of various crops and their products. Pyrethroids are considered as the most effective insecticides with extreme neurotoxic nature that reach the aquatic systems via different pathways such as surface runoff or by drift causing heavy water pollution, show deleterious effects on many non-target species including fish. The present

investigation was undertaken to study the acute toxicity induced by λ -cyhalothrin 2.5% EC, a synthetic pyrethroid insecticide, and its effects on oxygen consumption levels and behavioural alterations in the common carp, *Cyprinus carpio*. The experimental fish were divided into groups and exposed to different concentrations of Lambda Cyhalothrin for 24, 48, 72, and 96 hours. The 96 h LC₅₀ was found to be 0.72 μ g/l. The data on the oxygen consumption and behavioural patterns of experimental and control fish exposed to lethal and sub-lethal concentrations were calculated. A comparison was made between the control and experimental fish under sub-lethal and lethal concentrations of λ -cyhalothrin for every 2 hours. Under both lethal and sub-lethal concentrations of λ -cyhalothrin, the fish showed an increased tendency in oxygen consumption in the initial 2 h of exposure and a gradual decrease during the subsequent period of study. Behavioural changes like increased irregular, erratic and darting swimming movements and loss of equilibrium were observed in the exposed fish. Excess mucus was found to be secreted all over the body. The present investigation revealed that λ -cyhalothrin is highly toxic and had a profound impact on behaviour and oxygen consumption of the fish *Cyprinus carpio*. **Key words:** Pyrethroids, λ -cyhalothrin, toxicity, sub-lethal and lethal concentrations, oxygen consumption, behavioural changes.

T-15

"A Study on Atrazine's Impact on Daphnia Magna's Dynamics and Microcystis Aeruginosa Interactions in Freshwater Systems"

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Abstract

"Herbicide pollution, particularly from substances like atrazine, poses a significant threat to aquatic ecosystems, not only impacting individual organisms but also disrupting complex ecological relationships. This study investigates the cascading effects of atrazine toxicity on Daphnia magna populations, exploring how these effects ripple through the food web to ultimately influence water quality and phytoplankton biomass. Specifically, we studied the combined impacts of atrazine exposure (at concentrations of 0, 0.05, 0.10, and 1.0 mg/L) and fish predation cues on Daphnia population dynamics. Our results revealed that while fish kairomones generally increased Daphnia population density and resting egg production, they also tended to decrease total biomass and individual dry weight. Conversely,

atrazine exposure reduced total biomass, individual dry weight, and resting egg production in Daphnia populations. Furthermore, atrazine attenuated the positive effects of fish kairomones on resting egg production and biomass. Notably, atrazine also decreased Daphnia population density in the presence of fish cues. This study also delves into how atrazine influences key physiochemical water parameters, impacting phytoplankton communities – the primary food source for zooplankton. We specifically identify behavioural changes in Daphnia magna associated with a decline in Microcystis aeruginosa due to atrazine's toxic effects. These findings underscore the complex interactions between chemical pollutants, predator-prey dynamics, and phytoplankton ecology, highlighting the critical need to understand the far-reaching consequences of herbicide use on aquatic ecosystem health."

Keywords:

Herbicide Pollution, Atrazine, Daphnia magna, Population Dynamics, Combined Effects, Microcystis aeruginosa

T-16

"Impact of Environmental Pollutants on Biodiversity: A Toxicological Assessment of Ecosystem Resilience and Species Richness"

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Abstract

Toxicology and biodiversity are related disciplines that have a big influence on human health and natural balance. With a focus on the interaction between toxicological stressors and ecosystem resilience, this study investigates how environmental pollutants affect local biodiversity. We evaluated the effects of industrial waste on the variety of aquatic and terrestrial species in a chosen biome using a mix of field sampling, laboratory analysis, and statistical modeling. According to the findings, sensitive indicator species have greater mortality rates, and areas with high pollution concentrations show a noticeable loss in species richness and evenness. Additionally, one of the main causes of trophic disturbances was found to be the bioaccumulation of organic poisons and heavy metals. In order to protect biodiversity and ecosystem health, this study emphasizes the critical necessity for sustainable environmental policies and pollutant mitigation techniques. Our research adds to the increasing amount of data showing how crucial it is to include toxicological knowledge into initiatives to conserve biodiversity.

T-17

"Effects of Toxicants on Aquatic Organisms: Implications for Ecosystem Health"

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Abstract

Toxicants in aquatic environments pose significant threats to aquatic organisms, impacting their health, behavior, reproduction, and survival. These harmful substances, which include heavy metals, pesticides, and endocrine-disrupting chemicals, enter water bodies through various human activities such as industrial discharge and agricultural runoff. The effects of toxicants on aquatic species can range from bioaccumulation and biomagnification, where toxins concentrate through the food chain, to impaired reproduction and behavioral changes that compromise survival. Additionally, toxicants can lead to respiratory problems by depleting oxygen levels, and in high concentrations, they can cause immediate mortality. These impacts not only threaten individual species but also disrupt entire ecosystems, affecting biodiversity and ecosystem services such as nutrient cycling and water purification. Understanding the mechanisms and consequences of toxicant exposure in aquatic organisms is crucial for developing effective strategies to mitigate pollution and preserve aquatic ecosystems.

Key words :- Toxicants; Impacts; Aquatic Organisms; Threat

T-18

AQUATIC TOXICOLOGY AND PESTICIDES EFFECTS ON AQUATIC ANIMALS

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Abstract:

Pesticides are chemical or biological agents used to control, repel or kill pests, including insects, rodents, fungi and unwanted plants (weeds). They are used in many sectors, including agriculture, forestry and food storage, highly toxic to aquatic organisms such as snails, fish, etc. By producing excessive ROS, pesticides can cause severe biochemical and histological changes as well as neurological dysfunction in freshwater organisms. Pesticides can enter aquatic organisms through their lipid layer, which can cause oxidative stress. The liver, kidney, brain, and gills of aquatic organisms are particularly vulnerable to pesticides. This field of study includes freshwater, marine water and sediment environments. Common tests include standardized acute and chronic toxicity tests lasting 24–96 hours (acute test) to 7 days or more (chronic tests). In aquatic environments, pesticide toxicity causes mortality, reproductive failure,

ure, eggshell thinning, suppression of the immune system, and other fish health complications such as excessive slim on fish scales and gills, cancers, tumours and lesions. Aquatic toxicology is a multidisciplinary field which integrates toxicology, aquatic ecology and aquatic chemistry. Agricultural runoff into aquatic systems raises the risk of exposure of pesticides to non-target species, leading to adverse consequences on the ecosystem. In this review, an attempt has been made to critically review the usage of pesticides in India, their entry into riverine ecosystems and the impact of pesticides on freshwater microorganisms, invertebrates and vertebrates. The review of legislation in India to control pesticide usage shows that proper implementation of the laws is needed on an urgent basis.

Keywords: Pesticides, Aquatic toxicology, Aquatic animals

T-19

TOXICITY EVALUATION AND BEHAVIOURAL STUDIES OF FRESHWATER FISH *LABEO ROHITA* EXPOSED TO BIFETHRIN 10% EC (PYRETHROID)

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ABSTRACT

Pesticides are the primary source for the achievement of green revolution. All over world pesticides are widely used to avoid the harmful pests from the crops. Bifethrin 10% EC is the synthetic pyrethroid insecticide which acts on nervous system of the target organisms but unfortunately it can show the effects on non-target organisms like insects and other invertebrates including those that constitute the base of aquatic and terrestrial food webs. It enters the human systems through the food chain and shows its effects such as headache, nausea, breathing problems and other nervous disorders. The aim of the present study is to determine the acute toxicity of the chemical Bifethrin 10% EC a synthetic pyrethroid on the fresh water carp *Labeorohita* and also to notice behavioural alterations. In the experimental fish the LC₅₀ values of Bifethrin 10%EC for 96hr was observed as 2.2µg/l respectively and the LC₅₀ values were calculated in Finney Probit Method. The effect of Bifethrin on Fish had shown uncontrolled behaviour like schooling, hyper secretion of mucus, decreased agility, increased opercular movements, rapid jerking movements, discoloration of the body, erratic swimming, losing of scales, gasping, loss of equilibrium.

Key words: Bifethrin, Pyrethroid, Insecticide, LC₅₀, *Labeorohita* , Toxicity evaluation, hyper secretion of mucus and behavioural studies.

T-20

Molecular Mechanism of Kidney Damage Caused by Abamectin in Carp: Oxidative Stress, Inflammation.

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Abstract:

Indiscriminate use of pesticides not only leads to environmental pollution problems, but also causes poisoning of non-target organisms. Abamectin (ABM), is an insecticide used worldwide, due to its persistence in the environment and its high toxicity to organisms. The kidney, as a key organ for detoxification, is more susceptible to the effects of ABM. In this study, carp was used as an indicator organism for toxicological studies to investigate renal damage caused by ABM residues. In this work, carp were exposed to ABM (0, 3.005, and 12.02 µg/L) for 4 d and the nephrotoxicity was assessed. Histopathological findings revealed that ABM exposure induced kidney damage in carp, as well as an increase Creatinine. Meanwhile, ABM as a reactive oxygen species (ROS) stimulator, boosted ROS bursts and lowered antioxidant enzyme activity while activating the body's antioxidant system, the Nrf2-Keap1 signaling pathway. The

accumulation of ROS can also lead to the imbalance of the body oxidation system, leading to oxidative stress, at the same time, NF- κ B signaling pathway associated with inflammation was activated, which regulated expression levels of inflammatory cytokines (TNF- α , IL-6, IL-1 β , and iNOS increased, while IL-10 and TGF- β 1 decreased). In addition, ABM exposure caused structural damage to kidney mitochondria of carp, resulting in decreased mitochondrial membrane potential and ATP production capacity, and mediated apoptosis through endogenous pathways Bax/Bcl-2/Caspase-9/Caspase-3. In conclusion, ABM caused kidney damage in carp by inducing oxidative stress, inflammation, and apoptosis through mitochondrial pathway.

Keywords: Abamectin, Detoxification, Nephrotoxicity, Reactive Oxygen Species.

T-21

Accumulation of Nitrate and its toxicity in the *Penaeus monodon*: Implications for Aquaculture and environmental sustainability

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Nitrate is a toxic compound that poses significant challenges in shrimp aquaculture, impacting health, growth and survival. This study focuses on the dynamics of ammonia accumulation and toxicity in Giant tiger prawn (*Penaeus monodon*), a key species in aquaculture. Nitrate buildup in shrimp bodies is influenced by water quality parameters such as temperature, pH and salinity. Elevated levels disrupt homeostasis, leading to behavioural changes, oxidative stress, lipid peroxidation, protein oxidation and DNA damage. These effects compromise shrimp health and threaten the sustainability of aquaculture operations. Maintaining optimal water quality through continuous monitoring and implementing waste management strategies like biofiltration, aeration, and water exchange can mitigate nitrate toxicity. These practices enhance prawn growth, health and survival, supporting sustainable aquaculture. Further research into advanced technologies and bioremediation methods is recommended to minimize nitrate accumulation and its impacts on pleopods and moulting time.

Keywords: Giant tiger prawn, *Penaeus monodon*, Water quality management, Nitrate accumulation sustainability, Nitrate toxicity.

T-22

Accumulation of Ammonia and its Toxicity in the Shrimp Body: Implications for Aquaculture and Environmental Sustainability

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Ammonia is a toxic compound that poses significant challenges in shrimp aquaculture, impacting health, growth, and survival. This study focuses on the dynamics of ammonia accumulation and toxicity in Pacific white leg shrimp (*Litopenaeusvannamei*), a key species in aquaculture. Ammonia buildup in shrimp bodies is influenced by water quality parameters such as temperature, pH, and salinity. Elevated levels disrupt homeostasis, leading to behavioural changes, oxidative stress, lipid peroxidation, protein oxidation, and DNA damage. These effects compromise shrimp health and threaten the sustainability of aquaculture operations. Maintaining optimal water quality through continuous monitoring and implementing waste management strategies like biofiltration, aeration, and water exchange can mitigate ammonia toxicity. These practices enhance shrimp growth, health, and survival, supporting sustainable aquaculture. Further research into advanced technologies and bioremediation methods is recommended to minimize ammonia accumulation and its impacts on pleopods and moulting time.

Keywords: Pacific white leg shrimp, *Litopenaeusvannamei*, Water quality management, Physiological stress, Ammonia accumulation sustainability, Ammonia toxicity.

T-23

**THE GRADUAL RISE OF
BIOMAGNIFICATION OF PESTICIDES IN
AQUATIC ECOSYSTEM CAUSES
ENVIRONMENTAL RISK**

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Abstract:

Aquatic ecosystem dealing with water bodies and the biotic communities both plants and animals in freshwater, marine and brackish. In the present scenario everyone knew very well that our daily life running with pesticides to cultivate and increase the production of agriculture and aquaculture crops for mitigating present and future droughts. But increased consumption of pesticides disturbs not only the aquatic ecosystem and its impact on the entire world through persistence of chemical substances and food chain energetics. Pesticide residues find their way into the soil or water and their consumption happens directly or indirectly. The bioaccumulation and bioconcentration of

pesticides increase at higher levels in the food chain is known as biomagnification i.e. from smaller organisms to higher animals through lipophilic substances and fats which cause main route of biomagnification due to their slow metabolization and excretion. Physical and chemical properties of pesticides, environmental conditions, the length of a food chain and complexity of a food web are the factors which influencing biomagnification. It improves different channels to provide a serious risk to the both environment and human health and it is different in stagnant and running water ecosystem. Biomagnification in stagnant water suppresses productivity by trigger their biological growth and localized refers epidemic. In the case of running water chemicals dissolved in water and concentrated in consumed animals will be carried by the moving water and actively transfer to multiple regions. Finally, it causes pandemic threaten to birds and human life. Generally regular monitoring data can be used to find the concentration of existing substances in the environment and lipid content of the animal tissues and it is suitable for stagnant water but in the case of running water it would be some extent different so further it suggests improved and modified standardised protocols are necessary for pesticide analyse.

Key words: Bioaccumulation, Bioconcentration, Lipophilic Substances, Metabolization and Excretion.

T-24

A Preliminary Genotoxic study of MNT assay in the Erythrocytes of the fish *Cyprinus carpio* exposed to Deltamethrin technical grade and 11% EC

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Abstract:

A preliminary study of the genotoxic effect by Micronucleus assay (MNT) is attempted in the erythrocytes of the blood of the fish *Cyprinus carpio* exposed to lethal and sublethal concentration of deltamethrin and technical grade and 11% EC for a period of 4 days and 10 days respectively. It serves as a biomarker study that can be the indices of the toxic action of the toxicants both deltamethrin technical grade as well as 11% EC. The fish showed certain changes in the nucleus in the frequency of their occurrence which is in the order to technical grade lethal > technical grade sub-lethallethal 11% EC > sub-lethal 11% EC. The exposure of the MNT assay showed the alterations which are observed compared to the control as the small micronucleus, blebbed micronucleus, binucleated cell and notched nucleus. The changes with other earlier studies are going to be discussed with the available literature.

Keywords: MNT assay, *Cyprinus carpio*, Deltamethrin, Synthetic pyrethroid, 11% EC,

Technical grade, lethal, sub lethal concentrations.

T-25

Aquatic Ecotoxicology: A Comprehensive Review of Contaminant Exposure and Effects

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Abstract

This review article provides a comprehensive synthesis of the existing literature on the impacts of toxicant exposure on aquatic ecosystems. We examine the physiological, behavioral, and ecological effects of toxicants on aquatic organisms, as well as the mechanisms of bioaccumulation and biomagnification. The

interplay between toxicant exposure and environmental stressors, such as climate change, is also discussed. Our analysis highlights the complexities and uncertainties associated with assessing the risks of toxicant exposure in aquatic ecosystems. We identify key knowledge gaps and research priorities, and provide recommendations for future studies. This review aims to provide a foundational resource for researchers, policymakers, and managers seeking to understand and mitigate the impacts of toxicant exposure on aquatic ecosystems.

Keywords

Toxicant Exposure, Aquatic Ecosystems, Bioaccumulation, Biomagnification.

T-26

Oxygen consumption of freshwater fish *Ctenopharyngodon idella* exposed to λ – cyhalothrin in lethal and sublethal concentration

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ABSTRACT:

Today's pesticides are used indiscriminately, which affect aquatic environment including fishes. One of the early

symptoms of acute pesticide poisoning is the alteration or failure of respiratory metabolism. Oxygen consumption measurements provide a robust indicator of whole animal stress and concomitant water quality.

In the present study, under lethal and sublethal concentrations of λ -cyhalothrin fish *ctenopharyngodon Idella* showed as increased tendency in oxygen consumption during the initial time of exposure from 0 to 6hrs i.e. at every two hours of interval are 0.805, 0.926, 1.016 and 1.093 in lethal and 0.794, 0.865, 0.922 and 0.995 are in sublethal compared to controls are 0.819, 0.787, 0.769 and 0.788 were noticed respectively. Under lethal and sublethal concentration of λ -cyhalothrin fish showed gradual decrease in oxygen consumption during the period of exposure till the end of the experiment i.e. from 8 to 22 hrs are 0.904 to 0.291 in lethal and 0.843-0.318 in sublethal compared with controls are 0.859 to 0.515 respectively. But in sublethal concentrations from 10 to 12 hrs a sudden decline was observed i.e. 0.711 to 0.568. It indicates severe respiratory distress and rapid molecular movement leads to more intake of toxicant which results in increased mucus secretion and decrease in oxygen uptake efficiency. Finally, it concluded that the alteration in oxygen consumption increased and thereafter decreased which is a bioindicator for assessing the pesticide toxicity.

T-27

**A study on the impact of
Sesarmaerythroductyla for maintaining
physiochemical parameters of mangrove
forests.**

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ABSTRACT

"Mangrove forests are critical coastal ecosystems that provide essential services, such as shoreline stabilization, carbon sequestration, and biodiversity conservation. Within these ecosystems, the role of biotic components, including species like *Sesarmaerythroductyla* (red-clawed mangrove crab), is significant yet underexplored. This study investigates the impact of *Sesarmaerythroductyla* on the physiochemical parameters of mangrove ecosystems, emphasizing its contributions to soil aeration, nutrient cycling, and overall ecosystem health. Field observations and controlled experiments were conducted in select mangrove forests to analyze the crab's burrowing activity,

organic matter recycling, and its influence on parameters such as soil pH, salinity, nutrient availability (nitrogen, phosphorus), and water quality. Results indicate that the crab's burrowing enhances soil porosity and oxygenation, leading to increased microbial activity and nutrient mineralization. Furthermore, the redistribution of organic debris by the species fosters nutrient-rich sediment layers, critical for mangrove root development and plant productivity. The findings underscore the ecological importance of *Sesarma erythroactyla* in maintaining the physiochemical balance of mangrove ecosystems. Conserving and managing this keystone species could enhance mangrove restoration efforts and promote long-term ecosystem stability. This research highlights the need for integrative approaches to mangrove conservation that consider the functional roles of native fauna in sustaining critical ecosystem services.

Key words: *Sesarma erythroactyla*, mangrove forests, physiochemical parameters, nutrient cycling, ecosystem stability.

T-28

Biomagnification of Toxicants in Ecosystems: A Comprehensive Review

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Abstract

This review provides an in-depth examination of the biomagnification of toxicants in ecosystems, synthesizing current knowledge on the underlying mechanisms, influential factors, and ecological and health consequences. The complex interplay between food web dynamics, toxicant properties, and environmental variables is highlighted, emphasizing the need for integrated research approaches to predict and manage biomagnification. Key knowledge gaps and research priorities are identified, informing strategies for mitigating the impacts of biomagnification on ecosystem health and sustainability.

Keywords

Biomagnification, Toxicants, Ecosystems,
Environmental Sustainability, Food Webs,
Risk Assessment.

T-29

**ACUTE TOXICITY BIOASSAY OF
CADMIUM AND MERCURY ON THE
JUVENILES OF ASIAN SEABASS (*Lates
calcarifer*)**

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The present study was undertaken to investigate the acute toxicity of two heavy metals (cadmium and mercury) in the juveniles of Asian Seabass, which is considered as an important fish species in both brackish and fresh water. It absorbs heavy metals like cadmium and mercury from water and sediment they live in. if the metals are increased the species behaviour will be changed and These metals are toxic to humans and animals, so the present is carried out in the FRP tanks under Laboratory condition to detect both cadmium and mercury. Median lethal concentration (LC50) is calculated for every 24hrs.After LC50 values for 96hrs by probit analysis shows 6.08ppm for cadmium and 1.03ppm for mercury. Furthermore, the exposed specimens showed the dose and duration dependent, abnormal behaviour and hyperactivity. Mercury indicated more toxic than

cadmium for seabass. Mostly it is reduced by the bioaccumulation.

Keywords: *Lates calcarifer*, heavy metals, cadmium and mercury.

T-30

**The impact of pollutants on aquatic
organisms**

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ABSTRACT:

Environmental pollutants such as metals, pesticides, and other organics pose serious risks to many aquatic organisms. Chemical and physical causes of disease in aquatic organisms are generally linked to water and food because these are the primary pathways of toxic substances to animals in the aquatic environment. Accordingly, a great deal of previous research has characterized physiological mechanisms of toxicity in animals exposed to contaminants. In contrast, effects of contaminants on fish behavior are less frequently studied. Because behavior links physiological function with ecological processes, behavioral indicators of toxicity appear ideal for assessing the effects of aquatic pollutants on fish populations. Here we consider

the many toxicants that disrupt complex fish behaviors, such as predator avoidance, reproductive, and social behaviors. Intoxication of fish can be acute, sub acute, or chronic. Chemical-linked food safety issues can occur if chemical contamination of edible aquatic organisms occurs. The toxicity of a specific substance can vary between fish species and can change with water temperature, pH, and ion composition. Contaminants like heavy metals, oil spills and pesticides can directly harm fish and other aquatic organisms. fish can ingest these toxic substances, which can cause deformities like gill damage, fin and tail rot, reproductive problems and even death. Because of the globalisation of the food industry, there is an enormous demand for fish and fish products worldwide, and the continuous availability of seafood to serve our needs depends on the health and cleanliness of our ecosystems. Also, preserving aquatic life which is a part of our food chain, will automatically preserve other organisms of the food chain, and thus our biodiversity.

Keywords: Environmental pollutants, aquatic organisms, gill damage, reproductive problems.

T-31

Biochemical Alterations Of Total Proteins, Glycogen Lactate Dihydrogenase (Ldh) And Transferase Enzymes Aspartate Aminotransferases (Aat) And Alanine Aminotransferases (Aalt) Induced By Bifenthrin (A Synthetic

Pyrethroid) In The Fish Labeo Rohita (Hamilton)

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Abstract:

Bifenthrin type 1 synthetic pyrethroid technical grade and 10% EC induced alterations in the biochemical parameters of total proteins (TP), Glycogen and Lactate dehydrogenase (LDH), Aspartate Amino Transferase (AAT) and Alanine Amino transferase (ALAT) in the fish Labeorohita, in the laboratory after exposing them in both lethal and sublethal concentrations for four days and 10 days respectively taking into consideration of 96 hour LC₅₀ values of the respective toxicants. The fish organs, Gill, Liver, Kidney, Brain and Muscle are studied and found an appreciable quantity of percentage as decrement of TP, glycogen and increment in LDH, AAT and ALAT enzymes in this present study. Proteolysis and an hormonal imbalance due to the toxic stress as an effect resulted in the protein break down and gluconeogenesis might be also be reasons of the decrement followed by increment of the three enzymes studied in the biochemical parameters of the fish. Shifting of aerobic pathway to anaerobic resulted LDH activity that got enhanced.

Keywords: Total proteins (TP), glycogen, Aspartate Aminotransferase (AAT) and Alanine

Aminotransferase (AALT), Lactate dehydrogenase (LDH)

T-32

TOXICITY AND BEHAVIOURAL CHANGES IN THE FRESH WATER

COMMON CARP CYPRINUS CARPIO EXPOSED TO PERMETHRIN A SYNTHETIC PYRETHROID OF CLASS I TYPE

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Abstract – Acute toxicity tests are conducted to the fish *Cyprinus carpio* employing both static and continuous flow through tests in the laboratory, using the toxicant Permethrin, a synthetic Pyrethroid of class I type. The tests are conducted for 24 hrs, 48 hrs, 72 hrs and 96 hrs and the values are respectively 4.2 µg/L, 3.75µg/L, 3.01 µg/L in static renewal and 2.7 µg/L, 3.09 µg /L, 2.7 µg/L and 2.74 µg/L for technical grade in continuous flow through system. Using Permethrin 25%EC, a commercial formulation, the values are 6.30µg/L, 5.3 µg/L, 4.43 µg/L and 3.72 µg/L in static renewal system and 5.3 µg/L, 4.36 µg/L, 3.54 µg/L and 2.73µg/L in continuous flow through system respectively. Loss of equilibrium followed by drowning to the bottom, chromatophores

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decolourisation and mucous secretion are some of the behavioural changes observed as indices of toxicity.

Keywords: Acute toxicity, Static test, Continuous flow through system, Permethrin 25%EC, Behavioural alterations.

T-33

Microplastic toxicity in Indian marine ecosystems: Implications for sustainable fishery

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ABSTRACT

Indian marine waters are the second largest plastic polluted ecosystems globally. Microplastics (MPs) have been increasingly detected and quantified in coastal ecosystems. MPs can enter the coastal environments through surface runoff, wastewater effluents, outfalls from ships, domestic and industrial waste. Intensification of MPs that are likely to cause acute toxic effects and long-run environmental risks. Hence the coastal environment pollution through MPs has become an axis for criticism from environmental groups because of an apparent negative effect on the marine

ecosystem and their biota. The toxic effect of MPs potentially accumulated in marine organisms including fish due to their small size are subsequently transferred to humans through food chain. Therefore, it is imperative to reduce the negative impact of MPs on the environment and provide greater long-term ecological and economic safety for the operation of fishery industry in India. Hence the present attempt has been made to present an overview on the MPs toxicity in Indian marine ecosystems for pollution abatement towards sustainable development.

Keywords: Fisheries; Marine ecosystems; Microplastics; Toxicity; Environmental risk

T-34

Heavy Metal Contamination in Aquaculture Ponds of East and West Godavari, Andhra Pradesh:

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Abstract:

Aquaculture in the East and West Godavari districts of Andhra Pradesh, India, holds immense economic and social significance.

Renowned for large-scale shrimp and fish farming, this region supports rural livelihoods, contributes substantially to state and national revenues, and creates considerable employment opportunities. The recent findings reveal rising concerns over heavy metal contamination in aquaculture ponds. Several studies reported elevated concentrations of cadmium, chromium, lead, and zinc, frequently exceeding permissible regulatory limits. These pollutants primarily derive from industrial effluents, agricultural runoff with chemical inputs, and urban wastewater discharge. Importantly, heavy metals accumulate in pond sediments and adjacent agricultural soils, suggesting a cyclical process that perpetuates contamination in aquatic systems. Such pollution severely impacts cultured species by triggering oxidative stress, hampering growth, and weakening immune functions. In addition, the risk of biomagnification raises significant public health threats, particularly for communities dependent on aquaculture products. The aim of the present review is urgency of implementing sustainable practices such as advanced treatment technologies, bio- and phyto-remediation, and enhanced regulatory frameworks to mitigate heavy metal loads. Ongoing monitoring and extensive awareness initiatives are critical to tracking contamination trends, informing policy decisions, and safeguarding ecosystem integrity. The future studies should adopt integrated, multidisciplinary strategies that leverage scientific innovations while prioritizing

stakeholder engagement, ensuring the long-term viability and productivity of aquaculture in the Godavari region.

Keywords: Aquaculture, Heavy metals, biomagnification, Godavari districts

T-35

Organic pesticides and its impact on animals and their organ systems

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Abstract:

Organic Pesticides which are commonly used by farmers for the crop cultivation. Nowadays Some organic pesticides are used to control the highly usage of toxic chemicals. Rotenone is one of the organic pesticide, insecticide which is derived from the roots of Derris spp. It is insoluble in water colourless, odorless crystalline(sand-like) powder. Over usage of some pesticides one of rotenone effects the animals and humans when they breathed in and it irritates the skin causing rash or burning, it may damage the liver and

kidney when these organs are effected by rotenone. It is identified and determined by collecting the air samples of some particular area. Exposure of rotenone to 2,500mg/m³ is immediately effect the life of human health and dangerous. Organic chemicals are low effective some times not effect organisms when we use it in limited or proper amount. But these days chemicals are also mixed and shows impact and effect of organ systems . There are some tests to find out the exposure and effects of these pesticide. Some other names of the rotenone is Barbasco, Fish-Tox, Tubatoxin etc.

T-36

Ramification of anthropogenic activity on Fish and Aquatic Ecosystem

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Abstract:

Pollution in natural environments, particularly in aquatic ecosystems, causes significant harm to both physical systems and organisms. Harmful substances like pesticides, heavy metals, industrial waste, Poly Chlorinated Biphenyls, and crude oil are commonly released into water bodies. These pollutants can have both acute and chronic effects on aquatic life. Acute impacts

often result in large-scale mortality events, such as fish kills, while chronic effects are more gradual, leading to weakened immune systems, slowed metabolism, and damage to vital organs, including gills and epithelia. Over time, fish exposed to polluted waters can develop diseases like fin and tail rot, gill disease, liver damage, and ulcerations. Polluted waters are characterized by undesirable features such as altered color, odor, taste, high turbidity, toxic chemicals, heavy metals, sewage, and pathogens like virus, bacteria, protozoa and worms. Fish in these environments may develop morphological deformities and lesions that correlate with pollution levels. To reduce pollution's effects on fish health, it is crucial to properly treat effluents before they are released into water bodies. The improper disposal of pollutants without adequate pre-treatment should be strongly discouraged to protect aquatic ecosystems and the species that depend on them. Efforts to minimize pollution and safeguard the health of aquatic organisms are vital for maintaining ecological stability.

Key words: Anthropogenic, Poly Chlorinated Biphenyl, Acute, Chronic, Fin rot, heavy metals

L-37

**AZOXYSTROBIN, COPPER AND THEIR
COMBINE SYNERGISM IMPACT ON
PROTEIN ALTERATIONS IN THE
FRESHWATER FISH *LABEO ROHITA***

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Abstract:

Determination of Protein alterations useful to identify and examine the abnormalities in the chosen organisms at tissue and cellular level. Hence the present research work carried to estimate the amount of Proteins in the selected tissues such as Gill, Liver, Kidney and Intestine of *Labeorohita* exposed to 1day lethal, 1 and 14 days sublethal of Azoxystrobin (Fungicide), Copper (Heavy metal) individually and combined. Under 1day lethal exposure the maximum percentage of depletion was in kidney and the percentage of augmentation was found in both intestine and Liver of Azoxystrobin due to some factors such as stress response mechanism, oxidative stress, dependence of concentration and exposure time and selected tissues. Under 1day sublethal and 14 days sublethal exposure there was no increment of protein levels was found and maximum depletion was in intestine of Combined synergism (CS). When compared to individuals mixed toxicants showed more stress on exposed fish so great protein reduction was found in CS. Protein reduction might be due to high-energy demand in TCA cycle. The decrease in total protein level and increase in free amino acids level in both tissue and liver suggest the high

protein hydrolytic activity due to elevation of protease activity. The present study reports metabolic dysfunction in response to pesticide toxicity in the fish because pesticide acts as stress inducing factors by triggering the functional state of the exposed fish.

Key words: TCA cycle, Elevation, Metabolic dysfunction, and Protease activity.

T-38

Phenthoate 50% EC Toxicity and Its Impact on Aminotransferases of Freshwater Fish Catla (*Gibelioncatla*)

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Abstract: The toxicity of commercial grade Phenthoate 50% EC. to the freshwater fish Catla (*Gibelioncatla*) using static system, LC₅₀ values were determined as 14.2, 13.0, 12.0 and 7.0 ppm respectively. The fish were exposed to Lethal and Sub-lethal concentrations (1/10th of static 96 h LC₅₀ value) of the pesticide for 96 h and the biochemical changes of aminotransferases, Aspartate aminotransferase (SGOT/AST) and

Alanine aminotransferase (SGPT/ALT) were estimated in the test fish. Increased activities of AST and ALT in different tissues of brain, liver, muscle, gill and kidney in the test fish suggest either increased operation of transamination or increased synthesis of amino acids from other sources like glucose or fatty acids during Phenthoate 50% EC intoxication, The changes in lethal exposure were more prominent compared to sub-lethal exposure fish. These changes were attributed to the intoxication of the test toxicant Phenthoate 50% EC.

Key words: Acute toxicity, Static test, Phenthoate 50% EC, *Gibelioncatla*, Aminotransferases.

T-39

INVESTIGATING THE MYSTERIOUS ILLNESS IN ELURU DISTRICT OF ANDHRA PRADESH AND ITS LINKS TO ACUTE ORGANOPHOSPHATE EXPOSURE

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ABSTRACT

The Eluru outbreak in Andhra Pradesh, India, emerged in late 2020 as a baffling public health crisis, with over 600 individuals hospitalized due to acute neurotoxic symptoms, including seizures, vomiting, and unconsciousness. This study investigates the underlying causes,

identifying acute pesticide poisoning specifically involving the organophosphate pesticide triazophos as a probable factor. The findings draw upon field visits, interviews with victims, and analyses conducted by leading Indian research institutions. These investigations suggest that contamination of water and food with pesticides and heavy metals was a key trigger. However, critical gaps remain in understanding the exact pathways of contamination, leaving the affected population vulnerable to future outbreaks. Despite initial efforts by scientific and governmental bodies, the absence of conclusive data and preventive strategies underscores systemic inadequacies in public health responses. Victims continue to experience trauma and lingering health effects, while institutional reports and findings remain inaccessible, limiting community awareness and preparedness. This paper highlights the urgent need for comprehensive epidemiological studies to trace contamination routes, establish long-term health impacts, and develop effective intervention strategies. It calls for stricter regulations on pesticide use, particularly hazardous organophosphates, and a shift toward sustainable agricultural practices to mitigate environmental and health risks. Transparent communication between authorities and communities is essential to foster trust and enhance public health education. The Eluru outbreak underscores the interconnectedness of environmental contamination, agricultural practices, and public health. Addressing these

challenges requires policy reforms to reduce chemical dependency, improve regulatory oversight, and invest in community-focused health systems. Such measures are vital to safeguarding vulnerable populations and preventing similar crises in the future.

Keywords: Eluru Mysterious Disease, Organophosphate Pesticides, Triazophos Contamination, Neurotoxic Illness, Pesticide Poisoning, Public Health Crisis.

T-40

Bioaccumulation and Sublethal Effects of Azoxystrobin in *Ctenopharyngodon idella*: Behavioral, Morphological, and Ecotoxicological Insights

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Abstract

Azoxystrobin (AZ), a widely used fungicide, has raised concerns about its bioaccumulation and sublethal impacts on aquatic organisms, particularly in fish species critical to aquaculture. Despite its prevalence, research on

AZ's long-term effects and its mechanisms of toxicity in commercially important fish like *Ctenopharyngodon idella* (grass carp) remains limited. This study aimed to investigate the bioaccumulation potential and sublethal effects of AZ in *C. idella* under controlled laboratory conditions. Fish were exposed to environmentally relevant AZ concentrations, and behavioral responses, oxidative stress markers, and histopathological changes were assessed. Behavioral alterations, such as reduced feeding and erratic swimming, were observed in a dose-dependent manner. Biochemical analyses showed significant oxidative stress, indicated by increased catalase (CAT) and peroxidase (POD) activity, reduced superoxide dismutase (SOD) activity, and upregulation of stress-related genes such as HSP70. Histological examination revealed bioaccumulation-induced damages, including hepatocellular degeneration, epithelial hyperplasia in gills, and glycogen depletion in liver cells. The study highlights the potential of AZ to disrupt metabolic processes and immune responses, further increasing susceptibility to infections and ecological risks. These findings emphasize the urgent need for regulatory frameworks to limit AZ contamination in aquatic ecosystems and encourage the development of environmentally safer alternatives. Future research should focus on AZ's long-term ecological impacts, including its interaction with other pollutants and potential effects on biodiversity.

Keywords: azoxystrobin, *Ctenopharyngodon idella*, bioaccumulation, oxidative stress, behavioral changes, histopathology

T-41

***Impact of Atrazine on the plankton dynamics
in Freshwater carp ponds in Kolleru
Catchment***

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Abstract

Herbicide pollution, particularly from algaecides like Atrazine (2-chloro-4-ethylamino-6-isopropylaminos-triazine), poses a significant threat to sustainability of aquatic ecosystems by disrupting ecological relationships among biotic and abiotic parameters. An effort was made in this study to record deleterious effects of atrazine on phytoplankton and zooplankton populations drawn from IMC culture ponds sharing the similar agro-climatic contours in which different concentrations of Atrazine ranging from 0.05 ppm (= 12.5 ml/Ha) to 0.5 ppm (= 125 ml/Ha) was used to control harmful algae. Fish ponds in which herbicide application was not administered were treated as control.

Post experimental results revealed that there was 60% reduction in the biomass of *Microcystis aeruginosa* within 24 hours of herbicide application followed by 72% of phytoplankton after three days of the first application besides, taking 45 days for recovery of the green algal communities. There was a distinct shift in the phytosociology of the affected plankton communities and this dissimilarity persisted for more than 60 days. Phytoplankton communities returned to normal assemblage after 90 days of herbicide application. Zooplankton exhibited short term reductions in numbers after the application of second dose (1st booster). Rotifers were not significantly affected when compared to copepod and cladoceran communities. Reduction in zooplankton density was not observed after primary application (1st dose) of herbicide indicating that their decline is a secondary effect envisaged by reduction in standing biomass of phytoplankton in the available food spectrum. There was no remarkable deterioration of water quality in the herbicide treated ponds after primary and booster doses. Findings recorded in this study highlights the critical need to understand the remote consequences of herbicide use in aquatic food production systems.

Key words: *Herbicide Pollution, Atrazine, Population Dynamics, Combined Effects, Microcystis aeruginosa, Rotifers, Copepod, Cladocera*

T-42

THE TOXICOLOGICAL EFFECTS OF MICROPLASTICS ON COMMERCIALY SIGNIFICANT FISHES AND ITS IMPLICATIONS ON HUMAN HEALTH

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ABSTRACT: Microplastics (MPs), which are particles smaller than 5 mm, can be produced by physical destruction, chemical reactions, and microbiological activity. MPs may eventually enter aquatic ecosystems through surface runoff. Microplastics are emerging contaminants in the Aquatic ecosystem, which cause many harmful effects on aquatic organisms, especially on fish. Fish is a staple and affordable food source, rich in animal protein, along with various vitamins, essential amino acids and minerals. MPs could cause significant harm to fish, including physical damage, death, inflammation, oxidative stress, disruption of cell signalling and cellular biochemical processes, immune system suppression, genetic damage, and reduction in fish growth and reproduction rates. The activation of the detoxification system of fish exposed to MPs may be associated with the toxicity of MPs and chemical additives to plastic

polymers. Furthermore, MPs can enhance the bioavailability of other xenobiotics, allowing these harmful substances to more easily enter and accumulate in fish. Accumulation of MPs and associated chemicals in fish can have adverse effects on the fish and humans who consume them, with these toxic substances magnifying as they move up the food chain. Changes in migration and reproduction patterns and disruptions in predator-prey relationships in fish exposed to MPs can significantly affect ecological dynamics. These interconnected changes can lead to cascading effects throughout aquatic ecosystems. Thus, implementing solutions like reducing plastic production, enhancing recycling efforts, using biodegradable materials, and improving waste management is essential to minimize plastic waste and its environmental impact.

Keywords: Microplastics, Oxidative Stress, detoxification, Xenobiotics, plastic waste.

IMMUNOLOGY

IM-01

The Importance and Role of the Immune System and Maintenance of Health in the Post-COVID Pandemic Era Through Clinical Perception

D.ARUNA

Research Scholar YUV Kadapa Abstract

The immune system is a critical defense mechanism that protects the body from infections, regulates inflammation, and supports tissue repair. Its complex network of cells, tissues, and organs works cohesively to maintain health. In the post-COVID era, immune system dysfunction has become a central concern, particularly with the rise of conditions such as Postural Orthostatic Tachycardia Syndrome (POTS), Myalgic Encephalomyelitis/Chronic Fatigue Syndrome (ME/CFS), and Mast Cell Activation Syndrome (MCAS). These disorders, often triggered or exacerbated by viral infections like COVID-19, present significant challenges to both patients and healthcare providers. From a clinical perception, these conditions are often marked by immune dysregulation, with persistent inflammation, autonomic dysfunction, and hypersensitivity. POTS results in symptoms such as tachycardia and dizziness, which are frequently linked to immune-mediated changes in the autonomic nervous system. ME/CFS, characterized by debilitating fatigue and post-exertional malaise, involves chronic immune activation and inflammation. MCAS is driven by excessive mast cell activation, leading to a range of allergic-type responses. This

seminar will explore how clinical perception of the immune system's role in these disorders is essential for effective diagnosis and management. It will highlight evidence-based strategies for enhancing immune function, including dietary adjustments, stress reduction, regular exercise, and adequate sleep, all of which contribute to immune resilience. Additionally, pharmacological treatments, such as immunomodulators, mast cell stabilizers, and anti-inflammatory medications, will be discussed. By integrating these insights into clinical practice, healthcare providers can adopt a more holistic approach to managing these complex conditions, ultimately improving patient outcomes in the post-COVID era.

IM-02

Recent Advances and Significance of Molecular and Genetic Approaches in Modern Biotechnology

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Abstract:

The advent of molecular and genetic technologies has revolutionized various fields, including medicine, agriculture, and environmental science.

ABSTRACT:

Cancer is a leading cause of mortality across the globe accounting for nearly 10 million deaths in every year from 2022 to 2024 according to the world health organization (WHO). The most common cancers are breast, lung, colon, rectum and prostate. Vaccine can have a transformative effect on global health with the first successful dose administered by Dr Edward Jenner to protect against smallpox in 1796. The first cancer vaccine was developed by Prof. Ian Frazer of University of Queensland in Australia that prevents cervical cancer. The cancer vaccine is not given to patients to prevent cancer happening, but to patients with existing tumors- making it different from other vaccines. It is designed to help our immune system to recognize what cancer cells look like normal cells. This revolutionary form of immune therapy then helps the body to recognize, destroy and prevent the spread of existing cancer cells. In October 2024 Oxford University researchers were awarded funding to create the world's first vaccine to prevent ovarian cancer. This kind of preventive cancer vaccines recognize the target viruses known to cause certain types of cancers. Thus far cancer vaccines are playing a magnificent role in preventing and curing the deadly disease. Avoiding tobacco and alcohol use, exercising regularly, eating healthy food etc. are some preventative measures of cancers.

Recent advancements such as CRISPR-Cas9 gene editing, next-generation sequencing (NGS), and synthetic biology have enabled precise manipulation of genetic material, leading to significant breakthroughs in understanding complex biological processes. These technologies facilitate the identification and characterization of genes associated with diseases, enabling targeted therapies and personalized medicine. In agriculture, molecular techniques have accelerated the development of genetically modified organisms (GMOs) with enhanced traits, such as disease resistance and improved yield. Additionally, advancements in bioinformatics have allowed for the integration of vast amounts of genetic data, fostering innovations in predictive modelling and systems biology. The significance of these molecular and genetic approaches lies not only in their ability to address pressing global challenges, such as food security and health crises, but also in their potential to pave the way for future discoveries that enhance our understanding of life at the molecular level.

Keywords: Molecular Biology, Genetic Engineering, CRISPR, GMOs, Bioinformatics, Systems Biology.

IM-03

**CANCER VACCINE-- THE FABULOUS
GAME CHANGER IN CANCER THERAPY**

**HARINATH PRATHAKOTA,
VIJAYALAKSHMI MANGALI & PROF. V.
VENKATA RATHNAMMA**

Keywords: Vaccine, Tumors, immune system, preventary cancer vaccine

IM -04

Impact of dietary immunostimulants on the morphometry and haematology of *Aeromonas hydrophila*-challenged

Gibelioncatla (Hamilton, 1822)

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Aquaculture is the cultivation of marine and freshwater fish in controlled conditions, and it is a rapidly increasing food production business. However, a major obstacle to aquaculture is the widespread use of antibiotics since the emergence of antibiotic-resistant bacteria. Thus, immunostimulants are replacing chemotherapeutic therapies for aquaculture disease control. In such a scenario, morphometric and haematological evaluations are necessary to check the impact of immunostimulants on the health of both healthy and pathogen-infected fish. Because of its high nutritional value and other beneficial effects on human health, *Gibelioncatla* has been a popular cultured freshwater fish in India, and there is a scarcity of information on the effect of immunostimulants on the *Aeromonas*-infected *G. catla*. Therefore, the study examined the effects of immunostimulants on *G. catla* morphometric and

haematological parameters in normal and *Aeromonas*-infected conditions. This study found that oral administration of immunostimulants such as vitamin C, vitamin E, chitin, chitosan, and levamisole significantly increases body weight, feed intake, feed conversion, and biomass. Morphometric investigations demonstrated that immunostimulant-supplemented feed considerably affected body length, width, and weight. Among all the tested feeds, levamisole and vitamin E had the greater growth-promoting properties under *Aeromonas* infection. The haematological analysis demonstrated that immunostimulants substantially increased haemoglobin content, as well as RBC, WBC, eosinophil, lymphocyte, monocyte counts, and ESR in both healthy and *Aeromonas*-infected fish. However, immunostimulants decrease neutrophil number and do not exhibit any effect on basophil count. In conclusion, immunostimulants promote *G. catla* growth, immunity, and survival under *Aeromonas* infection.

Keywords: *Aeromonas*, *Gibelioncatla*, Immunostimulants, Morphometric data, Haematology, Vitamin C, Levamisole

IM-05

Antidiabetic Potential of *Zingiber officinale*: A Sustainable Approach to Diabetes Mitigation

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Abstract: Ginger (*Zingiber officinale*) has gathered attention on diabetes management by numerous studies suggest that Ginger possessed antidiabetic properties due to its bioactive compounds including Gingerols and Shogaols. All these compounds exhibit antioxidant, antidiabetic and insulin sensitizing effects contributing to improved glycemic control and lipid metabolism indicate that Ginger may balance insulin sensitivity by facilitating better glucose uptake in peripheral tissues. Additionally, Ginger has ability to reduce oxidative stress. It shows regular consumption of Ginger can lead to significant reduction in fasting blood glucose and HbA1c level in diabetic patients and aid in reducing complications associated with diabetes such as neuropathy and cardiovascular issues by lipid profiles management and reducing oxidative stress. Incorporating Ginger into the diet can be beneficial as a complementary approach to conventional diabetes treatment however while promising these effects vital investigation through well designed clinical trials to be established on optimal dosages and long term safety. Overall Ginger may serve as a valuable natural adjunct in diabetes management promoting better health outcomes and enhancing the quality of life for individual with diabetes. Molecular and genetic approaches are used to screen for compounds that interact with the same targets as gingerol or enhance its effects. This can lead to the development of new drugs with improved efficacy and reduced side effects.

Key words: Ginger, Diabetes, Oxidative stress, Gingerols, Shogaols

IM-06

A Review on Effect of Photobiomodulation Therapy on Obese Mice -Histological changes and Protein Analysis

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Abstract:

The effect of Photobiomodulation therapy on obesity is a growing area of interest, given its potential to influence cellular metabolism, inflammation, and tissue regeneration. This study aimed to evaluate the histological and protein-level changes induced by Photobiomodulation therapy in obese mice. Male or female mice were fed with high-fat diet to induce obesity and were subsequently treated with Photobiomodulation therapy at specific wavelengths, power densities, and dosages over a defined period. The results were analysed through histological examinations of adipose tissue, liver, and muscle, focusing on changes in fat deposition, inflammation, and fibrosis. Protein analysis, using techniques such as Western blot or ELISA, were conducted to measure

biomarkers related to lipolysis, oxidative stress, and metabolic regulation and key inflammatory cytokines. Photo biomodulation therapy demonstrated significant effects on reducing fat deposition and optimizing tissue structure. Protein analysis revealed modulations in key markers of lipid metabolism and inflammation, suggesting that Photobiomodulation therapy effectively mitigates obesity-related metabolic dysfunction. These findings highlight the Photobiomodulation therapy as a promising, non-invasive intervention for addressing obesity-related tissue alterations and metabolic imbalance. Future studies should refine Photobiomodulation therapy parameters and explore the therapy's long-term effects in preclinical and clinical models

Key words: High-Fat Diet, Obesity, Photobiomodulation Therapy (PBMT)

IM-07

The Beneficial Aspects of Immunostimulants in Fish and Fishery Products: A Review of Current Knowledge and Future Perspectives

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ABSTRACT

Fish and fishery products are essential sources of protein and vital micronutrients critical for human health. Over the past three decades, the production of various aquatic products such as finfish, crustaceans, mollusks, and algal plants has

significantly increased through aquaculture. This industry has rapidly evolved into a modern approach for enhancing global aqua production. However, in the last two decades, microbial diseases have emerged as a major constraint to the aquaculture industry. These diseases often result from the transfer of pathogenic organisms among cultured species of fish and shrimp and between countries, exacerbated by inadequate quarantine measures. Consequently, the shrimp industry in India and other Southeast Asian nations has faced significant economic losses. Given the lack of effective remedies against viral diseases, the use of Immunostimulants in aquaculture systems has become an essential strategy for disease control. Immunostimulants activate the immune system of aquatic animals, enhancing their capacity for disease resistance. They are defined as substances that boost innate or non-specific immune responses by directly interacting with and activating immune system cells. Immunostimulants can be classified based on their sources, including bacterial preparations, polysaccharides, animal or plant extracts, nutritional factors, and cytokines. Although drugs, synthetic chemicals, and vaccination programs have been employed to prevent and control diseases, their success has been partial. An alternative approach has been the application of compounds designed to stimulate the immune systems of fish and shrimp, collectively known as Immunostimulants. These compounds have proven to play a beneficial role in managing diseases in aquaculture systems.

Key words: Immunostimulants, Immune system, Aquaculture, Pathogens

IM-08

Applications of Immunostimulants in Fin-Fish and Shellfish: A Review of Current Trends and Future Perspectives

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ABSTRACT

In India, aquaculture has emerged as a vital practice to meet the growing demand for fish and shrimp, both for commercial purposes and human consumption. To enhance aquaculture productivity and ensure the health of cultured organisms, Immunostimulants have become an indispensable tool. These are bio-friendly agents that promote growth and improve disease resistance without causing toxicity, pathogenicity, or undesirable side effects in aquatic organisms. Immunostimulants are naturally occurring or synthetic compounds that enhance the immune system by boosting the host's resistance to diseases, primarily caused by pathogens. These agents are classified based on their origin, mode of action, and method of administration. Common Immunostimulants include β -glucans, bioactive alginates, chitin, chitosan, muramyl dipeptides, vitamins, as well as extracts from plants and animals. They are primarily used as feed additives to strengthen immunity and improve overall health.

Immunostimulants hold significant promise in aquaculture as an alternative to antibiotics, minimizing the risks of antibiotic resistance and residue in aquatic products. This technology, further advanced by genetic engineering that has the potential to enhance the safety, sustainability, and reliability in aquaculture. Studies have demonstrated that the inclusion of Immunostimulants in aquaculture leads to marked improvements in growth rates, survival rates, and resistance to diseases. The future of Immunostimulant applications lies in their industrial development and integration into sustainable aquaculture practices. Ongoing research and innovations will expand their utility in fin-fish and shellfish culture, ensuring environmental sustainability and global food security.

Keywords: Immunostimulants, Immunity, Aquaculture, Pathogen,

IM-09

Immunology and Health in the Pandemic Era: Challenges, Innovations, and Future Directions"

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Abstract

The COVID-19 pandemic has dramatically

reshaped the field of immunology and health research, highlighting the immune system's central role in combating infectious diseases and its broader implications for public health. This paper explores key advancements in understanding innate and adaptive immune responses to SARS-CoV-2, emphasizing the mechanisms underlying cytokine storms, T-cell dynamics, and antibody-mediated immunity. Additionally, it examines the integration of immunomics within the One Health framework to address interconnected human, animal, and environmental health challenges. The pandemic's long-term health effects, including cardiovascular risks and potential therapeutic applications, are also reviewed. Notably, emerging research suggests innovative avenues such as the virus's potential role in cancer immunotherapy. Finally, the study underscores the importance of patient and public involvement in immunology research, aiming to bridge gaps in knowledge and foster more effective, inclusive healthcare solutions in the pandemic era and beyond. This comprehensive review provides a roadmap for leveraging immunology to address ongoing and future health crises.

Key words: Pandemic, infectious diseases, health effects

IM-10

Impact of Antibiotic use in

Litopenaeusvannamei culture: Risks and Sustainable alternatives

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ABSTRACT

The use of antibiotics in *Litopenaeusvannamei* aquaculture is a common practice for managing bacterial diseases for enhancing shrimp growth and survival. However, the indiscriminate and prolonged use of antibiotics may be hazardous to human health and aquatic ecosystem as well as the well-being of the shrimp. Antibiotic resistance develops in bacterial populations, with resistant genes potentially transferring to human pathogens through the food chain, reducing treatment effectiveness and endangering public health. Sub-lethal doses also disrupt shrimp gut microbiota, impairing immunity, digestion and nutrient absorption. The environment is also seriously impacted because the pond water and sediments hold antibiotic residues and disrupt microbial diversity and develops resistant strains to grow. The residues can be spread in nearby ecosystems harmful to non-target organisms and destabilizing the ecological balance. Residual antibiotics in shrimp create food safety problems which cause trade restrictions in international markets. To alleviate these risks, the sustainable practices such as biosecurity measures, immunostimulants, and probiotics are the most effective alternatives to antibiotics. These approaches serve to safeguard shrimp health, while also preventing damage to the environment and ensuring public health.

Government has to be responsible for setting standards for the controlled use of antibiotics. The integration of these sustainable practices will guarantee the long-term viability of shrimp farming, protect aquatic ecosystems, and maintain food safety standards.

Keywords: Shrimp culture, Antibiotic residues, Food safety, Sustainable aquaculture practices.

IM-11

NGS (Next Generation Sequencing) Technology as a new trend in genome research bioinformatics

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Abstract

Next-generation sequencing (NGS) is a wonderful tool used in genomics research. NGS has sequence millions of DNA fragments at once, providing detailed information about the structure of genomes, genetic variations, gene activity, and changes in gene behaviour. Recent advancements have focused on faster and more accurate sequencing, reduced costs, and improved data analysis. These advancements hold great promise for unlocking new insights into genomics and improving our understanding of diseases and personalized healthcare. Now its impact on various areas of research, such as clinical genomics,

cancer, infectious diseases, and etc. The advancement of next-generation sequencing (NGS) has brought about a paradigm shift in genomics research, offering unparalleled capabilities for analysing DNA and RNA molecules in a high-throughput and cost-effective manner. This transformative technology has swiftly propelled genomics advancements across diverse domains. NGS allows for the rapid sequencing of millions of DNA fragments simultaneously, providing comprehensive insights into genome structure, genetic variations, gene expression profiles, and epigenetic modifications. The versatility of NGS platforms has expanded the scope of genomics research, facilitating studies on rare genetic diseases, cancer genomics, microbiome analysis, infectious diseases, and population genetics. Moreover, NGS has enabled the development of targeted therapies, precision medicine approaches, and improved diagnostic methods. It provides an insightful overview of the current trends and recent advancements in NGS technology, highlighting its potential impact on diverse areas of genomic research. Moreover, the review delves into the challenges encountered and future directions of NGS technology, including endeavours to enhance the accuracy and sensitivity of sequencing data, the development of novel algorithms for data analysis, and the pursuit of more efficient, scalable, and cost-effective solutions that lie ahead.

Keywords: next-generation sequencing; genomics; microbiome; molecular diagnostics; bioinformatics; epigenetic modifications.

IM-12

Reshaping Immunology and Health in the Post-Pandemic Era: Lessons Learned and Future Directions:

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Abstract:

The COVID-19 pandemic has profoundly impacted global health, highlighting the critical role of immunology in preventing and controlling infectious diseases. As we navigate the post-pandemic era, it is essential to reassess our understanding of immunology and its applications in maintaining public health.

This review article synthesizes the current state of knowledge on immunology and health, focusing on the key takeaways from the pandemic. We discuss the importance of vaccine development, immune system modulation, and diagnostics in preventing and managing infectious diseases. Furthermore, we explore the emerging concepts of immune

metabolism, trained immunity, and the microbiome's role in shaping immune responses. The review also delves into the long-term consequences of COVID-19 on immune function, including potential increases in autoimmune diseases and immune-mediated disorders. We emphasize the need for sustained investment in immunology research, global collaboration, and public awareness campaigns to promote vaccine uptake and healthy lifestyle choices.

Ultimately, this review aims to inform healthcare professionals, policymakers, and the general public about the transformative power of immunology in promoting health and preventing disease in the post-pandemic era.

Keywords: immunology, COVID-19, vaccine development, immune system modulation, public health.

IM-13

Aquatic Ecotoxicology: A Comprehensive Review of Contaminant Exposure and Effects

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Abstract

This review article provides a comprehensive synthesis of the existing literature on the impacts of toxicant exposure on aquatic ecosystems. We examine the physiological, behavioral, and ecological effects of toxicants on aquatic organisms, as well as the mechanisms of bioaccumulation and biomagnification. The interplay between toxicant exposure and environmental stressors, such as climate change, is also discussed. Our analysis highlights the complexities and uncertainties associated with assessing the risks of toxicant exposure in aquatic ecosystems. We identify key knowledge gaps and research priorities, and provide recommendations for future studies. This review aims to provide a foundational resource for researchers, policymakers, and managers seeking to understand and mitigate the impacts of toxicant exposure on aquatic ecosystems.

Keywords

Toxicant Exposure, Aquatic Ecosystems, Bioaccumulation, Biomagnification.

IM-14

Enhancement of shrimp immunity through Biofloc technology in hatcheries

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ABSTRACT

Aquaculture has been emerged as one of the fastest growing animal-based food producing sectors in India. However, the rapid growth of aquaculture industry was hampered due to several limitations, including the production of poor-quality seed during the initial stages, raising concerns about the disease outbreaks with poor immune system leading to limited productivity. Keeping in view of the above concerns in the shrimp larval and postlarval stages, there is a need to address the probable technological advancements for the betterment of shrimp. Biofloc technology gives a promising alternative, offering a holistic approach to shrimp farming that focuses on enhancing the shrimp's innate immune system, reducing reliance on antibiotics, and improving overall water quality. This article delves into the mechanisms by which biofloc technology strengthens the shrimp immune response, highlighting its potential to revolutionize shrimp hatchery practices.

Key words: Aquaculture, Biofloc technology, Hatchery, Shrimp, Sustainable.

IM-15

Relationship between nutrition and Immunity

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Abstract

Nutrition plays a vital role in the regulation of immunological responses. The immune system accounts for a relatively minor portion of the total nutritional requirements in the normal healthy human begins but activation of the immune system in response to an immune challenge has a major impact on nutritional status and requires for most nutrients. Nutrient deficiencies increase susceptibility to most infectious diseases, such as bacterial, viral, and parasitic diseases. While nutritional deficiencies increase the severity of the disease and increase the probability of secondary infections. “For survival, a well-functioning immune system is critical. The immune system must be constantly alert, monitoring for signs of invasion or danger and make backup for response. To distinguish self from non-self and furthermore discriminate between non-self-molecules which are harmful (e.g. from pathogens) and innocuous non-

self-molecules (e.g. from food) cells of immune system play an important role altogether”. In these studies of Nutrients explores the relationship between diet and nutrients and immune functions. Here, we outline the important functions of the immune system and how it interacts with nutrients across the life course, highlighting the work included within the body. This includes the role of micronutrients, macronutrients, and the gut microbes in mediating immunological effects. Nutritional modulation of the immune system has applications within the clinical setting, but can also have a role in healthy populations, acting to reduce or delay the onset of immune-mediated chronic diseases. Future research in this area will ultimately lead to a better understanding of the role of diet and nutrients in immune function and will facilitate the use of bespoke nutrition to improve the human health.

Keywords: Immunity, nutrition, pathogens, microbes and micronutrients.

IM-16

Regulatory roles of RNAs and RNA modifications

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Abstract:

The post-transcriptional modifications of RNA nucleotides were well known for decades, but the exact positions of the modifications and their physiological functions were poorly understood until recently. The modifications in mRNAs represent a critical layer in the regulation of gene expression. Chemical modifications in abundantly found non-coding RNAs namely, rRNA and tRNA, were identified long back before more than half a century (Stacey, 1965), and these RNAs consist of more than 160 modified nucleotides (Boccaletto et al., 2018). In the last decade, increased number of modifications were identified and characterized in less abundant species of RNA such as, mRNAs and long non-coding RNAs (lncRNA). All these modifications are collectively termed as epitranscriptome, including, N6 - methyladenosine (m6 A) that accounts for 80% of RNA methylation modifications. At the same time, several other modifications of RNA, such as m1 A, m5 C, m3 C, pseudouridine (Ψ) and m7 G have also been demonstrated to be involved in cancer and drug resistance, but the detailed molecular mechanisms involved are not clearly understood.

Advanced techniques, like high-throughput next-generation sequencing (NGS) and nanopore-based mapping, were useful to map the position of these modifications with single nucleotide accuracy, and genetic screens could uncover the "writer", "reader", "eraser" proteins, which help to install, interpret and remove such modifications, respectively. The new technologies and methods allow identification, transcriptome-wide mapping,

and functional characterization of a growing number of RNA modifications, that provide perception into the biology of these marks. The post-transcriptional modifications have an important role during animal development, highlighting how these discoveries can affect multiple aspects of development from fertilization to differentiation in many species.

Key words: Posttranscriptional regulation, RNA modifications; RNA modifying genes; m6A; epitranscriptome.

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IM-17

Impact of COVID-19 on Women's Fertility and Pregnancy Outcomes

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Abstract:

The COVID-19 pandemic has raised concerns regarding its effects on women's fertility and pregnancy outcomes. This retrospective observational study analyzed data from 500

women aged 20-40, categorized into three groups: COVID-positive, COVID-vaccinated, and control. Key parameters, including time to conception, miscarriage rates, and pregnancy complications, were assessed alongside ovarian reserve markers like Anti-Müllerian Hormone (AMH). Results indicated that women with prior COVID-19 infection experienced a slight but statistically insignificant delay in conception (mean time: 8 months vs. 6 months in controls). Vaccinated women exhibited no adverse effects on conception rates or pregnancy outcomes compared to the control group. Marginally higher rates of pregnancy complications, such as preeclampsia and gestational diabetes, were noted in the COVID-positive group (15%) compared to vaccinated (10%) and control (8%) groups. Importantly, no significant differences in AMH levels or ovarian reserve were observed across the groups. The findings suggest that while COVID-19 infection may have a minor impact on reproductive outcomes, vaccination is safe and does not impair fertility or maternal health. Vaccination should be encouraged to mitigate severe disease without compromising reproductive potential.

Keywords:

COVID-19, fertility, pregnancy outcomes, conception, vaccination, reproductive health

IM-18

**Immunity After Pandemic Recovery and
Vaccination**

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Background: The coronavirus pandemic caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), is associated with a robust immune response. It infects various cells that express ACE2 receptors.

Innate Immune response to corona virus

infection: Innate immune system function depends on several types of cells, including dendritic cells, monocyte cells, macrophages, neutrophils, eosinophils, mast cells and NK cells. Innate immunity response against corona infection strongly depends on PAMPs/DAMPs-PPRs interactions and IFN-1- dependent responses.

Cell mediated response: The cellular anti virus response starts from Nk cells through cytokine production (IL-6) and the direct lysis of infected cells. Subsequently CD8+T cells destroy infected cells, whereas CD4+ T cells stimulate B cells to produce antibodies.

Immune response to SARS-CoV-2 Vaccination:

The vaccination efficacy against Delta 77%, in case of Omicron 55.9%. Medications influence the effectiveness of vaccines.

Conclusion: The strength and durability of immunity acquired after infection or vaccination against SARS-CoV2 are generally similar with slightly higher post-vaccination antibody and a longer duration of post-infectious response.

Keywords: COVID-19, vaccine, Immune response

**Post-Pandemic Health Challenge: Vitamin D
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USA**Abstract:**

Vitamin D is an essential nutrient that plays a critical role in maintaining overall health, supporting immune function, and facilitating the absorption of calcium, which is vital for bone strength. Inadequate vitamin D levels can lead to a range of health issues, including weakened bones and increased susceptibility to infections. Recommended daily intakes vary by age, with infants and most adults requiring 15 mcg (600 IU) daily, while adults over 71 years need 20 mcg (800 IU) Vitamin D is available in two primary forms: D2 (ergocalciferol) and D3 (cholecalciferol). Vitamin D3 is considered more effective in raising blood level vitamin D compared to D2. The body absorbs vitamin D more efficiently when consumed with meals containing fat, as it is lipid-soluble. While vitamin D is crucial for health, excessive intake is often due to overuse of supplements – can lead to toxicity. Symptoms of vitamin D toxicity include nausea, vomiting,

muscle weakness, kidney damage, with severe cases potentially leading to kidney failure or even death. Most cases of toxicity arise from the overconsumption of supplements rather than dietary sources or sun exposure. Additionally, vitamin D supplements may interact with certain medications, such as orlistat, statin, and corticosteroids, necessitating caution for individuals on these treatments. A recent study has highlighted that 40% of American adults experience vitamin D deficiency. A daily vitamin D supplementation with 2000 IU (50 µg) may be considered a simple, effective, and safe dosage to prevent and treat vitamin D deficiency in the adult general population.

Key Words: vitamin D, supplementation, health, toxicity, bone health, immune function, medication interactions.

IM-20**Assessment of lipid profile and kidney function
tests in plasmodium berghei infected mice
treated with artemisinin-based combination
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Abstract

Background: Malaria pathogenesis is associated with changes in lipid profile and kidney function.

Thus the present investigation was aimed to study the changes in lipid profile and kidney function tests in *Plasmodium berghei* infected mice treated with artemisinin-based combination drugs i.e., Artesunate + Amodiaquine (ASAQ), Artesunate + Sulfadoxine Pyrimethamine (ASSP) and Artesunate + Lumefantrine (AL).

Methods: The course of infection was studied in *P. berghei* infected mice and drug treated mice by blood smear examination. The lipid profile and kidney function tests were estimated by following the standard protocols.

Results: The Total cholesterol (TC), low-density lipoproteins (LDL), very low-density lipoproteins (VLDL) and triglycerides (TG) were increased whereas high-density lipoproteins (HDL) was decreased in *P. berghei* infected mice when compared to the control mice. Among kidney function tests serum creatinine, serum urea and potassium ion levels were increased whereas sodium ions and chloride ions were decreased in *P. berghei* infected mice when compared to the control mice. But when these infected mice were treated with ASAQ, ASSP and AL, all the above parameters were restored to normal values significantly ($P < 0.05$). But among these three drug combinations, ASAQ combination was the most effective than ASSP and AL in restoring the cholesterol, serum creatinine, serum urea and electrolyte levels.

Conclusion: The artemisinin-based combination drugs are recently being used for treatment malaria in view of growing drug resistance. Hence, the present investigation was taken up on these drug

combinations, but ASAQ was found to be the most efficacious than ASSP and AL in treating *P. berghei* infection in experimental mice by restoring the all the above parameters.

Key words: *Plasmodium berghei*, lipid profile, kidney function tests, Artemisinin-based combination drugs.

BIODIVERSITY

B-01

**Preservation and Conservation of Biodiversity
in India**

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ABSTRACT

Biodiversity refers to the variety of life forms on Earth, including plants, animals, and microorganisms, along with their genetic diversity and the ecosystems they inhabit. India, one of the world's most biodiverse countries, is home to about 8% of the world's recorded species, including many that are endemic. However, rapid urbanization, deforestation, pollution, climate change, and over-exploitation of natural resources pose significant threats to the country's biodiversity. Preservation and conservation of biodiversity are critical for ensuring ecological balance, food security, and economic stability.

This paper explores the importance of biodiversity conservation in India, the challenges faced in protecting it, and the strategies employed at various levels, including governmental, non-governmental, and local community efforts. We examine the role of protected areas, wildlife corridors, biodiversity hotspots, and international conventions in biodiversity preservation. Additionally, the paper delves into innovative conservation methods like community-based conservation, ex-situ and in-situ conservation

practices, and the implementation of sustainable development policies. The study also emphasizes the need for public awareness and education on the value of biodiversity to foster active participation in conservation efforts.

In conclusion, a multifaceted approach, combining scientific research, policy implementation, community involvement, and global cooperation, is essential to safeguard India's rich biodiversity for future generations.

Keywords: Biodiversity, Conservation, Preservation, Protected Areas, Wildlife Corridors, Biodiversity Hotspots, Ex-situ Conservation, Wildlife Protection Act, Sustainable Development, NGOs, Climate Change, Community-Based Conservation, Policy Framework.

B-02

**GREEN SOLUTIONS: THE ROLE OF
ALGAE IN REDUCING ATMOSPHERIC
CO₂ LEVELS**

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Abstract

One of the main causes of global warming and climate change, rising atmospheric carbon dioxide (CO₂) levels, is being mitigated by algae, which

are quickly becoming a viable solution. Algae provide a sustainable and efficient way to absorb and reduce atmospheric CO₂ through their natural process of photosynthesis, which transforms CO₂ into organic compounds. The function of algae in reducing CO₂, the processes by which they absorb carbon, and its potential for large-scale carbon sequestration are all thoroughly examined in this research. It talks about the opportunities and difficulties of using algae to mitigate climate change and provides graphical representations of CO₂ absorption rates.

Key words: Global warming, atmospheric CO₂, photosynthesis, organic carbon, sustainable

B-03

Advancements In Biodiversity Informatics and Data Sharing: Future Pathways for Conservation

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Abstract:

Biodiversity is essential for the health and stability of ecosystems, but human-induced changes have caused a rapid decline in species diversity and habitat integrity. In response, biodiversity informatics has become a key field, utilizing

modern technologies and data-sharing systems to advance ecological research and conservation practices. This paper examines the significance of biodiversity informatics in transforming how biodiversity data is collected, analysed, and shared. Technological innovations such as remote sensing, genetic barcoding, participatory citizen science, and open-access data platforms are explored for their impact on biodiversity studies. However, issues like data accuracy, intellectual property rights, and privacy remain obstacles. This study emphasizes the need for enhanced collaboration, standardized data formats, and open data sharing to address these challenges. Through biodiversity informatics, researchers and decision-makers can develop more efficient conservation methods, promoting global efforts to protect biodiversity for future generations.

Keywords: Biodiversity; Bioinformatics; Conservation

B-04

Guardians of Flight: Strategies for the Preservation and Conservation of Butterfly Biodiversity

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Abstract

As vital pollinators and markers of the health of ecosystems, butterflies are under unprecedented assault from pesticide usage, habitat loss, and climate change. This study highlights the necessity for a diversified strategy while outlining practical methods for the conservation and maintenance of butterfly biodiversity. In order to improve genetic variety and resilience, the first technique is restoring habitat and establishing butterfly corridors to link disparate environments. Second, public education and participation are essential; programs that include local people in conservation efforts can raise knowledge of the ecological significance of butterflies and cultivate a culture of stewardship. Thirdly, the use of sustainable farming methods can lessen the negative effects of pesticides and encourage butterflies to coexist with crop production. Additionally, important habitats can be preserved and butterfly populations can be supported by the creation of protected places like butterfly reserves. Data on butterfly populations, migration patterns, and the effects of environmental changes are provided by research and monitoring programs, which are also crucial for informing conservation initiatives. Last but not least, policy advocacy is essential to influencing local, national, and worldwide laws that promote biodiversity protection. We can better address the issues that butterfly species face and increase their chances of surviving by combining these tactics. In order to protect these

important pollinators and their habitats for future generations, conservationists, legislators, and the general public are urged to work together in this study.

Keywords: Butterflies, biodiversity conservation, habitat restoration, climate change, sustainable agriculture, public engagement, pollinators, ecological health.

B-05

Conservative Methods for Butterfly Conservation: Strategies for Sustainable Preservation

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Abstract

Despite being important markers of biodiversity and environmental health, butterflies are seriously threatened by pollution, habitat loss, and climate change. For their long-term maintenance, effective conservation measures are necessary. The conservative approaches to butterfly conservation are examined in this essay, with a focus on habitat restoration, community involvement, and policy lobbying. The creation and preservation of native plant communities can supply vital resources like nectar and host plants for a variety of butterfly

species, making habitat restoration imperative. Agroecological methods and butterfly garden establishment are two examples of initiatives that can improve fragmented landscapes and improve habitat connectivity. In conservation projects, community involvement is essential. Local communities can take an active role in conservation efforts by raising awareness and enjoyment of butterflies through educational activities and citizen science projects. Incorporating stakeholders into decision-making procedures guarantees that conservation tactics are broadly accepted and culturally appropriate. Furthermore, to influence environmental laws and land-use planning that give priority to butterfly habitats, strong policy lobbying is required. Funding and resources for conservation initiatives can be obtained through cooperation with governmental and non-governmental groups. According to the paper's findings, a multimodal strategy that incorporates habitat restoration, community engagement, and policy advocacy is necessary for the long-term conservation of butterfly populations. We can increase ecosystem resilience, encourage biodiversity, and guarantee the survival of these essential pollinators for future generations by putting these cautious techniques into practice.

Keywords: Butterfly conservation, habitat restoration, community engagement, policy advocacy, biodiversity, sustainable preservation, pollinators.

B-06

Fluttering Futures: Strategies for Butterfly Conservation in a Changing Environment

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Abstract

Important aspect of butterfly conservation management is the control of invasive species. Invasive plants and animals can out compete native species for resources and disrupt the delicate balance of ecosystems. They can also serve as host plants for butterfly larvae, leading to decreased populations of native butterflies. To prevent this, invasive species removal and control strategies are implemented. This may involve manual removal, chemical control, or biological control methods. Furthermore, public awareness and education play significant roles in butterfly conservation management. Many people are unaware of the importance of butterflies and the threats they face. By raising awareness through various means, such as workshops, educational campaigns, or wildlife centers, we can encourage individuals to take action and contribute to conservation efforts. This can include planting butterfly-friendly gardens, avoiding the use of

pesticides, or participating in citizen science projects to monitor butterfly populations. To monitor the effectiveness of conservation management strategies, data collection and research are vital. This includes monitoring butterfly populations, studying their habitat requirements, and analyzing the impacts of conservation measures. By collecting and analyzing this data, we can adapt our strategies and make informed decisions to ensure the long-term survival of butterflies. In overall, managing butterfly conservation involves protecting and rebuilding habitats, managing invasive species, spreading knowledge, and carrying out research. By making little changes, like adding native plants to their gardens or giving to local conservation organizations, any person can help with butterfly conservation. By working together, we can change things and guarantee that upcoming generations will be able to appreciate the wonder and significance of butterflies in our ecosystems.

Keywords: Butterfly Conservation, Biological Control, Ecosystem, Educational Campaigns, Wildlife Centers

B-07

Preserving Lepidopteran Variety: Methods for Conserving Butterflies

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Abstract

Butterflies are important markers of ecological health, and their protection requires a diversified strategy to maintain their survival in dynamically changing habitats. This study examines important methods for protecting and conserving butterfly populations, with a focus on habitat preservation, climate resilience, and public involvement. The complex ecosystems that sustain a variety of butterfly species depend on the preservation and restoration of key habitats, such as wetlands, meadows, and forest edges. Furthermore, the necessity of adaptive management techniques is underscored by the effects of climate change on lifecycle phases and migration patterns. Local butterfly populations can be supported by programs that support native plant species in both urban and rural areas. These initiatives can improve food sources and breeding grounds. Additionally, community service and education are crucial; increasing awareness of Butterfly ecological roles can motivate grassroots conservation initiatives. To create and carry out successful conservation policies, cooperation between local communities, conservation organizations, and governmental entities is crucial. By combining scientific study with community service, we can build robust ecosystems that sustain the diversity of butterflies. In addition to

enhancing our natural history, the preservation of these amazing insects offers vital information on the condition of our ecosystem, highlighting the urgent need for long-term conservation efforts. We can guarantee a future in which butterflies flourish and serve as a symbol of the health of our ecosystems by taking preventive measures and working together.

Keywords: Climate change, Habitat preservation, Community involvement, Butterfly conservation, and Ecological health.

B-08

Molecular Taxonomy and Bioinformatics in the Modern Biotechnology of Butterflies

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Abstract

The classification and comprehension of butterfly variety have been transformed by molecular taxonomy, which makes use of genetic data. Researchers can clarify the evolutionary links of butterfly species—many of which are visually similar but genetically distinct—by employing methods like DNA barcoding and phylogenetic analysis. This method improves on conventional

taxonomic techniques by offering a more precise foundation for species identification and classification, which is crucial for biodiversity assessment and conservation initiatives. The processing and analysis of the enormous volumes of genetic data produced by molecular techniques heavily relies on bioinformatics. Interpreting complex biological data is made easier by tools and software for phylogenetic tree construction, sequence alignment, and genomic data mining. Our knowledge of butterfly ecology, evolution, and adaptations is enhanced by the combination of molecular data with ecological and behavioral research. Innovative approaches to butterfly conservation are provided by contemporary biotechnology applications, such as synthetic biology and genetic manipulation. For example, the creation of genetically modified organisms (GMOs) can preserve butterfly populations while aiding in the control of pests. Moreover, bioinformatics facilitates the identification of genes linked to desirable characteristics like color patterns and infection resistance. In summary, the integration of bioinformatics and molecular taxonomy in butterfly study enriches our knowledge of the species' biodiversity and creates opportunities for biotechnological applications targeted at sustainable management and conservation.

Keywords: Molecular taxonomy, bioinformatics, butterflies, DNA barcoding, phylogenetic analysis, biodiversity, genetic modification, conservation, biotechnology.

B-09

Impact of Adama Custodia on Aquatic Biodiversity and Ecosystem Functioning.

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Abstract

This study examines the impact of Adama Custodia, a triazole-based fungicide, on aquatic biodiversity and ecosystem functioning. The effects of Custodia exposure were tested in freshwater mesocosms over 30 days, with concentrations of 0.5, 1.0, and 2.0 µg/L. We assessed biodiversity through species richness and diversity indices for planktonic and benthic organisms, and examined ecosystem functions including primary productivity (chlorophyll-a), nutrient cycling (nitrogen and phosphorus), and microbial decomposition. Results showed a significant reduction in species richness and diversity, particularly in sensitive taxa such as algae, invertebrates, and zooplankton. Custodia exposure also disrupted primary productivity, decreasing algal biomass and impairing nutrient cycling processes. Microbial decomposition rates were lowered, indicating impaired ecosystem services. Additionally, shifts in trophic interactions were observed, with opportunistic species dominating. These findings

highlight that Custodia fungicide can negatively affect both biodiversity and key ecosystem processes, potentially leading to long-term ecological imbalances. This underscores the need for further investigation into its environmental impact and the development of strategies to mitigate such risks.

Keywords:

Aquatic Biodiversity, Ecosystem, Adama Custodia

B-10

A STUDY ON AVIAN FAUNA DIVERSITY IN RECLAIMED AREA OF GOWTHAM KHANI OPEN CAST MINE, KOTHAGIDEM, TELANGANA

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Abstract

Open-cast coal mining in Kothagudem, Kothagudem district, Telangana has negative ecological effects, such as biodiversity loss, water shortage, and soil erosion. Identifying and protecting the key areas with high importance for ecological sustainability are great challenges. Thus, it can be seen as an effective measure to protect regional ecological sustainability by reclamation and revegetation, different varieties of avian fauna were observed in the restored study area. Specifically, after the ecological restoration, the vegetation has the capacity of water storage and water transfer in the study area provided

advantageous condition for the benign development of the society. There is no endemic, endangered species, having habitat in the core zone of the study area. The Species richness was high in birds 52 species, along with 90 species of trees, 39 shrubs, 13 lianas, 15 climbers, 74 herbs and 5 are aquatic species are habitat for the avian fauna, the Vegetation analysis suggests that there are more of tree species (90) in comparison to other life forms. Vegetation supports the avian faunal diversity in the study area.

Key words: Biodiversity, open cast mine, Ecological restoration, Avian fauna, Sustainability

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B-11

Microbial Perspectives on Polythene Biodegradation: Exploring the Role of Microorganisms in Addressing Plastic Pollution

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Abstract:

Plastic pollution, particularly from polythene (polyethylene), has emerged as a significant environmental concern worldwide. In response to this challenge, microbial perspectives on polythene biodegradation have garnered attention as potential solutions to mitigate plastic pollution. This article provides an overview of the mechanisms underlying microbial polythene biodegradation, including surface erosion, biofilm formation, metabolic pathways, synergistic interactions, and daptation. Furthermore, it explores the diversity of polythene-degrading microorganisms and their Poles in plastic degradation across different environments. Environmental factors influencing polythene biodegradation, such as temperature, pH, moisture, and nutrient availability, are discussed, along with strategies to optimize degradation rates. Biotechnological approaches, including microbial consortia development and genetic engineering, are highlighted as promising avenues to enhance polythene degradation efficiency. The article concludes with a discussion on the potential of microbial perspectives to address plastic pollution and outlines future research directions in this field.

Keywords: Microplastics; microbial degradation; environmental impact; plastic pollution, microorganisms; environmental degradation; biodegradation; enzymatic processes; carbon compounds; sustainable waste management.

**Impact of E-waste on Human Health and
Environment: Sustainable Recycling
management methods**

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Abstract:

Management of e-waste (electricals and electronics) is important issue in the twenty-first century, particularly in many developing nations. E-waste is a non-biodegradable and hazardous of land, air, water, and living things. Toxic substances such mercury, lead, cadmium, polybrominated flame retardants, barium, and lithium can be found in electronic waste. For instance, harmful substances are released into the environment when precious elements from electronic components are recovered using open-air burning and acid baths. E-waste is highly harmful to living things, notably people. It harms the brain, heart, liver, kidneys, and skeletal system and prevents the growth and development of organs, among other harmful health impacts. For instance, it is crucial to integrate the informal and formal sectors, and establish strictly enforce applicable laws, require improved eco-designs from manufacturers, control transboundary

movements, raise consumer awareness, and invest in the best sustainable recycling facilities and cutting-edge disposal services. The method of managing e-waste involves gathering it from the thousands of urban houses and businesses and sorting, repairing, refurbishing, and disassembling outdated electrical and electronic equipment. The current barriers to e-waste management will also be greatly reduced if novel and environmentally friendly scientific approaches, such as integrated processes using hybrid technologies and micro-factories, are used to replace conventional procedures.

Keywords: E-waste effects, Sustainable recycling, Management practices, and Scientific methods

B-13

**Protecting Biodiversity in the Anthropocene:
Strategies for a Sustainable Future**

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ABSTRACT

The Anthropocene epoch is marked by unprecedented human influence on Earth's ecosystems, leading to significant biodiversity loss. Habitat destruction, pollution, climate change, invasive species, and overexploitation of

natural resources are among the primary drivers of species extinction and ecosystem degradation. This paper examines the critical threats posed by human activities and explores sustainable strategies to mitigate biodiversity loss. Key conservation approaches include habitat restoration, the establishment of protected areas, and sustainable land-use practices. Policy frameworks such as the Convention on Biological Diversity (CBD) and the Kunming-Montreal Global Biodiversity Framework play a crucial role in global conservation efforts. Additionally, community-led initiatives, indigenous knowledge systems, and advancements in biotechnology and ecological monitoring provide innovative solutions to safeguard biodiversity. Ecosystem-based adaptation strategies are essential in addressing climate change-induced biodiversity loss. Rewilding, ecological corridors, and sustainable urban planning are explored as approaches to integrating conservation with human development. Public awareness, education, and interdisciplinary collaborations are emphasized as key drivers of long-term ecological sustainability. Protecting biodiversity in the Anthropocene requires urgent, collective action through evidence-based policies and multi-stakeholder engagement. By prioritizing conservation, societies can balance economic growth with ecological integrity, ensuring a resilient and biodiverse planet for future generations.

Key Words: Biodiversity conservation, Anthropocene, habitat restoration, climate change

adaptation, sustainable development, ecological resilience, protected areas.

B-14

“Biologically Derived Chitosan: Applications in Bioremediation and Environmental Cleanup”

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ABSTRACT

Chitosan, a versatile biopolymer derived from chitin, has gained attention for its wide range of applications in fields such as bioremediation and food technology. The extraction of chitosan from chitin has traditionally relied on harsh chemical processes, which can be both environmentally damaging and resource-intensive. Recently this highlighted the potential of biologically derived enzymes, such as protease and deacetylase, as eco-friendly alternatives for this process. These enzymes facilitate efficient deproteinization and deacetylation chitosan production without generating hazardous by-products. The enzymatic approach not only ensures high-quality chitosan with minimal environmental impact but also aligns with the principles of green chemistry and sustainability.

Chitosan is extensively utilized for environmental cleanup. Its high adsorption capacity allows for

the removal of heavy metals (e.g., lead, cadmium, and mercury) from industrial effluents, contributing to cleaner water systems. In dye industries, chitosan adsorbs harmful synthetic dyes, reducing their ecological impact. It is also modified for oil spill remediation by binding hydrocarbons effectively. Additionally, in aquaculture, chitosan reduces nutrient pollution by adsorbing ammonia and phosphates, maintaining water quality and preventing eutrophication.

Deacetylation is essential for converting chitin to chitosan, which increases solubility and functionality. These methods, supported by chitosan, reduce chemical waste and produce high-quality chitosan for applications in pharmaceuticals, agriculture, and food packaging.

This Study highlights the multidisciplinary relevance of chitosan and underscores its potential to address critical challenges in toxicology, immunology, and biodiversity conservation. Further research into cost-effective production and alternative biological sources could expand its accessibility, paving the way for broader adoption in sustainable development initiatives.

Key words: *Chitosan, Bioremediation, Effluent treatment, Environmental Restoration, Oil Spill Cleanup.*

B-15

Circadian Rhythms, Epigenetic Modifications, and Time Restricted Feeding: Implications for Cancer and Neurodevelopmental Disorders

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Abstract:

Circadian rhythms are physiological processes which regulate the sleep-wake cycle, metabolism, and hormonal functions driven by clock genes. Suprachiasmatic nucleus (SCN) located in the anterior hypothalamus, regulates the mammalian circadian clock. Disruptions in circadian rhythms are associated with various metabolic disorders, and cancers. Melatonin is crucial for synchronizing circadian rhythms, it maintains physiological homeostasis, and particularly stabilizing the circadian clock under conditions of inflammation and stress. Circadian rhythms misalignments such as sleep disturbances and melatonin deficiencies lead to the pathogenesis of Autism Spectrum Disorder (ASD). Time Restricted Feeding (TRF) is an effective strategy for improving metabolic health and in reducing obesity related risks. Epigenetic regulation, including DNA methylation and histone modifications influences the circadian machinery, with dysregulation of these processes contributing to cancer. Therapeutic strategies targeting circadian rhythm alignment, such as melatonin supplementation and epigenetic modifications,

offer promising avenues for reducing circadian related pathologies, including metabolic syndrome, ASD, and cancer.

Keywords: Circadian rhythms, Neurodevelopmental disorders, Time restricted feeding, Clock genes, DNA methylation, Cancer

B-16

Ichthyofaunal Diversity of Lake Kolleru, Andhra Pradesh, India: Systematic checklist, Conservation Status and Seasonal Abundance

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Lake Kolleru is the largest natural wetland ecosystem and is the only RAMSAR site in Andhra Pradesh harboring unique fish fauna, despite having substantial economic value that serving as a breeding ground for many species. Study was carried out for a period of two years from January 2016 to December, 2017 to determine ichthyofaunal diversity from five landing stations viz., A. Gundugolanu B. Adavikolanu C. Gudivakalanka D. Kaikaluru and E. Akividu. The study revealed the presence of 45 species belonging to 11 orders, 19 families and 30 genera. According to IUCN red list status, 4 (8.88%) species are Vulnerable, 3 (6.66%) are Near threatened, 36 (79.88%) are at lower risk, 1 (2.22%) is at Near extension, and data deficient

for 1 (1.66%). The frequency of occurrence for each species during pre-monsoon, monsoon, winter and post-monsoon months along with their individual abundance (%) reported that the maximum values were recorded during Monsoon season, June-September (41.84) and the minimum values were recorded in Pre-monsoon season, April-June (2.30). The estimation of individual species abundance showed the maximum abundance by Catfishes (*Heteropneustes fossilis*, 0.143 and *Mystus cavasius*, 0.119) followed by Loricariid fishes (*Pterygoplichthys disjunctivus*, 0.128 and *P. pardalis*, 0.111). The results imply the need to conserve the ichthyofauna of all the five stations of lake Kolleru with extensive conservational measures.

Keywords: Biodiversity, Fishfauna, Lake Kolleru, Species abundance, IUCN status.

B-17

Protecting Biodiversity in the Anthropocene: Strategies for a Sustainable Future

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ABSTRACT

The Anthropocene epoch is marked by unprecedented human influence on Earth's

ecosystems, leading to significant biodiversity loss. Habitat destruction, pollution, climate change, invasive species, and overexploitation of natural resources are among the primary drivers of species extinction and ecosystem degradation. This paper examines the critical threats posed by human activities and explores sustainable strategies to mitigate biodiversity loss. Key conservation approaches include habitat restoration, the establishment of protected areas, and sustainable land-use practices. Policy frameworks such as the Convention on Biological Diversity (CBD) and the Kunming-Montreal Global Biodiversity Framework play a crucial role in global conservation efforts. Additionally, community-led initiatives, indigenous knowledge systems, and advancements in biotechnology and ecological monitoring provide innovative solutions to safeguard biodiversity. Ecosystem-based adaptation strategies are essential in addressing climate change-induced biodiversity loss. Rewilding, ecological corridors, and sustainable urban planning are explored as approaches to integrating conservation with human development. Public awareness, education, and interdisciplinary collaborations are emphasized as key drivers of long-term ecological sustainability. Protecting biodiversity in the Anthropocene requires urgent, collective action through evidence-based policies and multi-stakeholder engagement. By prioritizing conservation, societies can balance economic growth with ecological integrity, ensuring a

resilient and biodiverse planet for future generations.

Key Words: Biodiversity conservation, Anthropocene, habitat restoration, climate change adaptation, sustainable development, ecological resilience, protected areas.

B-18

Global Growth and Advancements in Hydroponics: A Focus on Amphibious Plants, Food Fish, and Sustainable Feed Additives

karvepakula Aruna Kumari

World wide hydroponics creation (counting Amphibious plants) remains at 110.2 million tons, with the first sale esteem assessed at USD 243.5 billion. The complete creation included 80.0 million tons of food fish also, 30.1 million tons of sea growing plants. Starting around 2000, and 1990's. In any case, hydroponics keeps on becoming quicker than other significant food creation areas. Yearly development declined to a moderate 5.8 percent during the period 2001-2016, development is still. As of now hydroponics adds to 46.8 percent of complete worldwide fish creation. This expansion in development of hydroponics has been principally credited to advancement in great quality feeds. Any great quality feed is ready from appropriate and fundamental feed added substances. Later improvements in useful feed added substances are showing promising respects water ranchers. Useful feed added substances not just further develop the development execution of the fishes yet in addition further develop the

wellbeing execution of the fishes. These practical feed added substances are gotten from various sources. These are natural and eco-accommodating to fishes and climate. These practical feed added substances incorporate prebiotics. Kelp, mushrooms, microalgae compounds, natural acids, mycotoxins covers, effortlessly attractive or phytobiotic mixtures and yeasts.

B-19

Impact of Kumbh Mela pilgrimage on Water Quality Ganga River, UP.

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ABSTRACT

"The Kumbh Mela, a massive Hindu pilgrimage, we are respect them. substantial pollution of the sacred Ganges River due to the congregation of millions of devotees. Result change in the water quality of the river. Mass bathing leads to a rapid increase in fecal coliform bacteria, organic waste from offerings, and other pollutants, significantly impacting the river's water quality. high concentration of BOD, COD, Cl and pH from 8.09 to 8.83mg/L against 6.5 to 8.5mg/L of outdoor bathing water quality. Pre Kumbh mela pH 8.06, DO 9.4mg/L, BOD 1.7mg/L, COD 13.9mg/l, Temp 18 and post Maha Shivaratri pH 8.11, DO 9.0, BOD 2.96, COD 21.3. Higher BOD indicates

a higher concentration of organic matter in the water, signifying poor water quality. BOD and fecal coliform levels. waste management the gathering generates vast quantities of trash, including non-biodegradable materials such as plastics.²¹ Dec 2024. sewage generation estimated to increase by 10 per cent during the 2025 Maha Kumbh Mela in Prayagraj, the National Green Tribunal's (NGT's) principal bench has ordered the Uttar Pradesh government and Central Pollution Control Board (CPCB) to ensure no untreated sewage is discharged into the Ganga and Yamuna rivers.

Keywords: DO – dissolved oxygen, BOD – Biological oxygen demand, COD – chemical oxygen demand, CPCB – Central pollution control board, NGT- National Green Tribunal,

B-20

Efficacy of Sanitizers in Shrimp Culture: An Overview

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ABSTRACT

The use of sanitizers in shrimp culture has become a pivotal strategy to enhance biosecurity, improve water quality, and reduce disease outbreaks. This review examines the latest advancements, efficacy, and environmental implications of

various sanitizers used in shrimp aquaculture. Commonly employed sanitizers include chlorine compounds, quaternary ammonium compounds (QACs), hydrogen peroxide, iodine-based formulations, and organic acids. These sanitizers exhibit broad-spectrum antimicrobial activity, effectively controlling pathogenic bacteria such as *Vibrio* spp., a major concern in shrimp farming.

Recent studies highlight that while sanitizers improve water quality and shrimp survival rates, overuse or improper application can lead to adverse effects, such as microbial resistance, toxicity to non-target organisms, and accumulation of harmful residues in aquatic ecosystems. Comparative analyses of Bio-based sanitizers and Nano-formulated disinfectants reveal that they are emerging as eco-friendly alternatives, offering lower environmental impact and higher biocompatibility. The review also underscores the importance of adhering to optimal dosing protocols and periodic rotation of sanitizers to mitigate resistance development.

In order to ensure the sustainable and safe use of sanitizers in shrimp farming, regulatory frameworks and guidelines are essential. To further enhance shrimp health and productivity while lowering ecological risks, it is suggested that these sanitizers be used in combination with modern water treatment technologies like biofilters and probiotics. Future studies would concentrate on producing sanitizers that are more economical, non-toxic, and sustainable while also being adapted to an array of shrimp farming conditions.

KEYWORDS: Biosecurity, Biofilters, *Vibrio* spp., Bio-based sanitizers.

B-21

Molecular identification, typing and tracking of *Vibrio harveyi* in aquaculture systems: current methods in Andhra Pradesh

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Vibrio harveyi is an economically significant pathogen for the aquaculture industry and methods to identify, type and track *V. harveyi*-related populations are therefore of interest. Due to phenotypic similarities and genome plasticity, traditional phenotypic identification and typing methods are not always able to resolve *V. harveyi* from closely related species. This review provides an overview and evaluation of molecular methods currently used to identify and type *V. harveyi* related species in taxonomic and epidemiological studies and presents prospects and challenges for developing molecular methods for direct detection of *V. harveyi* in complex samples. Pathogenicity of *V. harveyi* has been related to a number of factors including secretion of extracellular products (ECP) containing substances such as proteases, haemolysins, and lipases, lipopolysaccharide, and a bacteriocin-like substance. Due to the economic importance of *V.*

harveyi infections, there is considerable interest in methods to identify, type and track *V. harveyi*-related populations associated with marine reared animals. Identification of *V. harveyi* strains can be a challenging task since species within the Harveyi clade (*V. harveyi*, *Vibrio campbellii*, *Vibrio alginolyticus*, *Vibrio rotiferianus*, *Vibrio parahaemolyticus*, *Vibrio mytili* and *Vibrio natriegens*) have a very high degree of both genetic and phenotypic similarity. Bacterial typing systems detect differences in the phenotypic or genotypic characteristics of strains, and based on their resolution power can be used to distinguish genera, species or strains. Bacterial typing systems therefore form the basis for the integration of bacterial taxonomy and epidemiology. Pathogen tracking is relevant for epidemiological studies concerned with the ecology and natural history of a disease; or with planning, monitoring and assessment of disease control programs. Methods for pathogen tracking include identification and typing methods as well as methods for direct detection and quantification of the relevant organism in environmental samples. This paper presents and evaluates current methods for identification and typing of *V. harveyi* related species and discusses prospects and challenges for developing molecular methods for direct detection of *V. harveyi* in complex samples. which covered in detail the epizootics of *V. harveyi* mediated vibriosis, traditional methods for *V. harveyi* identification, the different virulence factors of *V. harveyi*, and also discussed epidemiology and possible control measures for commercial

aquaculture hatcheries. The methods include both whole-genome targeting methods including, AFLP, REP-PCR and RAPD, and methods that target either individual or multiple marker genes. Promising methods for epidemiological studies of *V. harveyi* include RAPD and ribotyping, while MLSA is quickly emerging as the most promising identification tool. To date,

Keywords: *Vibrio harveyi*, vibriosis, extracellular proteins, pathogenicity, molecular epidemiology

B-22

AQUATIC ZOOPLANKTONIC SPECIES

TAXONOMY IN INDIA

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Abstract

Zooplanktons are critical components of aquatic ecosystems, serving as primary consumers that link primary producers to higher trophic levels. In India, aquatic zooplankton exhibit high diversity, distributed across freshwater, brackish, and marine ecosystems. This study reviews the taxonomy and distribution of major zooplanktonic groups in Indian waters, including Copepoda, Cladocera, Rotifera and Ostracoda. Taxonomic identification is crucial for understanding their ecological roles, including nutrient cycling, primary production regulation, and energy transfer. Indian freshwater systems harbor diverse zooplanktonic assemblages, with several endemic and cosmopolitan species, such as

Brachionus calyciflorus and Daphnia carinata. In marine environments, copepods dominate and significantly contribute to global biogeochemical cycles. Recent advances in molecular techniques, such as DNA bar-coding, have improved species-level identification, aiding in biodiversity conservation and management strategies. Environmental stressors, including pollution, eutrophication and climate change, threaten zooplankton diversity in India, affecting ecosystem stability. This abstract emphasizes the need for comprehensive taxonomic studies and continuous monitoring to protect and conserve zooplankton biodiversity, which is vital for sustaining aquatic ecosystems and fisheries productivity in India.

Keywords: zooplankton, taxonomy, biodiversity, eutrophication and conservation

B-23

Stewarding Natural Habitats – More than mere Conservation

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The diversity of life forms, in such large numbers that we have yet to identify most of them, is the greatest wonder of this planet. The biosphere is an intricate tapestry of life forms that are intertwined. The concept of biodiversity and the consensus among scientists and activists about the urgency of preventing biodiversity from continuing to be destroyed by the excesses of the human species

led to a shift in the way we address the issue of nature conservation. Conservation problems are social and economic, not scientific, yet biologists have traditionally been expected to solve them. Research is easy; conservation most decidedly is not. Seldom clear-cut, environmental issues often involve moral ambiguity. The transformations are accumulated and overlapped, but a thin line of continuity persists: the assigning of an intrinsic value for biodiversity based more on an aesthetic sensitivity and on a sense of empathy for the diversity of life than in an unquestioned scientific knowledge. The real world is more than a match for any model. Perhaps one could come away with a sense that when making conservation decisions in the name of preserving diversity, it might seem like a good idea at least to consider these four factors— utility of a species, distinctiveness of a species from other species, increased probability of survival, and cost of increasing the survivability of the species especially in a policy world. The core of the problem of biodiversity preservation today lies in specifying the objective that we are trying to preserve. At the end of the day, we must make up our minds about what is the objective function before we can properly use scientific information or formulate rational policies for good stewardship of natural habitats.

Keywords : biodiversity, conservation, species, preserve, stewardship

**Proximate Composition and Nutritional profile
Screening of *Moringa oleifera* Leaves.**

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Abstract:

Moringa is an important vegetable crop. This study was conducted to determine the chemical composition and mineral contents of leaves of *Moringa oleifera* leaves. The leaf samples were collected from Moringa trees grown in the farms. They were dried separately at 55 °C for 24 h and then ground to obtain a powder for analysis. The data on the proximate composition of the Moringa samples were subjected to Analysis of Variance to determine statistical differences among the mean values. The overall mean values of moisture, fat, protein, ash, fiber and total available carbohydrates of the leaves were 6.93 ± 0.16 , 7.78 ± 0.13 , 27.1 ± 0.43 , 7.34 ± 0.31 , 9.1 ± 1 and $46.5 \pm 3\%$, respectively. The Moringa leaves contained average values of 520 ± 96.0 , 7.7 ± 1.3 , 30.1 ± 15.5 , 0.8 ± 0.1 , 82.6 ± 6.4 , 1.7 ± 0.2 , 1.6 ± 0.2 and 0.02 ± 0.00 mg/100g of Calcium, Iron, Sodium, Zinc, Magnesium, Aluminum, Manganese and Chromium, respectively. Significant differences were observed for moisture, fat, protein and ash contents among the six Moringa samples. The

results showed that the leaves are rich in nutrients, particularly with high amounts of protein and ash. This suggests that Moringa leaf could serve as an important protein and mineral supplement in the diet and can be consumed as a vegetable. Thus, there is a need for further study to verify this.

Key Words: Moringa oleifera, Protein, Minerals, Nutrients and Carbohydrates.

B-25

**Preserving the Web of Life: A Review of
Strategies for Biodiversity Conservation**

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Abstract:

Biodiversity, the intricate web of life on Earth, is facing unprecedented threats from human activities, climate change, and habitat destruction. The preservation and conservation of biodiversity are critical for maintaining ecosystem services, ensuring food security, and promoting human

well-being. This review synthesizes the current state of knowledge on biodiversity conservation, highlighting effective strategies and approaches for preserving the natural world.

We examine the role of protected areas, such as national parks and wildlife sanctuaries, in safeguarding biodiversity hotspots. We also discuss the importance of sustainable land-use planning, eco-friendly agriculture, and community-led conservation initiatives. Furthermore, we explore the potential of cutting-edge technologies, including genetic engineering, biotechnology, and geospatial analysis, in supporting biodiversity conservation efforts.

Our review emphasizes the need for a multi-faceted approach to biodiversity conservation, one that integrates ecological, social, and economic considerations. We argue that preserving biodiversity requires a fundamental transformation of human values and behaviors, as well as a commitment to sustainable development and environmental stewardship. By synthesizing the latest research and best practices, this review aims to inform policy-makers, conservation practitioners, and the general public about the urgent need to preserve and conserve biodiversity for future generations.

Keywords: Biodiversity Conservation, Sustainable Development, Ecosystem Services, Protected Areas, Community-Led Conservation.

B-26

Comparative Genomics of two Asian Medicinal Leeches *Hirudonipponia* and *Hirudotianjinensis*: With emphasis on Antithrombotic Genes and their Corresponding Proteins.

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Abstract:

Asian medicinal leech is a common name for a group of medicinal leeches, such as *Hirudinarianipponia* and *Hirudinarianamanillensis*. *H. nipponia* is a well-known Asian medicinal leech that belongs to the same genus as the European medicinal leech. They are commonly found in natural waters of the East Asian region, including China, Japan, Mongolia and the Russian Far East. Their hosts include many amphibians, reptiles, and mammals, including humans. It is considered an important traditional Chinese medicine and has been recorded in the Pharmacopeia of the People's Republic of China (PPRC) for the treatment of bloodstasis, amenorrhea, edema, apoplexy, hemiplegia, and trauma. Medicinal leech therapy has also been used for broken finger replantation and skin avulsion injuries by sucking blood from diseased sites with this leech species. Although *H. nipponia* has been used for medical and medicinal purposes

for over two thousand years, the taxonomic status of these animals has not been fully resolved. It is known that *H. nipponia* has different body colour patterns among individuals found that there were substantial differences in mitochondrial cytochrome c oxidase subunit I (COI) gene sequences. Therefore, it is important to distinguish the correct species of origin of the proteins and their encoding genes. With the rapid development of high-throughput sequencing and analysing technologies, functional gene and protein research in leeches has now entered the era of genomics.

Key Words: Leech, Medicinal value, Genes and Morphology.

B-27

A Study on sustainability of Fish diversity under restructured Estuarine habitat of Machilipatnam coast after Seaport Materialization

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Abstract

The Bay of Bengal at Machilipatnam considered being rich in marine fish species. Interface areas of the marine and terrestrial environments are the richest and the most productive with regard to marine life. These coastal regions act as nurseries for a number of species particularly fish species which have been supporting the local fishermen communities and fish trading activity. Recent port construction activities such as dredging and tide

barriers started the physical modifications, these sea scape modifications alters the wave and water current patterns. The flushing time, representing the time taken to replace specific water mass in a coastal system, and which is used as a general indicator for this exchange, this reduced flush time would a factor for deterioration in water quality and high concentrations of heavy metals in the cost. Sea port post construction operations further increase the threat of deterioration of water quality. These degraded coastal regions would have a direct influence on sustainability fish populations and altering the relative abundance in species richness and species evenness. Considerable mangrove area of Machilipatnam sea shore and its breeding grounds for marine fish would be an effected area. The present study aimed to highlight noticeable impact on commercial fish population and their diversity due to change in environmental physically and biologically during their construction and operation of sea port at Machilipatnam.

B-28

Phytochemical studies of the plant *Parthenium hysterophorus*(congress grass)

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Abstract:

Plasmodium is a digenetic, intracellular parasite living in human liver cells and RBCs, with humans as secondary hosts and female Anopheles mosquitoes as primary hosts. *Plasmodium vivax*, the main cause of benign tertian malaria, triggers symptoms like fever, headache, shivering, anemia, and jaundice within 8-25 days. Medicinal plants are rich source of bioactive compounds like alkaloids, tannins, and phenols, which play a crucial role in treating various ailments, as highlighted by the medical system. Many effective antimalarial drugs originate from plants. Quinine is the first effective treatment, was derived from the Cinchona tree, inspiring the synthesis of chloroquine and primaquine. Similarly, artemisinin, derived from *Artemisia annua*, revolutionized malaria treatment. *Parthenium hysterophorus* is a species of flowering plant belonging to the family Asteraceae. Shade-dried *Parthenium* samples, the leaves, stem and roots extracted were subjected for in 90% different organic solvents methanol, ethyl acetate and chloroform at 50-60°C in a soxhlet apparatus (Borosil). After complete extraction, the filtrates were concentrated separately by rotary vacuum evaporation (>45°C) and then freeze dried (-20°C) to obtain solid residue. A solution of 50 mg/mL is taken. It was revealed that, methanol extract of leaves showed maximum yield followed by methanol extraction of stem. The phytochemical studies revealed that *Parthenium* have variety of phytochemical constituents namely alkaloids, triterpenes, flavonoids, tannins, carbohydrates, phenols, saponins, phlobatannins and steroids. The

medicinal properties of plants are influenced by factors such as geography, environment and soil quality. Therefore, this study is valuable in enhancing our understanding in drug development for malaria from plants.

Keywords: *Parthenium hysterophorus*, Chloroquine, Primaquine, Phytochemical study

B-29

Fish faunal diversity of Interu mangrove swamp from Krishna Estuarine region, Andhra Pradesh.

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Abstract

Interu mangrove swamp in Krishna estuarine region in Andhra Pradesh is an important coastal water body on which the nearby fishing communities depend for their livelihood. Interu mangrove swamp spreads over an area of about 1079 ha and is located at 81° 14' E and 16° 16' N. The present study recorded 50 species belonging to 44 genera of 27 families of 8 orders in the Interu mangrove swamp. Of which eels (order: Anguilliformes) represented a significant diversity with five families belonging to seven genera of eight species. Of which 2 species namely *Muraenichthys schultzei* (Bleeker) and *Brachyamblyopus brachysoma* (Bleeker) are being reported for the first time in India and one species

Gymnothorax meleagris (Shaw) is reported for the first time in India. Taxonomic descriptions also discuss in this paper.

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B-30

Food and feeding strategies of flathead mullet

***Mugil cephalus* (Teleostei:**

Mugilidae), from Krishna estuary Andhra Pradesh

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The flathead grey mullet, *Mugil cephalus*, is a mullet of the genus *Mugil* in the family Mugilidae and Order: Mugiliformes; is a brackish water fish also can thrive well in fresh water and marine waters. Study on the food and feeding habits of *Mugil cephalus* was recorded from June, 2022 to May, 2023 at monthly intervals from Krishna estuary from Andhra Pradesh. Observation of feeding habits indicated flathead grey mullet as omnivorous feeder. Total 120 specimens in length range 124 to 355 mm were subjected into analysis for food and feeding habits. In adult fish the analysis of the gut revealed that the Bacillariophyceae (Diatoms), Myxophyceae, Dino-flagellates, copepods and polychaetae worms along with sand and mud were the prominent representatives of this species. The volume of the gut was maximum in the months of August and September, low in the month of April

and May was observed in both males and females. The Gastro Somatic Index of males and females was observed and ranged between 4.5% - 7.5% in males and females goes to 4.1% - 7.4%. The range of physico-chemical attributes within these environments necessitates a wide tolerance to differing conditions, especially with regard to salinity, dissolved oxygen and temperature, all of which are discussed in this study.

Keywords: *Mugil cephalus*, Food composition, feeding strategies, Gastro Somatic Index

B-31

Prevalence of Mud Crab Reovirus (MCRV) in *Scylla serrata* brooders

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Abstract

Mud Crab Reovirus (MCRV) is an emerging pathogen posing a significant threat to the mud crab (*Scylla serrata*) aquaculture industry. While extensive studies have been conducted on prevalence of MCRV in grow-out systems, its prevalence in broodstock remains largely unexplored. This study aims to assess the prevalence and potential impact of Mud Crab Reovirus (MCRV) in mud crab broodstock

sourced from wild and various aquaculture facilities. Polymerase Chain Reaction (PCR) screening revealed a high prevalence of the virus in mud crab brooders, suggesting a latent or subclinical infection. These mud crab brooders were then subjected to histopathological and ultrastructural analyses to confirm the presence of MCRV and cellular lesions. Histological examinations indicated cellular alterations in hepatopancreas and gill tissues, with characteristic cytopathic effects associated with viral infections. Transmission Electron Microscopy (TEM) analysis further confirmed the presence of icosahedral viral particles within infected tissues. The findings underscore the need for routine screening of mud crab brooders to prevent vertical transmission and mitigate economic losses in hatchery operations. Implementing strict biosecurity measures and developing MCRV-resistant broodstock could be crucial strategies to control the spread of this pathogen. This study concluded that screening female *Scylla serrata* broodstock for Mud Crab Reovirus (MCRV) is essential to ensure the production of disease-free seed, which in turn supports farmers and safeguards the long-term sustainability of the mud crab aquaculture industry.

Keywords: Mud crab reovirus, *Scylla serrata*, broodstock, prevalence, PCR, histopathology, biosecurity.

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Chronic mass mortality of hatchery-reared mud crab (*Scylla serrata*) in polyculture grow-out ponds of Andhra Pradesh

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Abstract

Mud crab (*Scylla serrata*) farming is a rapidly expanding aquaculture sector in India, particularly in the coastal regions of Andhra Pradesh. However, the industry faces significant challenges due to emerging diseases, with Mud Crab Reovirus (MCRV) posing a major threat. This study investigates an outbreak of chronic mass mortality in hatchery-raised mud crab seed stocked in polyculture grow-out ponds in Andhra Pradesh. Despite the hatchery-raised status of the seed, affected crabs exhibited clinical signs such as lethargy, reduced feeding, and progressive

mortality, resulting in substantial economic losses. Diagnostic investigations, including histopathology, polymerase chain reaction (PCR), and transmission electron microscopy (TEM), confirmed the presence of MCRV infection. The findings suggest that the infection originated from wild sources, most likely introduced through the water supply used in the grow-out ponds. Histopathological examination revealed characteristic lesions in the gill and hepatopancreatic tissues, while TEM analysis confirmed the presence of viral particles. This study underscores the critical need for water quality management, robust biosecurity protocols, and routine screening of both seed and environmental inputs to mitigate the risk of disease outbreaks. The results highlight the importance of health management strategies to ensure the sustainability and long-term viability of mud crab aquaculture in the region.

Keywords: Mud Crab Reovirus, Chronic Mortality, Water Source, Aquaculture Sustainability

B-33

**ANALYSIS OF WATER QUALITY
MANAGEMENTS IN FISH HATCHERIES AT
NELLORE DISTRICT, ANDHRA PRADESH,
INDIA.**

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ABSTRACT

The living organisms are greatly influenced by the abiotic factors in an aquatic ecosystem. The water quality in ecosystem is determined by the biodiversity and population size of each species. The physico-chemical properties of water in Nellore hatcheries. It was monitored for one year. Monthly changes in physical and chemical properties of water such as temperature, pH, dissolved oxygen, free carbon dioxide, alkalinity, hardness and salinity were analysed for a period of one year from March 2nd to November 8th 2024. All the studied parameters found that the results of water quality are within in the permissible limits to support aquatic life.

Key words: Nellore hatcheries, Physico chemical parameters, Monthly variations.

B-34

**"Recent Nanoinformatics Approaches for
Developments in Nanobiotechnology and
Nanomedicine"**

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Abstract

Nanoinformatics has emerged as a pivotal discipline at the intersection of nanotechnology, bioinformatics, and computational science, enabling innovative approaches in Nanobiotechnology and nanomedicine. This review provides a comprehensive overview of recent advancements in Nanoinformatics, highlighting its role in designing, analyzing, and optimizing nanoparticles for biomedical applications. Key areas of focus include the development of computational models to predict nanoparticle behavior, machine learning algorithms for toxicity and efficacy assessments, and the integration of omics data for personalized nanomedicine. The review also addresses challenges in data standardization, regulatory frameworks, and the need for interdisciplinary collaboration to advance the field. These insights demonstrate the transformative potential of Nanoinformatics in revolutionizing diagnostics, therapeutics, and drug delivery systems.

Keywords: Nanoinformatics, Nanomedicine, Computational modeling, Artificial intelligence, Omics integration, Nanoparticle toxicity, Personalized nanomedicine, Drug delivery, Biomedical applications.

B-35

**COMPARATIVESTUDYOFFISH
DIVERSITY INUPSTREAMAND
DOWNSTREAMOF GODAVARI
RIVER NEAR PAPERMILL
RAJAMAHENDRAVARAM.EASTG
ODAVARI DISTRICT.**

NSRATAB 2025

S.SARADA MA, MSC, MED. Research scholar(P.T) under esteem guidance of prof.K.RAMANESWARI.DEPARTMENT OF ZOOLOGY, AKNU, RJY, EGDT, AP, INDIA.

ABSTRACT

This reasearch investigates various formation processes that the fish varieties available in premonsoon, monsoon, post monsoon periods in the year. The socio economic conditions of fishermen observed fish varieties collected and preserved. They will send to DNA barcoding of rare species for observation of nutrient values fishermen lifestyle and fishing process observed. notified registered families in fishermen society kadium. Their houses and financial conditions observed. What are the financial support given by government. Where they are living and from where they are migrated to here. Reasons for fishing reduction. Education status and marital in children lifestyle they are using traditional boards for fishing. Summer using motor boats. They are going fishing weekly twice in the early mornings. Monday Friday fishing holiday. Many families and registered in the society. They are living in poor conditions. Physical immunity is also improper. Old people female are in fish marketing. Youth are going to fishin fish varieties are reduce due to send drilling. Income sources from fishing is not enough for their survival. So they are searching for another income sources. They are suffering from severe storms and climatic hot conditions. they have to come rajmahendravararam for minimum needs and hospital facilities. Mostly available spaces are katlakatlabarliiusbendelisis, cirrhinus, cyprinus.

Keywords

Premonsoon ,monsoon, post monsoon, society,drilling,barcoding.

B-36

Antioxidant activity of *Rhizophora stylosa* Leaf Extracts.

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Abstract:

Diseases management in carp culture majorly involves the application of antibiotics. Herbal bioactive compounds are capable of treating the fish diseases without provoking any side effects. Phenols and flavonoids being strong antioxidants contribute in promoting fish immune system to fight against disease causing pathogens. DPPH and FRAP assays have proved that the aqueous extract of *R. stylosa* are potent antioxidant agents. Among the petroleum ether, ethanol, acetate and aqueous extracts, the highest total phenol content (TPC) and total flavonoid content (TFC) were recorded in aqueous extract i.e., 88.4mg GAE/g DW and 74.3 mg RE/g DW respectively and TFC values has showcased direct proportionality with the antioxidant activity as the highest values in DPPH and FRAP assay were shown by aqueous

extract i.e., 134.1±0.6 AAE µg/ml 113±1.0 AAE µg/ml.

Key words: R. stylosa, TPC, TFC, DPPH and FRAP

B-37

Ecobiological Investigations of *Lates calcarifer* in and around Narasapuram: Implications for Sustainable Fisheries Management.

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Abstract:

Lates calcarifer, a commercially valuable species, is an integral component of the marine ecosystem in and around Narasapuram. This study endeavors to elucidate the ecobiological aspects of *L. calcarifer*, encompassing its distribution, abundance, feeding habits, and reproductive biology. The research revealed that *L. calcarifer* exhibits a preference for brackish waters, with a

significant presence in the Godavari deltaic region. The species' diet comprises primarily of small fish, crustaceans, and mollusks, highlighting its apex predator status. Reproductive analysis indicated a prolonged spawning period, with peak activity observed during the monsoon season. The length-weight relationship and condition factor revealed variations in the species' growth patterns. This study's findings have significant implications for sustainable fisheries management, emphasizing the need for conservation measures to protect *L. calcarifer* populations. Recommendations include implementing closed seasons, regulating fishing gear, and promoting eco-friendly aquaculture practices.

Keywords: *Lates calcarifer*, ecobiology, Narasapuram, sustainable fisheries management, conservation.

B-38

EMERGING-TOXICANT CHRONICLES: UNDERSTANDING THE IMPACT ON AQUATIC ORGANISMS AND ECOSYSTEMS

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Abstract:

The "Emerging-Toxicant Chronicles" provides an in-depth examination of the impact of

toxicants on aquatic organisms, offering insights into the ever-evolving challenges confronting underwater ecosystems. Through a comprehensive review of current research and findings, this paper explores the diverse range of harmful substances that infiltrate water bodies, posing significant threats to the health and well-being of aquatic life. From industrial chemicals to pharmaceuticals, toxicants come in various forms and have been linked to a myriad of adverse effects on aquatic organisms. These harmful substances can accumulate in the tissues of fish, mollusks, and other aquatic species, leading to bioaccumulation and biomagnification up the food chain. As a result, not only individual organisms but entire ecosystems can be negatively impacted by the presence of toxicants, with far-reaching consequences for biodiversity and ecosystem functioning.

Furthermore, toxicants have been shown to disrupt physiological processes, such as metabolism, reproduction, and immune function, in aquatic organisms, making them more vulnerable to diseases and environmental stressors. The chronic exposure to toxicants can also lead to genetic mutations, reproductive abnormalities, and population decline in sensitive species, further compromising the resilience of aquatic ecosystems in the face of environmental changes. By shedding light on the intricate interplay between toxicants and aquatic organisms, this review aims to raise awareness of the urgent need for conservation efforts and pollution control measures to safeguard our waterways. By understanding the mechanisms of toxicity and identifying key areas for intervention, we can work towards mitigating the impact of toxicants on aquatic ecosystems and promoting the health and sustainability of our underwater world.

Keywords: Toxicants, aquatic organisms, underwater ecosystems, harmful substances, conservation efforts

IMPACTS OF CARBENDAZIM TOXICITY ON AQUATIC FISH: A REVIEW

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Abstract

Carbendazim is a widely used broad-spectrum fungicide that has shown potential toxic effects on aquatic fish, posing risks to aquatic ecosystems. This abstract will explore the impact of carbendazim toxicity on aquatic fish species. Exposure to carbendazim in water bodies can lead to detrimental effects on fish health and survival. Studies have shown that carbendazim can cause sublethal effects such as behavioral changes, reduced growth, and reproductive abnormalities in fish. The accumulation of carbendazim in fish tissues can disrupt physiological processes and impair vital functions, potentially leading to mortality in fish populations. The toxic effects of carbendazim on aquatic fish are attributed to its mode of action as a benzimidazole fungicide, which interferes with microtubule assembly and disrupts cellular processes in fish tissues. This disruption can result in oxidative stress, genotoxicity, and immunosuppression in fish exposed to carbendazim. Furthermore, the bioaccumulation potential of carbendazim in fish tissues raises concerns about its persistence in the aquatic environment and the subsequent transfer of

contaminants along the food chain, impacting higher trophic levels and posing risks to human health through seafood consumption. In conclusion, carbendazim toxicity poses significant risks to aquatic fish populations, ecosystem health, and human well-being. Effective monitoring, regulation, and alternative solutions for fungicide use are essential to mitigate the adverse impacts of carbendazim on aquatic environments and safeguard biodiversity.

Key Words: Carbendazim, Aquatic Fish, Toxicity, Fungicide, Ecosystem

B-40

BIOMAGNIFICATION OF TOXICANTS IN AQUATIC ECOSYSTEMS: IMPLICATIONS FOR ENVIRONMENTAL HEALTH AND CONSERVATION

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Abstract:

Biomagnification is a complex ecological phenomenon through which toxic substances accumulate and increase in concentration as they move up the food chain in aquatic ecosystems. This review article critically examines the mechanisms, consequences, and implications of biomagnification of toxicants in aquatic systems. By integrating findings from diverse scientific studies, we seek to enhance our understanding of the ecological and environmental ramifications of this process. Biomagnification poses a significant threat to the health and sustainability of aquatic

ecosystems and the organisms within them. Through the process of biomagnification, lipophilic toxicants such as heavy metals, persistent organic pollutants (POPs), and pesticides are ingested by aquatic organisms at lower trophic levels. These toxicants are metabolized and stored in the tissues of these organisms, leading to their bioaccumulation. As predators consume prey containing higher concentrations of these toxicants, the contaminants become even more concentrated in their tissues through biomagnification. This bioaccumulation and biomagnification of toxic substances can have devastating effects on the health and reproductive success of aquatic organisms, as well as on the overall ecosystem dynamics. Understanding the factors that influence biomagnification processes, such as the chemical properties of the toxicants, biological traits of organisms, and environmental conditions, is essential for effective risk assessment and management of aquatic ecosystems. Conservation efforts must address the sources of these toxicants and their subsequent impacts on aquatic biodiversity. This review highlights the urgent need for interdisciplinary research and policy interventions to mitigate the adverse effects of biomagnification and safeguard the health and integrity of aquatic ecosystems.

Keywords:

Biomagnification, aquatic ecosystems, toxicants, bioaccumulation, environmental conservation.

B-41

**ASSESSMENT OF PHORATE
INSECTICIDE EFFECTS ON
BIOCHEMICAL AND
HISTOLOGICAL PARAMETERS IN
*CHANNA PUNCTATUS***

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ABSTRACT

This study examines the biochemical and histological effects of the organophosphate insecticide phorate (10% CG) on the freshwater fish *Channapunctatus*. The fish were exposed to sub-lethal concentrations (1/10th of the 96-hour LC₅₀) of phorate, and acute toxicity was assessed using static and continuous flow-through methods over 24, 48, 72, and 96 hours. The calculated LC₅₀ values were 0.825, 0.725, 0.713, and 0.60 ppm for the static method, and 0.572, 0.55, 0.50, and 0.425 ppm for the flow-through method. Biochemical analyses were performed on the liver, gills, muscle, kidney, and brain to evaluate the impact of phorate exposure on glycogen, protein, DNA, and RNA content. The results indicated significant reductions in glycogen and protein levels across all tissues, with the liver and muscle showing the most notable declines, suggesting a dose-dependent impairment of carbohydrate and protein metabolism. A similar trend was observed for DNA and RNA content, with the liver and muscle tissues exhibiting the most substantial decreases, highlighting potential histological effects of phorate. These findings underscore the harmful impact of phorate on the metabolic and genetic stability of *Channapunctatus* and emphasize the need for stringent monitoring and regulation of pesticide usage in aquatic ecosystems to prevent long-term ecological damage.

Keywords: Phorate, freshwater fish, *Channapunctatus*, biochemical effects, histological effects, pesticide toxicity.



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