ABSTRACT VOLUME

A One Day National Seminar, Part- II

"Empowering Indian Youth for Global Leadership in Science and Innovation for Viksit Bharat"

28th March, 2025

Organized Collaboratively

All Science Depts & IQAC
M. G. College, Lalpur, Purulia

District Science Centre
Purulia

Edited by

Dr. Kalyan Senapati, Convener
Prof. Susanta Mallick, Organizing Secretory

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Message from Registrar for National Science Day Seminar – 28th March 2025

Dear Students,

It is a privilege to address you on this special occasion as we celebrate National Science Day, honoring the remarkable contributions of Dr. C.V. Raman and fostering a spirit of scientific inquiry in our nation. Dr. Raman's groundbreaking discovery of the Raman Effect revolutionized our understanding of light and matter, proving that Indian minds are capable of shaping the world of science.

Science is not just about theories and experiments; it is a way of thinking, questioning, and exploring the unknown. As young minds, you hold the power to push the boundaries of innovation and discovery. The future of our nation depends on how you embrace curiosity, challenge assumptions, and apply knowledge for the betterment of society.

India has a rich legacy of scientific excellence, and now it is your turn to contribute. Whether in AI, space exploration, medicine, or environmental science, your efforts can bring transformative changes. Never fear failure—it is a stepping stone to success. Keep learning, keep experimenting, and let your passion for science guide you toward a brighter future.

Let us celebrate the spirit of science day in this seminar with a renewed commitment to scientific temper, rational thinking, and innovation.

Best wishes for your journey ahead!

N Bandyopadhyay

Dr. Nachiketa Bandyopadhyay
Registrar
Sidho-Kanho-Birsha University, Purulia

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(NAAC Accredited Grade – "B+" w.e.f. 16. 09. 2016)

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Message to Students from Principal, Mahatma Gandhi College, Lalpur

We are delighted to announce that, once again, the students, teachers, and staff of all Science Departments are playing a pivotal role in celebrating National Science Day at Mahatma Gandhi College, Lalpur, Purulia. This year, we are proud to collaborate with IQAC and the District Science Center Purulia to mark this important occasion. We are honored to have the presence of Dr. Akhil Kumar Sen, Professor at BIT, Mesra, and Sri Dhrubajyoti Chattopadhyay, District Science Officer, Purulia, who will address our young minds on this special day.

National Science Day is celebrated every year on February 28 across India to commemorate the discovery of the 'Raman Effect' by the esteemed physicist, Sir C.V. Raman, who was awarded the Nobel Prize in 1930 for this ground breaking achievement. The first National Science Day celebration took place on February 28, 1987, marking the start of a tradition that continues to inspire generations. This year's theme, "Empowering Indian Youth for Global Leadership in Science & Innovation for VIKSIT BHARAT," emphasizes the crucial role of young minds in shaping India's scientific and technological progress. This aligns with the vision of Viksit Bharat 2047, which envisions a developed and self-reliant India.

With advancements in Quantum Computing, Artificial Intelligence, Geospatial Technology, and Climate Research, India is positioning itself at the forefront of global science and technology. Continued investment in research and innovation will be essential to drive sustainable growth and global leadership, contributing to the vision of Viksit Bharat by 2047. In line with these efforts, the Government of India has launched several important initiatives to support young researchers and foster innovation. The PM Early Career Research Grant (PMECRG) supports young researchers in pursuing independent research, while the E.V. Mission fosters

innovation in electric vehicle technology. Partnerships for Accelerated Innovation and Research (PAIR) follows a Hub and Spoke model, ensuring institutional collaboration in scientific research. Inclusivity Research Grant (IRG) provides financial support to researchers from Scheduled Castes (SC) and Scheduled Tribes (ST), ensuring equal opportunities in frontier research fields. The INSPIRE program, a flagship initiative of the Department of Science & Technology (DST), is designed to attract and support young talent in science and research.

Starting in 2025, the INSPIRE-MANAK scheme will expand its reach to Class 11 and 12 students, further strengthening India's scientific workforce and global leadership in research and development. To empower young women in science, the WISE-KIRAN (Women in Science and Engineering-KIRAN) scheme supports women at various stages of their scientific careers. Additionally, the Vigyan Jyoti Program encourages female students from Class IX to XII to pursue higher education and careers in STEM fields (Science, Technology, Engineering, Mathematics, and Medicine).

In conclusion, National Science Day is not only a celebration of scientific achievements but also a tribute to humanity's relentless pursuit of knowledge and progress. It is a reminder of our collective responsibility to use science to make the world a better place. Let us embrace this day to reignite our curiosity, engage in open discussions about science, and work together towards a brighter, more sustainable future.

As we look back at the monumental achievements of the past and look forward to the exciting prospects of the future, let us all be ambassadors of science. Through science we hold the power to shape a better world for generations to come. Happy Science Day!

Best Wishes,

(Dr. Santi Kundu)
Principal, Mahatma Gandhi College, Lalpur
Date: 24.03.2025

Message to Students from DSO Purulia

Dear Students,

Many times, we perceive great personalities as extraordinary beings, far beyond our reach. However, the truth is that they were ordinary individuals like us, who faced struggles, challenges, successes, and failures throughout their lives. Sir C.V. Raman was no exception.

Through this account of his life, we aim to inspire you to stay determined in the face of difficulties and work tirelessly toward your goals. Let his journey be a reminder that perseverance and dedication can lead to remarkable achievements. Keep striving, keep learning, and never lose sight of your dreams.

Best wishes,

(Dhrubajyoti Chattopadhyay)

DSO, District Science Centre, Purulia

Date- 19.3.2025

SUB COMMITTEE OF VIGYAN PARISHAD

- **Prof. Susanta Mallick, Convener, HOD, Dept of Zoology**
- **Dr. Kalyan Senapati, member, HOD, Dept. of Chemistry**
- **Prof. Asit Ray, member, HOD, Dept. of Botany**
- **Dr. Sheuli Ray, member, HOD, Dept. of Geography**

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- **Dr. Santi Kundu, Principal, M. G. College**
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- **Prof. Susanta Mallick, Convener, HOD, Dept of Zoology**
- **Dr. Kalyan Senapati, member, HOD, Dept. of Chemistry**
- **Prof. Asit Ray, member, HOD, Dept. of Botany**
- **Dr. Sheuli Ray, member, HOD, Dept. of Geography**

FLAYER

SEMINAR SCHEDULE

A One Day National Seminar, Part- II

on

Empowering Indian Youth for Global Leadership in Science and Innovation for Viksit Bharat

Organized Collaboratively

by

All Science Departments & IQAC of M. G. College

and

District Science Centre, Purulia

Date-28/03/25

Venue:- Seminar Hall, M. G. College, Lalpur, Purulia

Time – 10:00 am to 5:00 pm

Registration: 10.00 am - onwards

Inaugural Session- I

Time 11.00 to 11.15 am

Chair to all Dignitaries

Inaugural song (chorus) & felicitation

The garland in the picture of Sir C. V. Raman symbolizes honor and respect for his contributions to science

The act of watering plants takes on a fresh look

Inauguration & welcome address

Dr. Santi Kundi, Principal, MGC

Time 11.15 to 12.00 noon

Introductory address **– Prof. Susanta Mallick**
(Assistant Prof., Dept. of Zoology, MGC)

Speech by Honourable Principal

Inauguration of e-Abstract Book and Specimen

Session-II

Chairperson – Dr. Akhil Kumar Sen, Professor, BIT, Mesra
Keynote speaker: Sri, Dhrubajyoti Chattopadhyay, DSO, Purulia
Time-12.00 noon-12.45 pm

Chairperson- Sri, Dhrubajyoti Chattopadhyay, DSO, Purulia
Plenary speaker: Dr. Akhil kumar Sen, Professor, BIT, Mesra
Time-12.45-1.30 pm

LUNCH BREAK: 1.30 to 2:30 p. m.

Session-III

Chairperson- Dr. Kalyan Senapati**,** Asst. Prof., Dept. of Chemistry
Quiz contest: 2:30 -3.00 pm
Model presentation
Oral presentation-offline
Oral presentation- online mode
(Interaction and Question Answering)
(Dr. Sheuli Ray, Asst. Prof., Dept. of Geography, Sri. Siddhartha Daripa, Sact-II,
Dept. of Botany, Sri. Sanat Kumar Murmu, Sact-II, Dept. of Zoology)
Poster presentation
Time: 3.00-5.00

Vote for Thanks
Dr. Santi Kundu, Principal

_____ … _____

National Science Day, 2025

OATH

'On National Science Day, I pledge that I will try to be guided by a scientific outlook and social responsibility in my practical life and thinking. I will try to inspire others around me, relatives and friends, to be free of unscientific thoughts and superstitions. I will stand against the spread of distorted and unscientific think-ing in the name of science and any form of religious bigotry. I shall always uphold the banner of struggle of great Renaissance personalities like Rammohan Roy, Ishwar Chandra Vidyasagar, Prafulla Chandra Roy, Akshay Kumar Dutta and Meghnad Saha for spreading scientific temper and modern outlook based on truth.'

জাতীয় বিজ্ঞান দিবসে শপথ

"আজ ২৮ ফেব্রুয়ারী জাতীয় বিজ্ঞান দিবসে আমি শপথ করছি যে, আমি আমার ব্যবহারিক জীবনে ও চিন্তা-ভাবনায় বৈজ্ঞানিক দৃষ্টিভঙ্গী ও সামাজিক দায়িত্ববোধের দ্বারা পরিচালিত হতে চেষ্টা করব। চারপাশের মানুষজন, আত্মীয়-পরিজন, বন্ধু-বান্ধবদেরও অবৈজ্ঞানিক চিন্তা ও কুসংস্কার থেকে মুক্ত করার চেষ্টা করব। বিজ্ঞানের নামে কাল্পনিক ও অবৈজ্ঞানিক চিন্তা এবং যে কোনও ধরনের ধর্মীয় অন্ধতা প্রসারের বিরুদ্ধে রুখে দাঁড়াব। নবজাগরণের পথিকৃৎ রামমোহন রায়, ঈশ্বরচন্দ্র বিদ্যাসাগর, প্রফুল্লচন্দ্র রায়, অক্ষয় কুমার দত্ত ও মেঘনাদ সাহা প্রমুখ মনীষীদের আধুনিক যুক্তিবাদী বৈজ্ঞানিক চিন্তা প্রসারের লক্ষ্যে গড়ে তোলা সংগ্রামী ঐতিহ্যকে উর্ধ্বে তুলে ধরব।"

Contents

Indian Youth for global Leadership in Science and Innovation for Vikshit Bharat

Akhil Kumar Sen
Department of Chemical Engineering
Birla Institute of Technology Mesra Ranchi
E mail: akhilsen@bitmesra.ac.in

Abstract: On 28th February 1928 Prof C. V. Raman and Sir K. S. Krishnan announced their groundbreaking discovery of scattering of light which was later known as Raman Effect. This discovery has a profound impact on various fields including modern Telecommunication, Spectroscopy, remote sensing and even space exploration. Recognizing the significance of this discovery and in honor of Prof C. V. Raman's contributions to science and to promote scientific awareness and research in India Government of India declare February 28 as National Science Day in 1986. The following points will be highlighted in the lecture.

- Some glimpses of Raman Experiments to realize the difficulties in discovery
- Uniqueness in Raman Scattering
- Country progress depends on the strong focus on Science and Technology
- True happiness comes from intellectual achievement and contribution to society
- Apply summer internship program (GOI) in higher educational institutions
- NEP2020 based curriculum helps UG students to go abroad for higher education
- Three/Four years in the UG program is very crucial, use judiciously to develop yourself to become world leader.

Milieu perception and practice among students of rural Bengal

Animesh Mandal
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Abstract: This study on the whole engrossed to realize the milieu perception related to worldwide and local environmental problem, health hazards, idea about environmental laws, among undergraduate girl students. The survey was conducted on 122 rural and urban undergraduate girl students randomly selected from different stream and class in the district of Purulia, West Bengal, India. The study is questionnaire in nature. The study is also design to know girl student environmental practices with regard to the preference of types of cosmetics uses, plastic bags, its uses and disposal, alternative uses against plastic bags and their participation in various environment related awareness programmes. For successful implementation of environment protection strategy, community especially women's participation is much more needed. So, a holistic understanding of the current status of milieu perception and practice among undergraduate girl student of Purulia district is evaluated. From the study it has been observed that there is no basic difference of environmental perception among undergraduate rural and urban girl student. Both of them possess almost equal type of ecological practices.

Keywords: Milieu perception, health hazards, student, environment protection, ecological practices.

Functionalized Nanoparticles: Application for Sensing of Biologically and Environmentally Important Analytes

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Abstract: For the detection of environmentally and biologically ions and molecules recent advances in nanomaterial design, development and synthesis has resulted in robust sensing systems that display superior analytical performance. The use of nanomaterials (1 – 100 nm) as sensors has become a multidisciplinary area of great interest for the detection and techniques to be applied for target molecules. Heavy and toxic metal ions and anions, carcinogenic and some biomolecules are harmful to human health if their concentration crosses the permissible limit. Hence early detection is most desirable for environment monitoring.. With the objectives to build up such systems, different kind of approaches with various type of materials has been designed. Nanoparticles are emerging as important new generation sensing materials for different kinds of analytes. The nanomaterial for example, metal nanoparticles (Au, Ag, Cu etc) , carbon dots, carbon onions, carbon nanotubes and graphene , have been reported as biocompatible, more sensitive, better selective nanomaterials in terms of their particle size, shape ,inter-particle distance, high carrier mobility, electrical conductivity and optical transparency fostering their explicit use in sensing applications. The utilization of nanomaterials as biosensor provides sensitive and accurate sensing of both environmental contaminants as well as biological macromolecules present in trace levels suggesting its widespread potential as promising biosensing agents as compared to the conventional biosensors. Synthesis of these nanostructures has been discussed along with their functionalization methods. The recent application of all these nanomaterials in sensing methods has been highlighted for the principal applicative field and the future prospects and possibilities have been outlined. The author expects this brief review will inspire readers to develop more novel functional material through continuous research.

Key words: Gold nanoparticles; carbon dots; nano onions; quantum dots, carbon nanotubes; graphene

Semiochemicals based Management of Green Leafhopper (GLH), *Nephotettix nigropictus* (Stal, 1870) (Hemiptera: Cicadellidae)

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Abstract: Rice (*Oryza sativa* L.) (Poaceae: Commelinids) is the principal source of food for more than half in West Bengal. The Green Leafhopper (GLH), *Nephotettix nigropictus* (Stal, 1870) (Hemiptera: Cicadellidae), is a major pest of rice. Unfortunately, even today for controlling pests generally farmers rely on using different synthetic pesticides, biochemical insecticides botanicals, pheromones, allomones, against that rice pest decrease the sustainability by bio-magnification and bio-accumulation of toxic substance in agro-ecosystems. To overcome this constrains caused by rice pest researchers usually focused on epicuticular wax based Semio-chemical components of rice, *Oryza sativa* L. cultivars (Dudeswar and Badsabhog) play an important role in host selection and oviposition of the rice bug, *Nephotettix nigropictus* (Stal, 1870). The GC-MS and GC-FID analyses of the epicuticular waxes indicated the presence of 8 n-alkanes, having chain lengths from n-C_{14} to n-C_{32} and 5 free fatty acids (FFAs) having chain lengths from $C_{16:1}$ to $C_{18:0}$. Among the identified n-alkanes and FFAs of selected rice cultivars, n-C_{20} (342.954 ± 9.499 µg plant^{-1}) and $C_{18:3}$ (520.960 ± 10.660 µg plant^{-1}) of Badsabhog cultivar were the most abundant. For olfactory attraction [female > male] and oviposition [female] the most stimulating synthetic-combined-mixture of the epicuticular wax components was represented by 3 n-alkanes (n-C_{16}, n-C_{18} and n-C_{20}) and 3 FFAs ($C_{16:1}$, $C_{18:3}$, $C_{18:0}$) in per plant equivalent quantity (568.399 ± 3.463 µg plant^{-1} and 962.715 ± 4.341 µg plant^{-1}, respectively). Moreover, this synthetic-combined-mixture (3 n-alkanes + 3 FFAs), when applied to intact plant of Badsabhog cultivar, caused stronger behavioral responses (attraction and oviposition) than those observed for other treatments. The host preference (Badsabhog > Dudeswar) of *Nephotettix nigropictus* (Stal, 1870) was evaluated simultaneously by olfactory, visual, and tactile cues, as valid for other insect species. Thus, the combined-synthetic-mixture (3 n-alkanes + 3 FFAs) in plant equivalent quantity (1689.114 ± 5.136 µg plant^{-1}) of Badsabhog cultivar acted as the most preferred lure and has the potential to be a part of an alternative sustainable strategy to develop baited trap in Sustainable Pest Management (SPM) of *Nephotettix nigropictus* (Stal, 1870) in the future.

Keywords: Plant Sap, Global Production, Epicuticular wax, n-alkanes, Free fatty acids, Baited trap, GC-MS, GC-FID, Semio-chemicals, Sustainable Pest Management (SPM).

Population Ecology and ETs Based Time Series for Sustainable Management Of *Leptocorisa Acuta* (Thunb.) on Three Rice Cultivars

Piyali Pakhira
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Abstract: Age-specific two-sex life table and economic thresholds (ETs) of a rice bug, *Leptocorisa acuta* (Thunb.) (Hemiptera: Alydidae) on three rice (*Oryza sativa* L., Family: Poaceae) cultivars [Gobinda Bhog (IET-12133), Basmati (IET-23403) and Tulaipanji (IET-20760)] were determined during 2017-2019. The population dynamics of *L. acuta* were significantly affected by the host phytoconstituents in terms of host suitability or susceptibility (Gobinda Bhog> Basmati> Tulaipanji). The average EIL and ETL for *L. acuta* was 1.361 and 1.107 pests/hill, respectively on Tulaipanji that were significantly ($F_{2,6}$≥7.421, P<0.05) lower than Basmati and Gobinda Bhog cultivar. For a single pest per m^2 (16 hills/m^2) the possible time that can be taken to reach EIL (Ti) and ETL (Tt) were 1.490 and 0.490 days, respectively on Tulaipanji cultivar which were also significantly ($F_{2,6}$≥8.451, P<0.05) lower than the other cultivars. The seed yield and benefit cost ratio (BCR) were 2537.313 (Kg/ha) and 1.577, respectively for Tulaipanji cultivar that were significantly ($F_{2,6}$≥9.234, P<0.05) higher than the others. The population ecology of *L. acuta* in relation with respective host chemical regime will enable growers to find the most resistant cultivar (Gobinda Bhog< Basmati< Tulaipanji) based on BCR values as well as susceptability (Gobinda Bhog> Basmati> Tulaipanji) due to host antibiosis. Even, the calculated ETs and time series for specific time based judicious management of the pest will also support superiority of the cultivars (Tulaipanji> Basmati> Gobinda Bhog) towards climate smart pest management (CSPM) of rice and or other such crops in near future.

Keywords: *Leptocorisa acuta*, population dynamics, *Oryza sativa*, phytoconstituents, sustainable management, CSPM.

Breast Cancer: A Lifestyle Disease

Dr. Baisakhi Saha
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Abstract: Breast cancer is often referred to as a lifestyle disease because certain lifestyle choices and environmental factors are found to trigger its onset. Lifestyle factors are not like genetic factors like BRCA1, BRCA2 or T53, because they can be modified. Individuals can change their choice of habits that may potentially reduce the risk for this disease. Being obese or overweight, especially after menopause, may increase the risk for breast cancer due to estrogen being produced from fatty tissues and high blood insulin level . A sedentary lifestyle with lack of moderately intense physical exercise for at least 150 minutes a week in turn has been linked to development of breast cancer. Unhealthy diet rich in processed food and saturated fat and scant fruit and vegetables can enhance the risk for this disease. Tobacco smoke, which contains various DNA damaging carcinogens like N-nitrosamines, aromatic amines and volatile organic hydrocarbons, is already known to be a risk factor for all types of cancer including that of the breast. Consumption of one alcoholic beverage a day increases the risk for breast cancer by 7-10% compared to nondrinkers. Delay in the age of childbirth of the mother, generally after the age of 30, can increase the risk for breast cancer as the breast tissue is exposed to estrogen for a longer period of time. Combined hormone therapy, consisting of both estrogen and progesterone, as a means to manage menopausal symptoms contribute to the development of breast cancer. Exposure to certain chemicals and pollutants like polycyclic aromatic hydrocarbons, dioxins and polychlorinated biphenyls and some pesticides may also increase the risk for development of this disease. It is indeed possible to prevent the onset of this disease by focusing on lifestyle interventions. Spreading awareness regarding these risk factors may have a significant impact on public health by reducing the overall incidence of breast cancer and improving its prognosis.

Studies on The Physico-Chemical Properties and Bacterial Flora of Milk and Fermented Milk Products

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Abstract: Milk constitutes an essential component of the daily dietary regimen for both expectant mothers and developing children. Several studies were carried out to assess the physico-chemical properties (viscosity, specific gravity, pH, titratable acidity, fat content) with special reference to Bacterial Flora of Milk and Fermented Milk Products (curd, yourgut, cheese, butter, ghee, lassi etc.). For physico-chemical properties most of the cases researchers have used pH-meter for assessing pH parameters (calibrated with pH 4 and 7 buffers) whereas titratable acidity was measured by titrimetric method, and expressed as percent of lactic acid. Specific gravity, conductivity and viscosity were determined by the AOAC, 2000 standard methods. For detection of Bacterial Flora researchers were mostly used Eosin Methylene Blue (EMB) agar test. From different work it has found that in good quality of milk mostly contain physico-chemical properties including pH: 6.56±0.71, Specific gravity: 1.04±0.05, Conductivity (mS): 8.20±2.95, Viscosity (cP): 1.38±0.62 and Titratable acidity (% lactic acid): 1.44±0.40. Researchers have found Bacterial flora in milk include *Lactobacillus acidophilus* LA-5, *Lactococcus lactis, Bifidobacterium animalis* subsp. Lactis BB-12, *Propionibacterium jensenii* 702, *Escherichia coli, Streptococcus, Staphylococcus,* and *Micrococcus* species. Researchers have shown that the methylene blue reduction test depends upon the ability of bacteria in milk to grow and to consume the dissolved oxygen, which reduces the oxidation reduction potentials in the medium. In good quality of milk had shown decolourization time between 6 hours and 8 hours. In the present review study, preliminary investigations were carried out to ascertain the physico-chemical properties and bacterial flora of various marketed milk samples and fermented milk products. The present study has been designed on basis of assessing the milk physico-chemical properties with special reference to Bacterial Flora. Analyzing of physico-chemical properties of milk and fermented milk products may be helpful for assess the quality and stability of milk and fermented milk products, ensuring they meet consumer expectations and regulatory standards and to identify potential pathogen and spoilage organism, enabling the implementation of effective quality control measure to ensure food safety and also to the concerned governmental parties to monitor the quality of the milk products in the market. On the other hand the study of Bacterial Flora on Milk and Fermented Milk Products may be very much helpful for enhancing the knowledge of bacterial strains and their fermentation capabilities allows for the optimization of fermentation processes, leading to improved flavour, texture and nutritional value in fermented milk products.

Keywords: Physico-Chemical Properties, Viscosity, Specific Gravity, pH, Titratable Acidity, Fat Content, Bacterial Flora, pathogen.

Physibility and Assessment of Green Biohydrogen Energy Production and Limitations in Industrial Production Level

Siddhartha Daripa

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Abstract: With the rising global demand for sustainable energy, biohydrogen production has gained significant attention as a renewable alternative to fossil fuels. Various bioreactors have been developed for high-rate biohydrogen production, including continuously stirred tank reactors (CSTR), anaerobic fluidized bed reactors (AFBR), packed bed reactors (PBR), up-flow anaerobic sludge blanket reactors (UASB), photobioreactors, and microbial electrolysis cells (MEC). These systems differ in terms of hydrogen production rate (HPR), hydrogen yield (HY), biomass retention, and operational stability. Dark fermentation systems generally achieve higher HPRs but lower HYs compared to photobioreactors and MECs, while granule-based reactors exhibit superior biomass retention and stability compared to floc systems. The integration of nanomaterials, such as gold (Au) and silver (Ag) nanoparticles, has shown promise in enhancing biohydrogen production by improving microbial activity and increasing hydrogen yield. However, challenges remain in optimizing reactor design, scaling up production, and ensuring economic feasibility. Effective collaboration among researchers, industries, policymakers, and biomass suppliers is crucial to overcoming these obstacles. Recent advancements in granule-based reactors, thermophilic processes, integrated systems, and numerical simulations provide new opportunities for optimizing biohydrogen production. Further research is needed to enhance system efficiency and facilitate large-scale implementation.

Keywords: Biohydrogen production, Sustainable energy, Bioreactors, Dark fermentation, Photobioreactors, Microbial electrolysis cells.

Scenario of Rare Genetic Disorders in West Bengal

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Abstract: Rare disorders comprise of ~7500 different conditions affecting multiple systems. Diagnosis of rare diseases is complex due to dearth of specialized medical professionals, testing labs and limited therapeutic options. There is scarcity of data on the prevalence of rare diseases in different populations. India being home to a large population comprising of 4600 population groups, of which several thousand are endogamous, is likely to have a high burden of rare diseases. Till date, collectively there are more than 9,000 rare diseases documented, which impose a devastating impact on patients, their families, and the healthcare system, including enormous societal burden. Obtaining a conclusive diagnosis for a patient with a rare genetic disease can be long and gruelling. For some patients it takes months or years to receive a definite diagnosis, and around 50% of the patients remain undiagnosed even with expert clinical and advanced high-end laboratory investigations. Owing to the large population and practice of consanguinity the Indian population is a pool of indigenous variants and unreported phenotypes or diseases. In West Bengal, genetic admixture occurs due to high migration rate and intercast marriage system at various time points. There are scanty reports available on the prevalence of rare genetic disorder. Here, in the present study we will discuss regarding few cases related to rare genetic diseases. Diagnosis of rare genetic diseases is always challenging. The present study will be helpful for understanding the genetic predisposition of rare genetic diseases and data formation.

Keywords: Rare genetic diseases, population, West Bengal, Laboratory investigation, diagnosis, data formation

Assessment of Successful Intercropping for Controlling Whitefly Infestation in Potatoes

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Abstract: The bio-efficacy of various intercropping treatment schedules, including T_1 (potato + onion), T_2 (potato + garlic), T_3 (potato + tomato), T_4 (potato + coriander), T_5 (potato + radish), T_6 (control), and T_7 (recommended insecticide), was assessed for their impact on whitefly (*Bemisia tabaci*) (Hemiptera: Aleyrodidae) incidence in a single potato variety, Kufri Chandramukhi. The study was conducted during the *rabi* season across two potato-growing years (2021–2022 and 2022–2023) from November to February. Significant variation in whitefly incidence was observed across potato crops and different intercropping treatments. Among the intercropped combinations, potato intercropped with onion (T_1) and garlic (T_2) showed the lowest whitefly infestation, while the highest incidence was recorded in the potato-tomato (T_3) combination. However, intercropping was less effective in reducing whitefly incidence compared to the recommended insecticide treatment (T_7).

Keywords: Assessment, Infestation, Intercropping, Potato, Whitefly

An Innovative Cost-Effective Immunoassay-Based Method Development Using Small Synthetic Peptide for Quantification of Amyloid-Beta 42 Oligomers in Plasma from Alzheimer's Patients

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Abstract: The Amyloid beta (Abeta) oligomers, the major pathological agent of Alzheimer's disease (AD) are abundant in cerebrospinal fluid (CSF), but due to poor availability of CSF and low abundance in plasma, it is difficult to detect using conventional ELISA routinely. This study aims at developing an assay using small peptide which will facilitate sensitive detection of the Abeta oligomers in plasma.

The Abeta-42 peptide, its modified beta-sheet mimic (K4) and few non-specific peptides were synthesized by solid-phase peptide synthesis and interaction between synthetic peptides and Abeta-42 peptide were demonstrated using ThioflavinT assay, confocal and atomic force microscopy (AFM) and nuclear magnetic resonance (NMR). Initially plasma samples from age and sex-matched AD patients (n=12) and non-demented controls (n=10), were used for optimization of the immunoassay method to detect plasma Abeta-42 oligomer in absence and presence of K4 peptide.

The K4 peptide was found to specifically promote Abeta-42 oligomerization (51.4 ± 7.8% increase) by reducing the lag-phase of the aggregation when added after 0.5 h during the course of aggregation at an equimolar concentration. The amplified signal (~2 fold increase) of Abeta oligomers in presence of K4 peptide was quantified at a concentration of 50-100 pg/ml in pooled plasma of AD patients using ELISA and increased fluorescence of oligomers were detected in confocal microscopy.

This method will be validated using more plasma samples from AD and healthy controls to use this cost-effective method for routine diagnostic purpose in future.

Sustainable Management of Small Indigenous Freshwater Fish Species: Addressing Biodiversity Loss and Socioeconomic Implications in Purulia, India

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Abstract: Small Indigenous Freshwater Fish Species (SIFFs) contribute to food security, nutrition, ornamental value, natural mosquito control, and livelihoods, particularly in rural and tribal communities in Purulia, India. They are rich in nutrients, proteins, fatty acids, vitamins, trace elements, minerals, and essential Polyunsaturated Fatty Acids. SIFFs are effective mosquito biocontrol agents that are marketed locally, particularly by rural women. They are also important to the ornamental fish industry and livelihoods. A total of 40 SIFFs from 14 families and seven orders were documented. Wild capture, often unorganized and unauthorized, is the main source of domestic supply, leading to population decline and biodiversity loss. Environmental challenges and anthropogenic activities, such as habitat destruction, fragmentation, water pollution, and agricultural effluent, have contributed to this decline. Intensified carp culture in wetlands has also put pressure on indigenous varieties. Effective management of breeding and culture, quality feed development, species awareness, understanding ecological roles, and proper training are essential. A comprehensive database of feeding, breeding, and environmental requirements and sustainable farming technologies for each potential indigenous fish species is crucial. Current information on diversity and sustainable conservation strategies is imperative.

Keywords: Small Indigenous Freshwater Fish Species (SIFFs) - biodiversity loss - conservation strategy

The Toxicity of Diclofenac Compound in Indian long-billed Vulture

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Abstract: The study discusses the critical endangerment of Indian vultures primarily due to the widespread use of the non-steroidal anti-imflammatory drug (NSAID) Diclofenac in the 1990s. Vultures feeding on livestock caracasses treated with Diclofenac compound suffered from visceral gout and renal failure due to the accumulation or uric acid crystals in their internal organs.This caused a rapid decline in Vulture populations. Recognizing the severity of the issue, the Indian government banned the veterinary use of diclofenac in 2006. However, despite the ban, Diclofenac continues to pose a threat to vulture populations.The decline of Vultures has socio-economic, cultural,biodiversity, and human health impacts. With fewer vultures to consume livestock carcasses, populations of dogs that feed on carcasses have increased ,potentially heightening the risk of rabies transmission to humans. Alternative drugs like Acelofenac and ketoprofen are identified as safe for vultures and effective for livestock. Raising awareness among veterinarians, pharmacists, livestock owners, and the general public is emphasized as an important measure to mitigate the ongoing threat to vultures.

Key- words: Diclofenac, Renal failure, keystone species, livestock caracasses, Rabies, Indian vultures.

Aromatic Iodination by I_2-IBX

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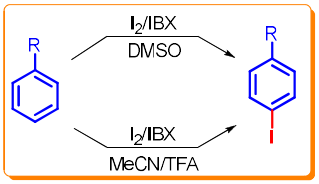

Abstract:-. Hypoiodous acid could be generated from the reaction between I_2-IBX. In the acidic medium Hypoiodous acid should liberate iodonium ions, which can be trapped for aromatic electrophilic substitutions. 4 molar equiv of IOH should, in principle, be generated for each mole of **IBX**. Thus, iodination of a variety of aromatic compounds was explored with **IBX**-I_2 in DMSO and CH_3CN-TFA. While the iodination was found to occur with **IBX**-I_2 in DMSO, the reaction was found to be more efficient when carried out in CH_3CN-TFA. However, for less activated aromatics, the excess reagent was found to expedite the reactions leading to excellent yields of iodinated aromatic products in reasonable reaction durations. A variety of aromatic compounds can be iodinated in either of the two conditions involving the use of DMSO or CH_3CN/TFA.

Reference

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Mystery of Bat Posture: How Bats Survive Hanging Upside Down for Extended Periods

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Abstract: Bats are unique among mammals for their ability to hang upside down for extended periods. Unlike sloths, which hang with their bodies parallel to the substrate, bats suspend themselves with their bodies in a straight downward position. This ability has puzzled scientists, particularly considering that humans and most other mammals cannot endure prolonged head-down postures. This study investigates the mechanisms behind the bat's ability to hang upside down, focusing on anatomical and physiological adaptations, especially the positioning of the head. We hypothesize that bats maintain their heads at a slight upward angle to facilitate blood circulation and overall stability, which allows them to stay in an inverted posture for hours. This paper reviews the literature and presents observational data to support this hypothesis.

Keywords: Bats, posture, hanging upside down, physiological adaptations, anatomical mechanisms, blood circulation

Impact of Climate Change on Animals

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Abstract: Climate change is one of the most significant threats to global biodiversity, with severe consequences for animal life. Rising temperatures, melting ice caps, shifting precipitation patterns, and extreme weather events are rapidly altering ecosystems, disrupting species interactions, and threatening survival. Many species are struggling to adapt to these abrupt environmental changes, leading to habitat loss, food scarcity, and population declines.

In polar regions, ice-dependent species such as polar bears and penguins are losing critical hunting and breeding grounds as ice sheets shrink. In marine ecosystems, coral reefs are experiencing mass bleaching events, affecting thousands of marine species dependent on them. Terrestrial animals, including migratory birds and forest-dwelling mammals, are facing changes in seasonal cycles, disrupting feeding and breeding behaviors. Additionally, rising temperatures have increased the spread of vector-borne diseases, further endangering wildlife populations.

Climate change is also accelerating species extinction rates, as many animals fail to adapt to rapidly shifting habitats. Ecosystem imbalances caused by species loss threaten global food webs and biodiversity. If current trends continue, cascading effects on ecosystems could lead to irreversible environmental damage.

To mitigate these impacts, urgent action is required, including reducing greenhouse gas emissions, expanding conservation efforts, protecting vulnerable habitats, and promoting sustainable land-use practices. Collaborative global policies and community-driven initiatives are essential to slowing climate change and ensuring the survival of countless species. The future of wildlife depends on immediate and sustained efforts to combat environmental degradation.

Keywords: Climate change, biodiversity loss, habitat destruction.

Mimicry: Nature's Art of Deception in West Bengal

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Abstract: West Bengal, with its diverse ecosystems, including dense forests, sprawling mangroves, and rich biodiversity, is home to numerous fascinating examples of zoological mimicry. Mimicry is a crucial evolutionary adaptation that allows species to survive by avoiding predators or enhancing their hunting abilities. This survival strategy plays a vital role in maintaining ecological balance and species interactions within the region's natural habitats.

In the Sundarbans mangrove ecosystem, species such as the mangrove pit viper (Trimeresurus purpureomaculatus) use camouflage mimicry to blend into their surroundings, assisting in both defense and ambush predation. Similarly, certain butterfly species, such as the common mime (Papilio clytia), exhibit Batesian mimicry, where harmless species imitate toxic ones to deter predators. In contrast, Müllerian mimicry is observed among species like the common rose (Pachliopta aristolochiae) and crimson rose (Pachliopta hector), where two unpalatable species share similar warning signals, reinforcing predator avoidance.

In the forests of North Bengal, leaf insects (Phylliidae) and tree frogs rely on cryptic coloration, mimicking leaves or bark to evade detection. Additionally, preying mantises and other arthropods use aggressive mimicry to lure prey by resembling harmless objects. These remarkable adaptations demonstrate the intricate relationships between species and their environments, offering insights into evolutionary biology and ecological stability.

Understanding mimicry in West Bengal is essential for biodiversity conservation, particularly as deforestation, climate change, and habitat destruction threaten these species. Studying mimicry not only deepens our knowledge of evolutionary processes but also emphasizes the importance of preserving fragile ecosystems. Conservation efforts must focus on protecting the habitats that sustain these adaptive behaviors, ensuring the continued survival of West Bengal's unique wildlife.

Keywords: mimicry, evolutionary adaptation, camouflage.

Bird Migration Patterns

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Abstract: The Lesser Whistling-Duck (Dendrocygna javanica) is a widespread waterfowl species found across the Indian subcontinent and Southeast Asia. Unlike many migratory waterbirds, this species does not undertake extensive long-distance migrations but instead exhibits local and regional movements in response to seasonal variations and resource availability. These movements are primarily influenced by fluctuating water levels, food distribution, and nesting conditions in wetland habitats.

During the monsoon season, Lesser Whistling-Ducks often disperse to temporary wetlands and rice paddies, taking advantage of increased food resources. As water bodies shrink during the dry season, they congregate in perennial wetlands, lakes, and reservoirs, demonstrating a high degree of adaptability to shifting environmental conditions. These localized movements ensure their survival and reproductive success while maintaining ecological balance in wetland ecosystems.

Understanding the movement ecology of the Lesser Whistling-Duck is crucial for wetland conservation and habitat management, especially in light of habitat degradation, climate change, and human disturbances. Protecting key wetland sites and maintaining suitable foraging and breeding areas is essential for sustaining stable populations of this species. Further research on their migration behavior, population dynamics, and habitat preferences will provide valuable insights for avian conservation efforts across their range.

Keywords: Lesser Whistling-Duck, Dendrocygna javanica, waterfowl.

The Impact of Global Warming on Biodiversity

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Abstract: Global warming, primarily driven by rising greenhouse gas emissions, is a major environmental threat, significantly impacting biodiversity and ecosystem stability. As global temperatures continue to rise, habitat loss, shifts in species distribution, and increased extinction risks are becoming more prevalent. Many species struggle to adapt to rapidly changing climates, leading to disrupted migration patterns, altered breeding cycles, and food scarcity.

Terrestrial ecosystems are facing severe consequences, with forests experiencing more frequent wildfires, polar species losing ice-covered habitats, and deserts expanding due to prolonged droughts. In marine environments, coral reefs are undergoing bleaching events, affecting thousands of marine species dependent on them. Additionally, climate change is altering species interactions, causing imbalances in food chains and ecosystem functions.

Rising global temperatures also influence the spread of invasive species and vector-borne diseases, further threatening native biodiversity. Increased ocean acidification due to excess carbon dioxide weakens marine organisms like shellfish and disrupts fish populations. In agricultural regions, pollinators such as bees are declining, impacting global food production and security.

If current trends continue, mass extinctions and irreversible ecosystem damage could occur, threatening both wildlife and human societies that rely on natural resources for survival. Addressing global warming requires urgent conservation efforts, reduced carbon emissions, habitat restoration, and sustainable environmental policies. International cooperation and scientific advancements are crucial in mitigating climate change and protecting biodiversity. By promoting climate resilience and conservation strategies, we can work toward a more sustainable future for all living organisms.

Keywords: Global warming, biodiversity loss, habitat destruction.

Abundant Medicinal Plants in Our Region

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Abstract: Medicinal plants have been an integral part of traditional and modern healthcare systems, offering natural remedies for a wide range of ailments. Our region is rich in diverse medicinal flora, many of which are used in Ayurveda, Unani, and herbal medicine for their therapeutic properties. These plants contain bioactive compounds with antimicrobial, anti-inflammatory, antioxidant, and adaptogenic benefits, making them essential for natural healing and pharmaceutical advancements.

Among the most abundant medicinal plants in our region, Neem (Azadirachta indica) is known for its antibacterial, antifungal, and immune-boosting properties. Tulsi (Ocimum sanctum) is valued for its respiratory and antiviral benefits, while Amla (Phyllanthus emblica) is a powerful antioxidant and immunity enhancer due to its high Vitamin C content. Ashwagandha (Withania somnifera) is widely used for its stress-relieving and rejuvenating properties, whereas Giloy (Tinospora cordifolia) is recognized for its role in boosting immunity and managing chronic diseases. Additionally, plants like Turmeric (Curcuma longa) and Aloe Vera (Aloe barbadensis) are extensively used for their anti-inflammatory, digestive, and skin-healing properties.

Despite their abundance, overharvesting, deforestation, and habitat degradation threaten the sustainability of medicinal plant populations. Conservation efforts, sustainable harvesting practices, and scientific research are essential to preserving these valuable resources. Promoting ethnobotanical studies, community awareness, and government policies can enhance the sustainable utilization of medicinal plants, ensuring their availability for future generations.

Understanding the therapeutic applications, cultivation methods, and conservation strategies of medicinal plants is crucial for integrating traditional knowledge with modern medicine. Encouraging herbal farming, research, and commercialization can support both biodiversity conservation and healthcare advancements.

Keywords: Medicinal plants, herbal medicine, Ayurveda.

The Whale Fall Phenomenon: Death That Breathes New Life

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Abstract: The Whale Fall Phenomenon – A Deep-Sea Ecosystem of Life and Recycling. The whale fall phenomenon is a remarkable example of nature's recycling process, where the remains of a deceased whale create a long-lasting, nutrient-rich ecosystem in the deep ocean. When a whale dies and sinks to the seafloor, its massive body provides a sudden, concentrated food source for a diverse range of scavengers, decomposers, and specialized deep-sea organisms. This process unfolds in multiple stages, each supporting different marine life for decades.

Initially, scavengers such as hagfish, sleeper sharks, and amphipods rapidly consume soft tissues, reducing the carcass to bones. In the second phase, opportunistic organisms like polychaete worms and crustaceans feed on remaining organic matter. Over time, sulfur-reducing bacteria break down lipids within the bones, creating a chemosynthetic environment that supports unique species, including bone-eating Osedax worms. This final stage can last for decades, fostering deep-sea biodiversity and sustaining previously undiscovered life forms.

Whale falls are critical to deep-sea food webs, serving as temporary oases of life in nutrient-poor environments. They also provide insights into evolutionary links between deep-sea hydrothermal vents, cold seeps, and chemosynthetic communities. However, human activities, including whale population decline due to commercial whaling and climate change, may reduce the frequency of whale falls, potentially disrupting deep-sea ecosystems.

Understanding the ecological significance of whale falls highlights the need for marine conservation, whale protection initiatives, and deep-sea biodiversity research. These natural events exemplify how death in one form sustains life in another, reinforcing the interconnectedness of oceanic ecosystems.

Keywords: Whale fall, deep-sea ecosystem, marine scavengers.

The Crucial Role of Bees in Agriculture And Sustainability

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Abstract: Bees are among the most important pollinators, contributing to the fertilization of nearly 75% of global food crops (FAO, 2021). Their role in pollinating fruits, vegetables, nuts, and oilseeds is crucial for ensuring food security, agricultural sustainability, and ecosystem stability. By transferring pollen between flowers, bees not only enhance crop yields and quality but also support the genetic diversity of plant species, maintaining healthy ecosystems.

Despite their ecological and economic significance, bee populations worldwide are experiencing a rapid decline due to multiple environmental threats. Habitat loss, pesticide exposure, climate change, and diseases such as Colony Collapse Disorder (CCD) are leading to declining bee numbers, disrupting agricultural production and biodiversity. Without sufficient pollination, many essential food crops could suffer reduced yields, threatening global food supplies and economic stability.

To mitigate these risks, proactive conservation efforts are necessary. Strategies such as reducing pesticide use, restoring wildflower habitats, supporting organic farming practices, and promoting sustainable beekeeping are essential for bee population recovery. Additionally, scientific research, government policies, and public awareness initiatives play a key role in protecting these vital pollinators.

Ensuring the survival and well-being of bees is not just a conservation issue but a global necessity for food production and environmental health. By prioritizing bee-friendly practices and policies, we can safeguard agricultural productivity, biodiversity, and ecological resilience for future generations.

Keywords: Pollination, bees, food security, biodiversity.

Carbon Sequestration: A Strategy for Climate Change Mitigation

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Abstract: Carbon sequestration is a critical process for reducing atmospheric carbon dioxide (CO_2) levels and mitigating the effects of climate change. This process involves capturing and storing CO_2 through natural and artificial methods to prevent its release into the atmosphere. Natural carbon sequestration occurs in forests, soils, wetlands, and oceans, where plants, microorganisms, and marine ecosystems absorb and store carbon. Artificial methods, including Carbon Capture and Storage (CCS) and Direct Air Capture (DAC), provide technological solutions for reducing industrial emissions.

Forests act as carbon sinks, absorbing CO_2 through photosynthesis and storing it in biomass and soil. Similarly, oceanic sequestration plays a crucial role, as oceans absorb about 25% of global CO_2 emissions, though increasing ocean acidification remains a concern. Soil carbon sequestration, enhanced by regenerative agriculture and conservation tillage, also contributes to long-term carbon storage.

Despite its effectiveness, carbon sequestration faces challenges such as deforestation, land degradation, high costs of CCS technology, and the risk of CO_2 leakage from underground storage sites. Implementing sustainable land management practices, afforestation, and reforestation efforts, along with advancements in carbon capture technology, is essential for maximizing sequestration potential.

As climate change accelerates, integrating carbon sequestration strategies with global policies, renewable energy adoption, and emission reduction initiatives is crucial for long-term climate stability. Enhancing research and investment in sustainable sequestration methods will ensure a balanced carbon cycle and a more resilient environment for future generations.

Keywords: Carbon sequestration, climate change mitigation.

Respiration in Bivalves

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Abstract: Bivalves, a diverse class of aquatic mollusks, have evolved specialized respiratory adaptations that enable them to thrive in sedentary, filter-feeding lifestyles. Their primary mode of gas exchange occurs across the gills (ctenidia), which possess a highly developed lamellar structure to maximize oxygen uptake from surrounding water. These gills, housed within the mantle cavity, not only function in respiration but also play a critical role in filter-feeding, making bivalve respiration an efficient dual-purpose system.

A key feature of bivalve respiration is the continuous water flow over the gills, driven by cilia on the gill filaments, which enhances oxygen diffusion. Many bivalves also possess water tubes within their gills that further optimize oxygen exchange. The presence of inhalant and exhalant siphons allows for the regulation of water intake and expulsion, ensuring effective respiration even in low-oxygen environments such as buried sediments or stagnant waters. Additionally, some species exhibit behavioral and physiological adaptations, including reduced metabolic rates in hypoxic conditions to conserve energy and oxygen.

The efficiency of bivalve respiration is closely linked to their morphology, physiology, and ecological niche, influencing their ability to adapt to varied aquatic habitats. Understanding these respiratory mechanisms provides insights into bivalve survival strategies, their role in aquatic ecosystems, and their potential responses to environmental changes such as pollution and climate fluctuations. This study highlights the importance of adaptive respiratory strategies in bivalves and their evolutionary significance in maintaining ecological stability.

Keywords: Bivalve respiration, ctenidia, filter-feeding, mantle cavity.

Aqua Culture: The Future of Fish Farming

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Abstract: Aquaculture, the controlled cultivation of aquatic organisms, has emerged as a sustainable solution to meet the growing global demand for seafood. With wild fish stocks declining due to overfishing, habitat destruction, and climate change, aquaculture provides an efficient and environmentally responsible alternative for producing fish, shellfish, and aquatic plants. It plays a crucial role in food security, economic development, and marine conservation, making it a key component of the future of global fisheries.

Modern aquaculture utilizes innovative technologies such as recirculating aquaculture systems (RAS), biofloc technology, and offshore fish farms, which enhance production while minimizing environmental impact. Selective breeding, disease management, and sustainable feed development have further improved the efficiency and ecological footprint of fish farming. Integrated multi-trophic aquaculture (IMTA) and aquaponics have also gained popularity as eco-friendly approaches that optimize resource use by combining fish farming with plant cultivation.

Despite its benefits, aquaculture faces challenges such as water pollution, disease outbreaks, habitat degradation, and reliance on wild fish for feed production. To ensure its sustainability, advancements in alternative protein sources for fish feed, improved waste management, and stricter environmental regulations are essential.

As global seafood consumption rises, responsible aquaculture practices will be crucial in maintaining aquatic biodiversity, reducing pressure on wild fisheries, and ensuring long-term food security. By embracing technological innovation, regulatory frameworks, and sustainable practices, aquaculture can serve as the foundation for the future of seafood production, balancing economic growth with environmental responsibility.

Keywords: Aquaculture, sustainable fish farming.

Virtual Escape: The Illusion of Happiness in a Digital World

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Abstract: This image symbolizes the growing addiction of humanity to the virtual reality world, contrasting sharply with the harsh truths of real life. It serves as a powerful commentary on society's increasing dependence on technology as a means of escape, where individuals seek solace in digital illusions rather than confronting reality. The composition highlights the psychological and emotional detachment that arises from this dependence, illustrating a world where virtual experiences overshadow genuine human connections. Through abstract visual elements, the image conveys the tension between escapism and existence, urging reflection on the consequences of our deepening reliance on artificial realities.

Promoting Soil Health through Sustainable Agricultural Practices: Protecting Earthworms from the Harmful Effects of Chemical Fertilizers

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Abstract: Earthworms, often referred to as "ecosystem engineers," play an indispensable role in maintaining soil health by enhancing its structure, nutrient cycling, and overall fertility. However, the growing global demand for food has led to the excessive use of chemical fertilizers, such as Urea, NPK, and DAP, which negatively impact soil biodiversity, particularly earthworms. This project explores the adverse effects of chemical fertilizers on soil health and the ecosystem services provided by earthworms. By raising awareness of the environmental risks associated with chemical inputs, the study advocates for a shift towards sustainable agricultural practices. It highlights the urgent need for farmers, policymakers, and researchers to adopt organic alternatives that preserve soil health, safeguard earthworm populations, and promote long-term agricultural productivity. The transition to organic and eco-friendly farming methods is not only essential for the sustainability of agriculture but also crucial for protecting the delicate balance of soil ecosystems.

A Survey based approach on ethnomedicinal remediation of kidney stone by the tribal population of Purulia district, West Bengal

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Abstract: Purulia is considered one of the most backward districts of West Bengal, has approximately 19.38% SC and 18.45% ST population and relies heavily on traditional knowledge for primary healthcare. The data was assembled through general interviews conversation with village elderly or quacks and others conversant with ethnobotanical use. These informants were either traditional healers themselves or had a family tradition of practicing healing practices and were familiar with the medicinal uses of plants. Since maximum members of the tribal community in the study zone had limited access to primary healthcare facilities, they trusted on quacks and elderly persons for primary healthcare. Direct interview, cluster discussion, and semi-structured interview were used to gather the ethnobotanical evidence. It was gathered that these tribes successfully treat urinary discomfort, low urine disease, and even urolithiasis or kidney stones using indigenous knowledge. The study describes the traditional usage of around 42 different plants from several families in various modes of application and formulations for the treatment of renal and stone-related disorders. The collected data were statistically evaluated using the formulas of use value (UV), informant consensus factor (ICF), and fidelity level (FL). A few plants, such as Basella alba, Abutilon indicum and Pterospermum acerifolium exhibit high ICF(0.76), FL(100%), and UV values(1.00). An in-depth considerate aspect of toxicology and pharmacology is needed, and yet there is an opportunity for new treatment regimes. More in-depth studies are essential with the use of plants to confirm their safety and efficacy.

Keyword: Traditional knowledge, urolithiasis, traditional medicine.

Zoonotic Disease

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Abstract: Zoonotic diseases are infections that spread from animals to humans, posing a significant threat to global health and economies. These diseases account for 60% of emerging infectious diseases (WHO, 2022) and include well-known examples such as COVID-19, rabies, avian influenza, and Lyme disease. Transmission occurs through direct contact, indirect contact, vectors (e.g., mosquitoes, fleas), contaminated food, and airborne particles.

Major zoonotic outbreaks, such as the COVID-19 pandemic and rabies epidemics, have demonstrated the devastating impact these diseases can have. Rabies, for instance, is nearly 100% fatal once symptoms appear but is entirely preventable through vaccination. Similarly, avian influenza and Ebola continue to pose global health challenges. The economic consequences are severe, leading to millions of deaths, healthcare burdens, livestock losses, and economic downturns due to lockdowns and trade restrictions.

To mitigate zoonotic risks, preventive measures must be taken at multiple levels. Individuals can protect themselves by practicing good hygiene, cooking meat properly, and avoiding direct contact with wild animals. Farmers and veterinarians play a crucial role in vaccinating livestock and controlling antibiotic overuse, while governments and scientists must focus on wildlife disease monitoring, research, and outbreak preparedness.

Addressing zoonotic diseases requires global cooperation between public health agencies, veterinary experts, and policymakers. By investing in preventive strategies, early detection systems, and public awareness, we can reduce the risk of future pandemics and safeguard both human and animal health.

Keywords: Zoonotic diseases, COVID-19, rabies, avian influenza, public health.

Diversity and Impact of Plant-Parasitic Nematodes on Banana Crop in India

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Abstract: Plant parasitic nematodes are a significant threat to banana cultivation worldwide, causing substantial yield losses and compromising crop health. These microscopic organisms primarily belong to three major nematode groups: Tylenchida, Dorylaimida, and Aphelenchida. Among these, members of the order Tylenchida are of particular concern due to their plant-parasitic nature, which makes them highly destructive to banana plants. Internationally, a total of 154 species of nematodes from 48 genera have been recorded in association with banana, with 73 species across 41 genera documented in India alone. This review provides an extensive checklist of 73 nematode species associated with banana cultivation, consisting of 31 species of Dorylaimida under 21 genera, 40 species of Tylenchida under 18 genera, and 2 species of Aphelenchida under 2 genera. Till date, a very few works have been done to assay the nature and amount of PPNs induced damage in banana crops. However, it been assessed that globally about 19.7% yield loss of banana crop occurs per year due to PPNs resulting a great monetary loss of about US $17.8 million. In India, the yield loss is about 15% and monetary loss is about Rs.9710.46 million. These nematodes have a profound ecological role in the soil ecosystem. Beyond being destructive plant pests, they contribute to essential soil processes such as nitrogen cycling and organic matter decomposition. This makes them integral to maintaining soil fertility and health. Additionally, plant-parasitic nematodes have the potential to serve as bio-indicators of soil condition, reflecting changes in soil health that are important for sustainable agricultural practices. Given their impact on banana yield and soil ecology, it is critical to adopt integrated pest management strategies that not only control nematode populations but also acknowledge their ecological roles. Further research is needed to improve understanding of nematode management and their potential benefits in maintaining soil health in banana plantations.

Keywords: Banana, diversity, plant-parasitc nematode, impact, India.

Google Page rank

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Abstract: The way Google displaying the pages upfront of our search query is not a mystery. It involves use of applied maths and some clever use of eigen vectors and eigen values. The page rank vector needs to be calculated that implies calculations for a stationary distribution Stochastic matrix. As links are added every day and the number of websites goes beyond billions, the modification of the web links structure in the web affects the page rank. So, search algorithm needs improvements day by day. Page rank runs a successful business and it is a right example of applied math and computer science used together. From the time it was introduces in 1998, Google's methods for delivering the most for delivering the most relevant result for our search queries has evolved in many ways. search queries have evolved in many ways. The page rank is not really a factor anymore in the way it was at beginning but it introduced the concept of finding the right answer the concept of finding the right answer for our query on Google.

Keyword: Eigen Vectors, Eigen Values, Page Rank, Stochastic Matrix, Websites

Self-Terminating Photorelease of Formaldehyde for the Synthesis of Fulvenes from Enynes after Triplet State Antiaromaticity Relief: An Ignored C1–C5 Cycloaromatization Reaction

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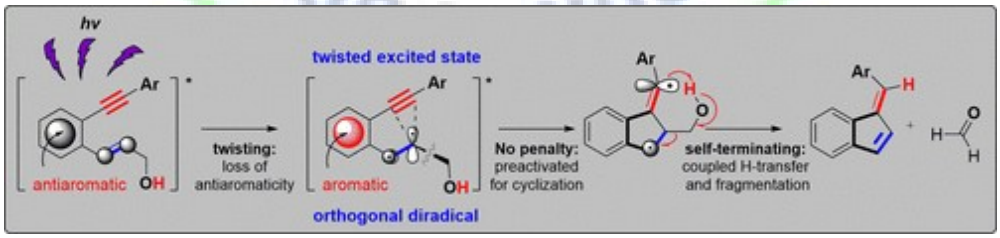
ABSTRACT: The final missing example of the four archetypical cycloaromatizations of enediynes and enynes was identified through the combination of a twisted alkene excited state with a novel self-terminating pathway for the intramolecular conversion of diradicals into closed-shell products. The photoexcitation of aromatic enynes to a twisted alkene triplet state establishes a distinctive stereoelectronic environment, facilitated by the alleviation of the excited state antiaromaticity of the benzene ring. This process enables the typically unfavorable 5-endo-trig cyclization and integrates it with 5-exo-dig closure. The 1,4-diradical product resulting from the C1-C5 cyclization undergoes internal hydrogen atom transfer, coupled with the fragmentation of an exocyclic C-C bond. This sequence efficiently yields benzofulvenes from enynes and extends the applicability of self-terminating aromatizing enyne cascades to photochemical reactions. A key characteristic of this self-terminating reaction is that, despite the involvement of radical species in the crucial cyclization step, no external radical sources or quenchers are required to produce the products. In these cascades, both radical centers are transiently formed and converted to closed-shell products via intramolecular hydrogen transfer and C-C bond fragmentation. Moreover, incorporating C-C bond cleavage into the photochemical self-terminating cyclizations of enynes introduces a novel approach for utilizing alkenes as alkyne equivalents in organic synthesis.



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