NATIONAL CONFERENCE

on

ENVIRONMENT, WATER, AGRICULTURE, SUSTAINABILITY AND HEALTH (EWASH-2023): STRATEGIZING A GREENER FUTURE

&

5th Annual Meet of STE

22nd - 23rd December, 2023

Protect the blue and green
Make the Earth pristine

Abstract Book & Souvenir

Jointly organized by

SWAMI RAMA HIMALAYAN UNIVERSITY
JOLLY GRANT, DEHRADUN, UTTARAKHAND

SAVE THE ENVIRONMENT
A Society for Research Awareness and Social Development

THE NATIONAL ACADEMY OF SCIENCES
PRAYAGRAJ, UTTAR PRADESH

D.A.V. (PG) COLLEGE
DEHRADUN, UTTARAKHAND


सर्वे भवन्तु सुखिनः
Save The Environment

NATIONAL CONFERENCE ON

ENVIRONMENT, WATER, AGRICULTURE, SUSTAINABILITY AND HEALTH (EWASH-2023): STRATEGIZING A GREENER FUTURE

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स्वामी राम हिमालयन विश्वविद्यालय

(उत्तराखण्ड अधिनियम सं0 12 वर्ष 2013 द्वारा स्थापित)

Swami Rama Himalayan University

(Est. vide Uttarakhand Act No. 12 of 2013)

Dr. Vijay Dhasmana
Chancellor

Date: 19th December, 2023

MESSAGE

Dear Esteemed Speakers, Delegates and Guests,

It gives me immense pleasure to welcome you all to the National Conference on "Environment, Water, Agriculture, Sustainability & Health (EWASH-2023): Strategizing A Greener Future" and the 5th Annual Meet of Save The Environment (STE) with the theme "Protect The Blue & Green, Make The Earth Pristine."

As you may be aware that this significant event is being organized jointly by Swami Rama Himalayan University (SRHU) Dehradun, Save The Environment (STE) Kolkata/Guru gram, DAV (PG) College Dehradun (Uttarakhand), and the National Academy of Sciences, India (NASI) Prayagraj (Uttar Pradesh).

I am confident that the event will be a unique opportunity for convergence of brilliant minds, dedicated professionals, and enthusiastic scholars who are committed to addressing the pressing challenges our planet faces. The conference will serve as a platform for the exchange of innovative ideas, cutting-edge research, and collaborative initiatives that aim to pave the way for a sustainable and healthier future.

The theme, "Protect the Blue & Green, Make the Earth Pristine," itself resonates deeply with the urgent need for collective action to preserve and nurture our environment. The discussions, presentations, and interactions during this event will undoubtedly contribute to the development of practical strategies that can be implemented to safeguard our natural resources and promote environmental sustainability.

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I extend my heartfelt congratulations to the organizers for their dedication and hard work in orchestrating this event. Their collaborative efforts have made EWASH-2023 a beacon of knowledge, innovation, and inspiration.

To all the participants, I encourage you to actively engage in the various sessions, share your expertise, and foster collaborations that will transcend the boundaries of disciplines and institutions. Together, let us strategize for a greener future, where the delicate balance between environment, water, agriculture, sustainability, and health is harmoniously maintained.

May this conference be a catalyst for positive change, and may the outcomes of the discussions propel us towards a world where the blue and green are protected, and the Earth remains pristine for generations to come.

Wishing you all a successful and enlightening experience at EWASH-2023.

(Dr. Vijay Dhasmana)

स्वामी राम नगर, जौली ग्रान्ट, देहरादून-248016, उत्तराखण्ड, भारत
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Swami Rama Himalayan University

(Est. vide Uttarakhand Act No. 12 of 2013)

डॉ. राजेन्द्र डोभाल, एफ.एन.ए.एस.सी.
कुलपति

Dr. Rajendra Dobhal, *FNASc*
Vice Chancellor

MESSAGE

Dear Participants, Distinguished Guests, and Esteemed Colleagues,

It is with great pleasure and enthusiasm that I extend my warmest welcome to you all for the "Environment, Water, Agriculture, Sustainability & Health (EWASH-2023): Strategizing A Greener Future" National Conference and the 5th Annual Meet of STE, hosted by Swami Ram Himalayan University in Jolly Grant, Dehradun.

As the Vice-Chancellor of Swami Ram Himalayan University, I am honored to witness the convergence of brilliant minds, researchers, academicians, and practitioners who are dedicated to exploring innovative solutions for the multifaceted challenges in environmental sustainability, water management, agriculture, and health. The theme, "Strategizing A Greener Future," underscores our collective responsibility to chart a course towards a more sustainable and resilient world.

Our planet faces unprecedented challenges, from climate change to the depletion of natural resources, and it is through forums like EWASH-2023 that we can collaboratively devise strategies to address these issues. The conference serves as a dynamic platform for knowledge exchange, fostering meaningful discussions that transcend disciplinary boundaries.

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This 5th Annual Meet of the STE, Gurugram/ Kolkata marks a milestone in our ongoing commitment to promoting science, technology, and engineering for the betterment of society. It is a testament to the dedication and excellence of our scientific community.

I encourage all participants to actively engage in the presentations, discussions, and workshops that will unfold during this event. Your insights and contributions are integral to the success of EWASH-2023, and I am confident that the ideas generated here will have a lasting impact on the fields of environmental science, water management, agriculture, sustainability, and health.

May this conference being organized jointly by Swami Rama Himalayan University (SRHU), Swami Ram Nagar, Jolly Grant, Dehradun, Save The Environment (STE), (A Society for Research Awareness & Social Development), Kolkata/ Gurugram, DAV(PG) College, Dehradun (Uttarakhand) & National Academy of Sciences, India (NASI), Prayagraj (Uttar Pradesh) inspire and empower us to work collectively towards a greener, healthier, and more sustainable future. I wish you all a stimulating and fruitful experience at EWASH-2023.

Warm regards,

(Dr. Rajendra Dobhal)

स्वामी राम नगर, जौली ग्रान्ट, देहरादून-248016, उत्तराखण्ड, भारत
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From:
Dr. S.K. Goyal
Chief Scientist & Head

सी.एस.आई.आर.- राष्ट्रीय पर्यावरण अभियांत्रिकी अनुसन्धान संस्थान
दिल्ली क्षेत्रीय केंद्र, ए – 93,94, फेज –1
नारायणा ओद्योगिक क्षेत्र, नई दिल्ली – **110 028,** भारत
मुख्यालय: नेहरू मार्ग, नागपुर – 440020, महाराष्ट्र

CSIR-National Environmental Engineering Research Institute, Delhi Zonal Centre, A-93/94, Phase-I, Naraina Industrial Area, **New Delhi – 110 028, India**
Headquarter: Nehru Marg, Nagpur - 440020, Maharashtra

MESSAGE

It is indeed a pleasure to know that "SAVE THE ENVIRONMENT", a Society for Research, Awareness and Social Development, Kolkata/Gurugram along with Swami Rama Himalayan University (SRHU), Dehradun is organizing two days National Conference on "Environment, Water, Agriculture, Sustainability and Health (EWASH-2023): Strategizing A Greener Future" during December 22-23, 2023 at SRHU, Dehradun to discuss and deliberate various challenges and technological solutions pertaining to environment, water, agriculture, sustainability and health to make human life easier, by fulfilling their aspirations, within the resources available in the country/planet.

With continuous increase in population, Worldwide and in India as well, the pace of development required to meet the needs and aspirations of people has put tremendous pressure on the natural resources and in-turn on the mother Earth. Current World population is about 8.0 billion, wherein nearly 1.42 billion (17.7%) people reside in India. As we all know that all the resources shall remain limited in the universe and cannot be enhanced, the only possible way is to continuously evolve new technologies/ processes that use lesser resources and generate more products to meet the continuously increasing requirements, while minimizing/eliminating the wastes generation. Even the minimal wastes generated need to be managed within safe limits, as these will become resources for future generations. The mantra of sustainable development has been given by the Hon'ble Prime Minister of India, Shri Narendra Modi ji at UN Climate Change Conference (UNFCCC, COP 2021) by defining the word "LiFE as Lifestyle For Environment".

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I am sure with the participation and deliberations by various stakeholders including the subject experts, academicians, researchers, students and policy makers in the conference will help positively in addressing the national as well as global challenges.

I congratulate the Organizers and wish the Conference a Grand Success.

(S.K. Goyal)

11.12.2023

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SAVE THE ENVIRONMENT
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MESSAGE

Dr Arunabha Majumder

Every living being on this earth is connected to the surrounding nature and environment. According to *VEDAS,* our ecosystem is the very basis on which life is sprouted. It has paid to obey the every aspects of the environment. Our tradition also teaches us that life consists of five elements – earth, air, water, fire and space. Accordingly our lifestyle must be consistent with the environment. Everyone on this earth shall live a life that is in tune with earth and does not harm it.

On the occasion of 5th Annual Meet of Save The Environment, a National Conference on Environment, Water, Agriculture, Sustainability and Health is scheduled to be held on 22nd and 23rd December 2023 at Swami Rama Himalayan Hill University, Jolly Grant, Dehradun. The conference will deliberate on various issues and challenges of climate change and its impact, environmental degradation and risk, environmental impact on agriculture, water conservation and management, environmental health related problems, environmental management action plan etc. The conference will also address environment and sustainable development.

In the above context we must thank and appreciate the initiative taken by Swami Rama Himalayan Hill University and Save The Environment for jointly organizing the National Conference.

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MESSAGE

It is a matter of absolute honor and enthusiasm to welcome you all to The National Conference on Environment, Water, Agriculture, Sustainability & Health (EWASH-2023): Strategizing A Greener Future and the 5th Annual Meet of Save the Environment, organized jointly by Swami Rama Himalayan University (SRHU), Dehradun; Save The Environment (STE), Kolkata| Gurugram; DAV(PG) College, Dehradun and the National Academy of Sciences, India (NASI), Prayagraj (UP) to be held from 22nd- 23rd December, 2023 at SRHU, Jolly Grant, Uttarakhand.

A synchronized approach taking multidisciplinary aspects forms the core of adaptation to climate change and serves as a crucial link between climate systems, human society, and the environment. Addressing concerns and potential measures to create a resilient protocol for environment and water management is the crucial need of the hour. Sustainable solutions and appropriate guidelines to improve human health is the key to an accentuated society.

Also, we have to devise strategies for building a stable ecosystem. This shall include reducing pollution, implementing sustainable land use and agricultural practices, ensuring water reuse and recycling programs, etc. By engaging stakeholders from different sectors, we can develop effective economic and social policies to promote sustainability.

EWASH - 2023 will bring together eminent academic and research stalwarts to harbor all the aforesaid topics. Several Keynote, Plenary, Invited and research talks will be hosted that will certainly benefit contemporary researchers, industry personnel,

engineers and policymakers to put forward invaluable suggestions for environment, water and health protection.I am thankful to **Dr. Rajendra Dobhal** , Vice Chancellor, Swami Rama Himalayan University, Jolly Grant; *Patrons* of EWASH-2023 **Prof. Arunabha Majumder**, Emeritus Professor, Jadavpur University, Kolkata & Former Director, AIIHPH, Kolkata and **Dr. Vijay Dhasmana**, Chancellor, Swami Rama Himalayan University, Jolly Grant, Dehradun; Convener **Dr. Sanjay Gupta**, Principal, Himalayan School of Biosciences, Swami Rama Himalayan University, Jolly Grant, Dehradun; Co-conveners **Mrs. Chhanda Basu** , General Secretary, STE and **Mr. Sanjit Mitra**, Treasurer STE; Co-ordinator **Prof. Prashant Singh**, Dept. of Chemistry, D.A.V. Post Graduate College Dehradun, Dehradun, Uttarakhand and Vice President, Save The Environment, Uttarakhand Chapter and the entire organising committee for their whole hearted and dedicated commitment in organizing the conference. Wish EWASH-2023 a grand success!!

(Dr. Kshipra Misra)
President, Save The Environment (STE), NGO, Kolkata
www.stenvironment.org;
Former Additional Director & Head
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School of Chemical Technology
Kalinga Institute of Industrial Technology (KIIT)
Deemed to be University U/S 3 of UGC Act, 1956

It is with utmost pleasure that I convey my sincerest and most fervent wishes for the success of the forthcoming conference, EWASH-2023. I hold a strong belief that this gathering will serve as a pivotal platform, fostering essential dialogues aimed at comprehending the intricate interplay between our environment and society. Moreover, I anticipate that it will act as a catalyst for global collaboration in safeguarding our environment and cultivating avenues for sustainability, thereby contributing to the enhancement of overall societal well-being.

The primary objective of this event is to convene distinguished experts across diverse domains, fostering discussions on entrenched environmental issues. Through the exchange of insights and ideas, we aim to deliberate upon prospective and sustainable strategies to address environmental challenges at local, national, and international levels. Furthermore, I am deeply convinced that this conference will offer a premier interdisciplinary forum for researchers, practitioners, and educators to showcase and deliberate upon the latest advancements in sustainable technology. It is my ardent hope that such scholarly congregations become regular occurrences, ensuring the continual dissemination of knowledge from experts to students and policymakers.

I extend my heartfelt commendation and profound gratitude to the esteemed leadership of "Swami R ama Himalayan University" and "Save the Environment", as well as to all the diligent members of the organizing committee, for their unwavering dedication in materializing this conference. I am confident that the participants will glean substantial benefits from the deliberations, and I reiterate my sincere aspirations for the resounding success of this conference.

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SAVE THE ENVIRONMENT (STE) was founded and registered on 19th November 1990. In 1992 with the collaboration of WWF (India), the organization started working to combat arsenic poisoning problem of water in the arsenic prone areas of West Bengal. Since then STE has been involved in various projects related to combat arsenic problem in India.

Our Vision
To protect present and future generations from various environmental hazards.

Our Mission
To create awareness and motivation among rural communities & provide cost effective, energy efficient & environment friendly technologies.

Our Activities
Conducting interactive sessions, workshops/ seminars, awareness programs, field operations through projects, science fairs, posters & quiz competitions.

Please join us and become part of our family
by enrolling yourself as Life Member of STE Family

Mail us at
info@stenvironment.org
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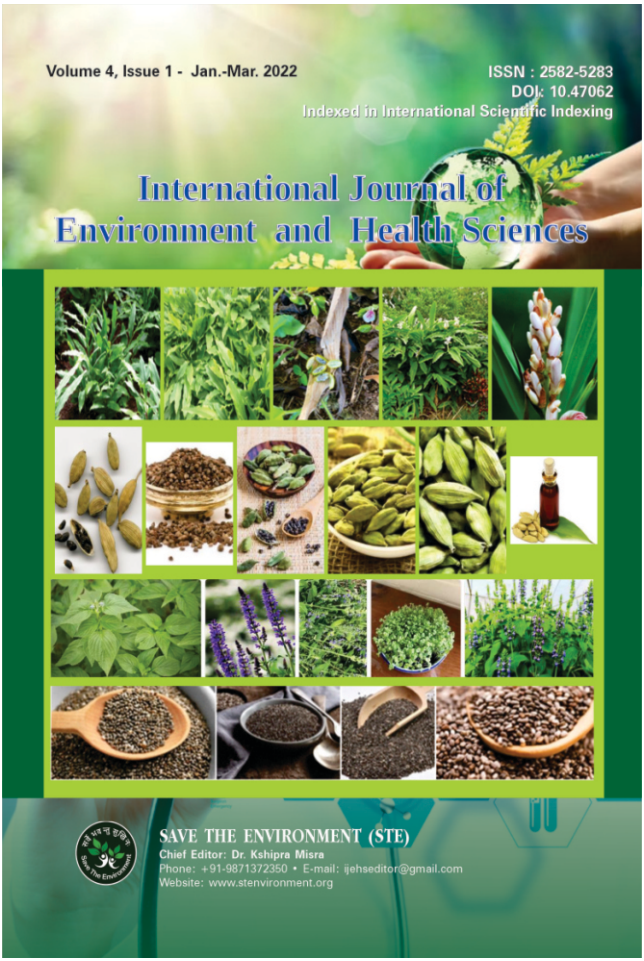
Know about us at
www.stenvironment.org

ARTICLES ARE INVITED FOR THE
INTERNATIONAL JOURNAL OF ENVIRONMENT AND HEALTH SCIENCES

This journal is being published by Save the Environment. Send your manuscripts for peer-review by e-mail. The authors must mention address, Contact Nos. and E-MAIL ID in their forwarding letter. Proof will be sent for correction before publishing. A pledge for originality will be signed by the authors.

We are pleased to announce that the DOI prefix for International Journal of Environment and Health Sciences is now available from Crossref, the official Digital Object Identifier (DOI). **The journal is now indexed in International Scientific Indexing (ISI).**



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keynote speaker

Pollution Control and Environment Conservation

Dr. Arunabha Majumder

Jadavpur University, Kolkata

ABSTRACT

Biotic or abiotic changes may lead to environmental degradation causing pollution. The multifaceted role of today's environmental management system heavily demands greater understanding of the functioning of living and non-living systems which are dependent on environment. Any degradation of environment will have impact on the living systems. The declining of forest cover significantly reduces forest ecosystem services, impacting environmental health and community well-being. Changes in biodiversity and loss of biological resources are continuing to disrupt the ecosystem. Global warming and climate change is showing significant impact on water resources and agriculture. Already estimated loss and damages of poor and marginalized population are huge. Natural living system supply humanity with an array of indispensible and irreplaceable services that support our life on earth. Living system also provides functional services, such as, maintenance of appropriate mix of atmospheric gases, preservation of soils, restoration of systems following disturbances, control of pests, cycling of nutrients and pollination of crops. Technological advancement no doubt, has bettered human life but it sharply intensified pollution of environment and poses severe threat to future generation. Common environmental health problem may arise from pollution of air, water, soil and noise; chemical poisoning, risk of contamination through food chain etc. The air quality in urban areas is deteriorating at a faster rate. In winter, highly polluted air is causing deleterious effect on human health and as a result urban population are suffering from acute respiratory infections, breathing trouble, asthma, eye irritation, headache etc. The causes of air pollution are mainly vehicle emission, construction and demolition activities, industrial emission and open burning. Today, water pollution is a great concern for the country. Water sources are getting polluted due to discharge of untreated or partially treated waste water from urban areas and industries, surface run-off from agricultural land carrying pesticides, insecticides and excess fertilizers, mixing of cattle dung and cattle-shed wastes, uncontrolled disposal of solid waste and dead bodies. Uncontrolled open disposal of municipal solid waste is causing air and water pollution, soil pollution, odour nuisance etc. Adverse health impacts from uncontrolled disposal of industrial toxic and hazardous wastes are resulting in human sufferings, land degradation and local environmental disorders.

In order to protect the environment from degradation following issues are to be addressed:
• Protection and conservation of natural resources • Afforestation • Minimization of air pollutants • Water conservation • Water supply and management • Solid waste management • Waste water treatment and management • Resource recovery from waste, recycle and reuse • Energy efficiency in environmental management • Generation and use of non-conventional energy • Emphasis on the use of green technology • Effective control of pollution • Ecologically balanced waste management • Protection and conservation of bio-diversity

Invited Speaker

Potent Carcinogen Dioxin, due to Air Pollution, is a Major Threat for High Cancer Risk in the Country

Dr. Ajay Gupta

Department of Applied Sciences, Himalayan Institute of Engineering & Technology, Kala Amb, Dist. Sirmaur, Himachal Pradesh, India

ABSTRACT

Strong evidences have emerged that food and environment are major causes of cancer in human population. Dioxins emitted from various industrial processes and diesel combustion are proven human carcinogen, as per US-EPA and ICRA. A case study of Dioxin released from auto-rickshaws, crude diesel generators, municipal waste burning and industrial combustion was done in district Yamunanagar (having one million human population) of Haryana state in India. There is a regular incomplete combustion of 69,131,000 liters of diesel, annually, by auto-rickshaws and unapproved crude diesel generators used by the public and 15,330 MT of solid waste burning every year, releasing total Dioxins emission more than 370 MT in the environment. Dioxins are such dangerous carcinogen that 0.1ug / L of air causes 10 cancer cases. What is more important that while smoke released by industries is released above 30 feet but the smoke containing Dioxin released by auto-rickshaws, unapproved diesel generators and municipal waste burning in open remains at lowest strata up to 10 feet where human population breaths more, thus inhaling even higher doses of Dioxin per day. Out of approximately 400 cancer cases in the district, 209 cases are estimated to be due to Dioxins alone ! This district model of Dioxin related carcinogenesis should be well extended to other cities of the state like Ambala, Kurukshetra, Panipat, Sonipat, Kaithal, Rohtak. Other cities viz. Varanasi, Lucknow, Ghaziabad, NOIDA, Bhopal, Agra, Kanpur, Puri, Dehradun etc. important either due to tourism, district headquarters, mandis etc., where there are huge fleet of such polluting autos and stockpiles of unapproved gensets. The policy makers and pollution law enforcing agencies need to swing into action for absolute curb on emission of dreaded Dioxins in the environment. They need to realize that they also breath the same Dioxin contaminated air that their fellow countrymen breath and Dioxin does recognizes the rich or poor; powerful or weak; very important person (VIP) or common man.

Keywords: Dioxins, Cancer, Diesel, Auto-rickshaw, Municipal wastes.

To decipher the phytochemical agent and mechanism for Urginea indica mediated green synthesis of Ag nanoparticles and investigation of its antibacterial activity against Methicillin-Resistant Staphylococcus aureus

Bhumika Jena[a], Swati Sucharita Singh[a], Susanta Kumar Behera[a, b], Smrutirekha Mishra[c], Sankha Chakrabortty[c], Dayanidhi Meher[d], Bansidhar Mulia[d], Suraj K. Tripathy[c], Ramesh Kumar[e], Byong-Hun Jeon[e]*, Cecilia Stålsby Lundborg[f] and Amrita Mishra[a]*

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ABSTRACT

Globally, Methicillin-Resistant *Staphylococcus aureus* bacteraemia is one of the commonest bloodstream infections associated with clinical complications and high mortality. Thence, devising effective and targeted biogenic silver based strategies are in great demand. However, limited insights regarding the biosynthesis methodologies impedes the possible scale up and commercial potentials. We, hereby demonstrate the biosynthesis of Ag nanoparticles using the phytochemical agent extracted and purified from bulb extract of *Urginea indica*. The chemical structure of the phytochemical agent is investigated by various chromatographic and spectroscopic techniques and was found closely relatable to N-ethylacetamide. Ag nanoparticles synthesis by this agent was found to have a strong Surface Plasmon band at 402 nm. X-ray diffraction and transmission electron microscopy further validated the formation of Ag nanoparticles with face-centred cubic structure with a size range of 20 to 30 nm. The biogenic metal nanoparticles have shown potential antibacterial activity against *S. aureus* and MRSA (within a range of 10 to 50 µg/mL). The nanoparticles have also shown promising anti-biofim activity against the above mentioned strains.The nanoparticles were expected to induce ROS mediated bactericidal mechamism. Cell viability and *in-vitro* infection studies advocate noticable biocompatibility and future clinical potential of the developed nanoparticles against *Staphylococcus* infections.

Keywords: Antibacterial; Biofilm; Green synthesis; Nanoparticles; Silver.

Reverse Pharmacology of Natural-Based Medicine: A New Frontier in Medicine

Bushra Parveen*

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ABSTRACT

In recent years, there has been a growing interest in natural-based medicine as a therapeutic alternative to conventional pharmaceuticals. This has led to the emergence of a new field of study known as reverse pharmacology, which focuses on identifying and understanding the active compounds in natural substances and their potential therapeutic effects. Reverse pharmacology is a relatively new approach to drug discovery that involves starting with a natural substance and working backwards to identify its active compounds and potential therapeutic effects. This is in contrast to traditional pharmacology, which typically starts with a specific disease or condition and then searches for compounds that can treat it. Many traditional medicines have been used for centuries to treat various ailments, and ethnopharmacology aims to understand the mechanisms behind their effectiveness. By studying the traditional uses of natural substances, researchers can identify potential therapeutic compounds and their targets. While reverse pharmacology shows promise, there are also challenges and limitations to consider. One of the main challenges is the lack of standardization and regulation in the production of natural-based medicines. This can lead to variations in the potency and effectiveness of these substances, making it difficult to replicate results in clinical trials. However, further research and collaboration are needed to fully realize the potential of this new frontier in medicine.

Keywords: Reverse Pharmacology, Traditional Medicines, Medicinal Plants, Clinical Trials..

Phycoremediation of Arsenic [As(III)] Using Novel *Chlorella Pyrenoidosa* 2378: A Viable Technology for Heavy Metal Remediation

Dr. Gaurav Saxena

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ABSTRACT

Industrial effluents with high concentrations of potentially toxic heavy metals (HMs) pose a threat to water resources worldwide. Therefore, it is critically important to eliminate HMs from contaminated waterways to protect both the environment and human health as they are known to be potentially dangerous contaminants that pose ecotoxicity and health concerns to living things. A novel microalgae strain, *Chlorella pyrenoidosa* 2378, was used in this study to phycoremediate a potentially harmful heavy metal (HM), arsenic [(AsIII)] from water samples. Batch experiments were carried out to assess removal efficiencies in BG-11 medium containing As(III) at concentrations of 200 mg/L under various operating parameters, including initial pH, inoculum size, contact time, and As(III) concentration. *Chlorella pyrenoidosa* 2378 was discovered to remove 65.14% of As(III) from the water sample during the experiment, and this result was verified using an inductively coupled plasma-optical emission spectrophotometer (ICP-OES). However, the energy dispersive spectroscopy (EDS), which revealed the presence of As(III) in microalgae biomass during phycoremediation, was used to demonstrate the capacity of *Chlorella pyrenoidosa* 2378 to biosorb HM. In addition, the Fourier transform infrared (FTIR) spectroscopy analysis of the treated biomass of microalgae revealed the presence of numerous functional groups observed at various peaks in the absorption spectra taken, including hydroxyl (−OH), amino (−NH_2), sulfhydryl (−SH), phosphate $(PO_4)^{3-}$, and sulphonic acid (R−S(=O)$_2$−OH) in the treated microalgae biomass, indicating that they might be used as adsorption sites at the cell surfaces of novel *Chlorella pyrenoidosa* 2378. The treated biomass of microalgae was morphologically characterized using field emission-scanning electron microscopy (FE-SEM), which revealed an ellipsoidal shape and rough, deformed cell surfaces as opposed to the control, which displayed a normal round shape of microalgal strain. After As(III) removal, there was a considerable rise in photosynthetic pigments such as Chl a, Chl b, carotenoids, and total Chl in the microalgae biomass, indicating the capacity of microalgae to withstand HM stress and its survival. Overall, this study showed that *C. pyrenoidosa* 2378 can be used to treat heavy metal-contaminated water and wastewater, including the possibility of *in-situ* phytoremediation without any secondary pollution but with the commercial viability of the application, which is urgently required to protect the environment and the general public's health.

Keywords: Microalgae, Heavy Metal, Arsenic, Pollution, Ecotoxicity, Phycoremediation, Environmental safety

Pesticide Predicament: Exploring Environmental and Health Impacts, and Eco-Friendly Solutions Through Bioremediation

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ABSTRACT

Pesticides play a pivotal role in modern agriculture, yet their widespread use has raised significant concerns about their adverse effects on the environment and human health. This study delves into the current status of pesticide impacts, examining their repercussions on ecosystems, water sources, and the broader environment. Additionally, the potential health risks associated with pesticide exposure in humans are explored. In response to these challenges, the abstract highlights the emergence of eco-friendly management strategies, with a particular focus on bioremediation. Bioremediation, as a sustainable and nature-based approach, harnesses the power of microorganisms and plants to detoxify and degrade pesticides. The abstract emphasizes the promise of bioremediation as an effective means of mitigating pesticide pollution and fostering environmental restoration. This study encompasses the multifaceted dimensions of pesticide use, recognizing the urgency of adopting environmentally responsible practices. As society grapples with the repercussions of conventional pesticide use, the exploration of eco-friendly alternatives, especially through bioremediation, offers a ray of hope for a sustainable and harmonious coexistence with nature.

Keywords: Pesticides, Environmental Impact, Human Health, Eco-Friendly Management, Bioremediation, Sustainable Agriculture.

e-Role of Biochar Systems in the Circular Economy

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ABSTRACT

The concept of a circular economy has gained prominence as a sustainable model for resource utilization and waste management. Biochar, a carbon-rich material derived from the pyrolysis of organic biomass, emerges as a promising component in this paradigm, offering multifaceted benefits in waste valorisation and environmental stewardship. This paper examines the pivotal role of biochar within the circular economy framework, focusing on its potential as a transformative agent in converting organic waste streams into valuable resources such as energy, biocatalysts, and adsorbents, and returning it to nature when put into the soil. Biochar production involves the thermal decomposition of biomass under controlled conditions, yielding a stable carbonaceous material rich in porous structures. This versatile substance serves as a potent soil amendment, enhancing soil fertility, moisture retention, and carbon sequestration. Moreover, biochar demonstrates exceptional adsorption properties, capable of trapping pollutants, mitigating greenhouse gas emissions, and purifying air and water resources. In the circular economy context, biochar acts as a key enabler by valorising and pyrolyzing various organic residues and waste streams. By utilizing agricultural residues, forestry by-products, and organic waste materials as feedstock for biochar production, this approach not only diverts organic waste from landfills but also generates a valuable resource with diverse applications across agriculture, environmental remediation, and renewable energy.

The integration of biochar into agricultural practices enhances soil health, increases crop productivity, and promotes carbon sequestration, thereby fostering a regenerative loop within the food production system. Additionally, biochar's potential extends beyond soil amendment; it serves as a renewable energy source through bioenergy production and aids in the remediation of contaminated lands, contributing to ecosystem restoration. This paper emphasizes the need for policy support, technological innovation, and cross-sectoral collaboration to scale up biochar utilization within the circular economy. Furthermore, addressing challenges related to standardization, market development, and life cycle assessments is crucial to realizing the full potential of biochar in fostering a circular, sustainable, and regenerative economy. In conclusion, biochar stands as a cornerstone in the transition towards a circular economy, offering a versatile and sustainable solution for converting organic waste into a valuable resource while promoting environmental resilience and resource efficiency.

Keywords: Circular Economy, Biochar, Soil applications, CO2 sequestration, Biomass pyrolysis/valorisation.

Sustainable Solutions: Bridging Health and Environment through Traditional Medicine Repurposing and Biofuel Adoption

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ABSTRACT

The synergistic potential of repurposing traditional medicines for modern therapeutics and adopting biofuels as an environmentally friendly strategy. Traditional medicines, deeply rooted in cultural practices, offer a vast repository of natural compounds with therapeutic properties. By repurposing and reimagining these age-old remedies, we can tap into a wealth of knowledge to address contemporary health challenges. Simultaneously, the adoption of biofuels as an eco-friendly strategy responds to urgent environmental concerns. Derived from renewable biological sources, biofuels present a cleaner and sustainable alternative to traditional fossil fuels. This duality of repurposing traditional medicines for therapeutic innovation and embracing biofuels for environmental sustainability creates a holistic approach to global challenges. The interconnectedness of human health and the environment is emphasized, promoting a comprehensive strategy that addresses both medical needs and environmental stewardship. This abstract advocates for a multidimensional approach where traditional wisdom contributes to modern healthcare, while environmentally friendly practices, such as biofuel adoption, pave the way for a greener and healthier future.

Keywords: Traditional medicine, Therapeutic innovation, Biofuels, Environmental sustainability, Global health, Interconnected strategies.

Understanding the Function of Graphene in the Catalytic Reduction of p-Nitrophenol using CuO/TiO_2/ZnO NPs Anchored Hydrogen Exfoliated Graphene

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ABSTRACT

This current abstract focuses on the sonochemical in situ synthesis of a novel functional catalyst by utilising hydrogen exfoliated graphene (HEG) supported titanium dioxide (TiO2) and copper sulphate (CuSO4) doped with zinc oxide (ZnO). This synthesis is abbreviated as Ti/Cu/Zn-HEG. Through the use of XRD, SEM-EDX, TEM, XPS, FTIR, and BET techniques, the synthesis of the Ti/Cu/Zn-HEG nanocomposite (NCs) catalyst was validated. This was accomplished through the characterization of the catalyst. In an aqueous solution, it was evaluated for its ability to catalyse the conversion of a model aromatic compound known as para-nitrophenol (p-NP). A nitroaromatic compound, the p-NP is both toxic and mutagenic in its effects on living organisms. For the sake of protecting both the environment and living beings, it is imperative that it be removed from the water system. The recently synthesised Ti/Cu/Zn-HEG nanocrystals were utilised as a potential candidate for reducing p-NP in practice due to their increased stability and catalytic activity. In order to achieve the maximum reduction of p-NP up to 98.4% at its normal pH of 7.1, the operating parameters, including p-NP concentration, catalyst dosage, and operating time, were optimised for 150 ppm, 400 ppm, and 10 minutes using response surface methodology (RSM) in Design-Expert software. This was done in comparison to the controls, which included HEG, Ti/Cu-HEG, and Zn-HEG. The analysis of variance of the response indicated that the regression equation was significant for the process, and that it had a significant influence on the concentration of the catalyst and the amount of time it was in operation. As evidenced by the model's low relative error (RE < 0.10), high regression coefficient (R2 > 0.97), and substantial Willmott d-index (dwill-index > 0.95) values, the model's prediction data (derived from RSM) and experimental data were found to be in good agreement with one another.

Keywords: Para-Nitrophenol Reduction; Graphene Based Catalyst; HEG; Optimizations.

Water quality of various water resources in the cold desert high-altitude region of Ladakh, India

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ABSTRACT

Water is essential for all the basic physiological functions of the body. Ground and surface water availability is limited in high-altitude regions, including the Leh-Ladakh region of India. The physico-chemical characteristics and availability of essential mineral nutrients and heavy metals in water resources have an enormous impact on the health of growing plants, humans, and animals. Therefore, evaluation of water quality is extremely important for sustaining agriculture and animal husbandry practices, along with maintaining human health. Therefore, the present lecture is a review of high-altitude water quality and several study reports of our group on physic-chemical parameters, various essential minerals, and heavy metals in the ground (hand pump), irrigation, pond, and river water of Ladakh, India. The findings revealed that most of the essential minerals and heavy metal levels in hand pump water were within the drinkable limit, whereas hand pump, pond, irrigation, and river water from some sites or places were higher in Ca, Mn, Zn, As, Cd, Fe, and Pb than the permissible limit of drinking water. Therefore, these water resources, if used for extended periods without water treatment, may pose health-related issues to humans and animals from these elements. So, regular study is required to monitor the water quality of various water resources in high-altitude regions for the development of specific mitigation strategies for water management for drinking and other purposes.

Keywords: Essential minerals, Heavy metals, High-altitude, Indus River, Water quality.

ABSTRACT
ORAL PARTICIPANTS

Oral Presentation-1

Hyptis suaveolens essential oil nano-gel for enhanced medicinal and regenerative medicine

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ABSTRACT

Prolonged inflammation of the tissue can hinder its ability to repair and slow down the healing process. Essential oils that are extracted from medicinal herbs may be able to help injured wounds heal, regenerate, and mend. Even though a wide range of essential oils from medicinal plants, whether extracted with an aqueous or organic solvent, have a lot of biological uses, their effectiveness is restricted because of uneven dispersion, a sluggish rate of sorption, and activity loss. Thus, many polymeric gel delivery systems have been studied to improve entrapment effectiveness and controlled release of essential oil; nevertheless, their high cost restricts their utility. Here, we maximize the effectiveness, stability, and controlled release of herbal essential oils for 6 to 8 hours by optimizing the encapsulation efficiency up to 90% on a bio-polymeric hydrogel matrix. Because of the notable effects of the essential oil's incorporation into the polymeric matrix, the in vitro experiments demonstrate the possible anti-inflammatory, anti-oxidative, and anti-microbial action (against E. Coli, S. aureus, and Candida) at extremely low levels. As a result, we can conclude that the hydrogel matrix that was created will be a useful bioengineered matrix that will enhance the therapeutic action of essential oil without causing a significant loss during natural recovery.

Keywords: Anti-inflammatory, Essential oil, Remedial, Healing, Entrapment.

Poster Presentation-2

Development and evaluation of hepatoprotective medicinal plant Terminalia arjuna: Review

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ABSTRACT

Liver ailments are a global problem, and traditional medical therapies are ineffective. Consequently, ensuring a functioning liver is crucial for entire well-being and health. Liver disorders may occur compared a wide range of causes including viral illnesses, autoimmune problem, misuse of alcohol and overdoses of drug. *Terminalia arjuna* (Roxb.) family Combretaceae commonly known as Arjuna is an evergreen large deciduous tree, height up to 60 to 70 feet. and abundantly grows on river banks, Bangladesh, Madhya Pradesh, India. This plant contain tannin, saponins, flavonoid, phytosterol, calcium and magnesium salts along with colouring matter etc. Traditionally used in the treatment of various diseases like cardiac failure, cirrhosis of the liver, hypocholesterolaemia, inflammation and is helpful to lower blood pressure and may boost up the aerobic exercise capacity etc. In ancient time traditional systems of medicine that are practiced in India. It deals with the health of the person and cures diseases and most beneficial in indigenous system of medicine. The aim of study reveals its expertise with Arjuna plants including Qualitative and quantitative phytochemical characterization and biological investigation. Now a days individuals are extremely aware of their health and as an outcome, everyone interested in using plant-based medicines etc., to maintain their lifestyles active and to cure various ailments. Since Ayurvedic and pharmaceutical products rapidly grow and abundant supply in the market. The current overview highlights morphological features, geographic distribution, and uses along with their scientific investigation on the medicinal plants such as PubMed, Science direct, Elsevier etc the pharmacological evaluation like macroscopic, microscopic, Initial phytochemical testing, Physical evaluation, phytochemical investigation and their biological screening. The efficacy of Terminalia arjuna has been proved by their scientific evaluation of many bioactive ingredients like glycoside, flavonoid, tannin and minerals and their cardioprotective, anti-inflammatory, cirrhosis of liver etc. Further studies are also required to isolate and characterize, functional groups of pharmacologically active compounds by which they exhibit various therapeutic actions. Various phytoconstituents along with its cardiotonic, liver, anti-inflammatory diseases scientifically reviewed their effectiveness. To identify and characterize the functional groups with their pharmacological activity which allow products to exhibit a variety of beneficial properties, more research is expected.

Keywords: *Terminalia arjuna*, Hepatoprotective, Pharmacognostic, Evaluation, Traditional uses

Oral Presentation-3

Biochar derived from rice husk and bentonite for efficient removal of malachite green and its characterisation

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ABSTRACT

In contaminated water, highly soluble malachite green may be carcinogenic. The goal of the current study is to remove and analyse the efficiency of biochar derived from rice husks of malachite green from wastewater. Native biochar made from rice husk was successfully converted into modified biochar using the base modification process. Rice husk samples have been pyrolysed. The Rice husk samples were milled and sieved before Fourier transformed infrared spectroscopy (FTIR) and BET for proximate and ultimate analyses. It has exhibited greater than 90% removal efficiency of malachite green and is expected to be used as potential adsorbent for malachite green remediation from industrial wastewater .As a result, we can conclude that the compressed matrix of biochar derived from rice husk and bentonite that was created in column filter showed the significant removal of malachite green dye.

Keywords: Rice husk, Biochar, Wastewater, Biofilter.

Poster Presentation-4

The advancement technologies used in the field of water conservation: Artificial Intelligence Approach

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ABSTRACT

The escalating global water crisis demands innovative approaches, and the integration of Artificial Intelligence (AI) emerges as a transformative force in shaping effective water conservation strategies. This poster presentation endeavours to elucidate the multifaceted contributions of AI in revolutionizing water resource management, exploring how advanced technologies are reshaping traditional practices. Furthermore, the poster delves into the predictive capabilities of AI in forecasting water demand patterns. By analysing historical data and considering various factors influencing water consumption, AI models aid in anticipating future requirements, allowing authorities to implement proactive measures for efficient water distribution. Real-world applications of AI in watershed management and ecosystem monitoring are explored, demonstrating its ability to adaptively respond to dynamic environmental conditions. By leveraging AI-powered tools, stakeholders gain valuable insights into ecosystems' health, fostering sustainable practices that preserve biodiversity and maintain ecological balance. The presentation underscores the collaborative nature of AI and human expertise, emphasizing the need for interdisciplinary collaboration in developing and deploying AI solutions for water conservation. The showcased research and applications collectively highlight AI's pivotal role in mitigating water scarcity challenges, presenting a compelling argument for the integration of AI technologies in contemporary water resource management practices. As we stand at the intersection of technology and environmental stewardship, this presentation invites attendees to engage in a discourse on harnessing AI's potential to secure a water-sustainable future.

Keywords: Artificial Intelligence, Innovative Approaches, Reshaping Traditional Practices, Ecosystems' Health, Environmental Stewardship.

Oral Presentation-5

Climate Change: A Major Issue of Uttarakhand

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ABSTRACT

Climate change is a crisis for both humanity and biodiversity. The evidence clearly shows that the cause of this change is the emission of greenhouse gases like carbon dioxide into the earth's atmosphere as a direct result of human activities, which include burning fuels for energy, transport and clearing forests and other ecosystems. Forests are one of the most important resources of Uttarakhand which have a direct role in supporting rural livelihoods in the state. Not only do forests meet people's day to day needs for fuel, fodder and timber but they also provide ecosystem services to people living downstream. Uttarakhand supports more than 65% of forest area and are home of a diverse floral and faunal species. The Uttarakhand Himalayans range forests distributed from sub-tropical to alpine zones, evergreen forests dominate the Central Himalayan zone with certain patches of deciduous forest. Due to rise in global temperature, there is a risk of extinction of many species of flora and fauna. Possible impacts of climate change on forest influences seasonal and climatic change, upward shift of lowland species, change in nutrient dynamics, invasion of alien species, changes in forest soil, seed bank and frequency and intensity of occurrence of forest fire. As per report of Remote Sensing, forest fire in Uttarakhand hills of Kumau and Garhwal regions events have increased from 922 in 2002 to 41,600 in 2019 and still rising. With the changing climate lengthening of fire season, increase in frequency and severity of forest fires in fire prone areas are expected. Climate induced droughts, and an apparent reduction in late spring/ pre monsoon rainfall have aggravated the fire events in the region. Pines are considered as the 'dangerous beauty'. This specie is very prone to fire. A large indigenous population are dependent on the forest like Jaunsari tribe, Tharu tribe, Raji tribe, Buksa tribe and Bhotiyas tribe. As per Uttarakhand center on climate change, and state action plan for climate change reports indicates that overall, less and more erratic rainfall, increasing temperature, increased frequency of intense rainfall events, less winter rain, overall decreased water availability warmer and shorter winters etc. has affected the various community's livelihood and their lifestyle. Various tribes living in distinct areas their distinct mode of living. But under the stress of climatic changes, they are forced to abandon the historical roots leading them to adjustment and dissatisfaction. There are few areas like Dehradun, Nainital, Haldwani, Haridwar which enjoy modern facilities but there is a demarcate lifestyle between the people of plains and hilly terrains and when such people are forced to plains. It is working constantly towards the sustainable development goals by achieving is targeted goals. As per reports of 2020-21 of Sustainable Development Goals, Uttarakhand was ranked 4th by NITI Aayog. It have large forest resources which needs to be preserved and conservation of forest, it's flora and fauna, biodiversity and also the communities of certain areas is needed to be taking care of.

Keywords: Climatic Changes, NITI Aayog, Nutrient Dynamics, Indigenous Culture.

Oral Presentation-6

Antimicrobial resistance: analysis of the health management crisis

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ABSTRACT

The growing menace of antimicrobial resistance is posing a serious challenge to effective treatment of infectious diseases. Way back in the 20th century, the Great antimicrobial pioneer Sir Alexander Flaming had warned of such a possibility. Though some clear causes are now well identified, the effective remedial strategy is yet to evolve. One understanding that transpires very clearly is that no routine approach will solve the problem. This work ventures into alternate innovative ways in the light of major established causes and well-identified mechanisms. The purpose is to ignite passion for very in-depth analysis of mechanisms towards development of the effective strategy that can go much beyond routine approach and offer a solution towards this massive human health problem.That this major health management crisis is assuming critical dimension is evident in the list of failed antibiotics that becomes longer by the day.

Keywords: Antimicrobial resistance; Mechanism of resistance; Antibiotics failure; Infectious disease; Health crisis.

Oral Presentation-7

The Nexus Between Increasing Air Pollution and Rising Eye Problems in India

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ABSTRACT

In recent years, India has been grappling with a concerning trend: the simultaneous surge in air pollution levels and the prevalence of eye problems among its populace. This presentation aims to explore and dissect the intricate relationship between escalating air pollution and the alarming rise in eye-related ailments across the diverse landscape of India. With this degradation, fine particulate matter (PM2.5 and PM10), volatile organic compounds (VOCs), nitrogen dioxide (NO2), sulfur dioxide (SO2), and other harmful pollutants have reached perilous concentrations, posing substantial health risks to millions. Of profound concern is the profound impact this deteriorating air quality has on ocular health. Studies have increasingly linked exposure to elevated air pollution levels with a spectrum of eye conditions, ranging from simple irritation to severe ailments like dry eye syndrome, conjunctivitis, cataracts, and macular degeneration. This correlation demands urgent attention, considering the widespread and lasting consequences it bears on the well-being and productivity of the Indian population. Furthermore, this presentation will delve into the specific pollutants and their mechanisms of harm to ocular tissues, shedding light on how these pollutants infiltrate and adversely affect the delicate structures of the eye. Understanding these intricate pathways is pivotal in formulating effective preventive measures and interventions to mitigate the burgeoning burden of eye problems attributed to air pollution. Addressing this multifaceted issue necessitates a comprehensive approach involving government policies, public awareness campaigns, technological advancements in pollution control, and collaborative efforts among healthcare professionals, environmentalists, and policymakers. The presentation will also spotlight successful initiatives, both local and global, that have demonstrated promising outcomes in curbing air pollution and subsequently alleviating eye-related health concerns. Moreover, a discussion on the socioeconomic implications of this correlation will be highlighted, emphasizing the disproportionate impact on vulnerable communities and underserved regions. Initiating equitable solutions is imperative to ensure that all segments of society have access to clean air and proper eye care facilities. In conclusion, this presentation endeavors to serve as a clarion call for urgent action to address the concurrent rise in air pollution and eye problems in India. By elucidating the intricate connections between these two issues and advocating for a holistic approach, it aims to ignite discourse, foster collaborations, and inspire impactful interventions aimed at safeguarding the ocular health of India's populace amidst the burgeoning air quality crisis.

Keywords: Air Pollution, Eye problems, Cornea, Retina, Ophthalmology, Particulate Matters, PM 2.5, PM 10.

Oral Presentation-8

Assessment of plant vigour and soil health using nanozeolite and plant growth promoting rhizobacterium *Bacillus* in *Cicer arietinum*

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ABSTRACT

Applications of nanocompounds and plant growth promoting rhizobacteria plays a vital role in enhancing plant growth and improving soil health. The current study focusses on effect of nanozeolites and bioinoculants such as *Bacillus* on soil heath and growth parameters of Black chickpeas. The results showed positive impact of the combined application of nanozeolite and bioinoculants on various agronomical characters and soil health through modulating nutrient status, microbial population and soil enzymatic activity. A significant increase in plant height, root height, shoot height, soluble leaf protein and different enzymes (catalase, SOD, POD) was observed in the treatment consisting of *Bacillus* and nanozeolites in comparison to the control. Similarly enhanced soil health parameters such as; alkaline phosphatase, dehydrogenase and fluorescein diacetate activity were recorded. The results suggest that nanocompounds along with PGPR improve the growth of plants and soil health and thus may benefit in agricultural practices for improvement of crop yield and quality.

Keywords: Nanozeolite, PGPR, Soil Enzymes, Bioinoculants.

Oral Presentation-9

Pharmacognostical, Phytochemical and Pharmacological Evaluation of Hypericum perforatum and *Alternanthera sessilis* for *Anticonvulsant* Activity

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ABSTRACT

About 50 million of peoples suffering from epilepsy around the world. Every year, 5 million people are estimated to experience epilepsy worldwide. Epilepsy is a type of nervous disorder in which clusters of nerve cells or neurons in the brain suddenly function abnormally, resulting in unusual behaviour or emotions, sensations, or muscle spasms. Hypericum perforatum L. generally known as St. John's wort, is one of the most famous species in the Hypericaceae. It is a perennial herb which is widely distributed in Asia, Europe and North Africa. The Plant has a wide range of medicinal applications including skin wounds, eczema, burns, diseases of the alimentary tract and psychological disorders. Alternanthera sessilis known as Multicellular joy plant family Amaranthaceae is an annual or perennial plant found throughout India, China, Taiwan. These plants are traditionally used to cure ulcers, depression, skin diseases, and problems with vitiated blood in Indian traditional medicine. The aim of present study is pharmacognostical, phytochemical and pharmacological screening of Hypericum perforatum (roots) and Alternanthera sessilis (whole plant) for Anticonvulsant activity. A comprehensive review of the recent scientific literature was performed using the following databases such as Google Scholar, PubMed, Science Direct, Elsevier etc. Pharmacognostical study is carried out by performing macroscopical, microscopical and physiochemical evaluation i.e., extractive values, ash values, moisture content, swelling index, foaming index and foreign matter. The present review highlights some of the salient pharmacological uses of both the plants for anticonvulsant action of extract on mice, scientifically proven chemical constituents such as α and β-spinasterols, lupeol isolated from Hypericum perforatum roots and Alternanthera sessilis (whole plant) are polyphenols, terpenes, flavonoids, tannin. Many research studies have been conducted to prove that both plant's potential as being skin wounds, eczema, burns, diseases of the alimentary tract and psychological disorders. Additional research on the pharmacological and biochemical activity of Hypericum perforatum and Alternanthera sessilis and its several bioactive constituents is necessary to further elucidate the models of anticonvulsant activity. Currently known and unknown about the biological properties of both the plants, those who choose to use this herb should be closely monitored by a physicians.

Keywords: Alternanthera sessilis, *Hypericum perforatum*, Pharmacognostic evaluation, anticonvulsant activity.

Oral Presentation-10

Assessment of organic botanicals work to increase rice-wheat production potential with the use of organic natural farming

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ABSTRACT

Now days Agriculture production is facing the major challenge of high cost of production and degradation of natural resources which can be efficiently managed by adoption of resource conservation techniques are limited. The present study was undertaken for 1 year (2022-2023) to identify efficient resource conservation options in organic agriculture under rainfed conditions of western Himalayan region of India. Eleven treatment consisting of different resources conservation practices viz., Pusa Basmati 1509 Rice T1(50% Beejamrit, jeevamrit & Pantnagar Ark + 50% FYM & vermicompost), T2(50% Ghanjeevamrit, Dashparniark & Pantnagar Ark + 50% FYM & vermicompost), T3(50% Amritpani, Panchgavya & Pantnagar Ark + 50% FYM & Vermicompost), T4(75% Beejamrit, Jeevamrit & Pantnagar Ark + 25% FYM & vermicompost), T5(75% Ghanjeevamrit, Dashparni & Pantnagar Ark + 25% FYM & Vermicompost),T6(75% Amritpani, Panchgavya & Pantnagar Ark + 25% FYM & Vermicompost), T7(25% Beejamrit, jeevamrit& Pantnagar Ark + 75% FYM &Vericompost),T8(25% Ghanjeevamrit, Dashparniark& Pantnagar Ark + 75% FYM & Vermicompost), T9(25% Amritpani, Panchgavya & Pantnagar Ark + 75% FYM & Vermicompost),T10(Absolute control),T11(100% FYM+ Vermicompost) were accommodated in a randomized block design with 3 replications during kharif season. As the main challenge for the organic production farm based input production of rice, treatment T7 , T2, T1 and T8 showed promising results to increase farmer's profitability with small or marginal land holdings under organic production system.

Keywords: Organic agriculture, Direct seeded rice, Zero Budget, Green Manuring.

Oral Presentation-11

Study of Plant tolerance for Air pollution in Residential & Commercial area of Dehradun

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ABSTRACT

In Today's time air pollution is a major issue globally. Besides various solutions to subside air pollution, Vegetation is progressively recognized as an alternative improve method by removing air pollutants mainly through absorption, adsorption deposition and accumulation process. Leaf surface of plants acts as a sink for the deposition of air pollutants in the urban environment and is considered an ecologically sustainable cost-effective strategy to mitigate the impact of air pollution. The present study was performed in Dehradun, the city of valley. The study examined the Air Pollution Tolerance Index (APTI) and Anticipated Pollution index (API) of selected plant species, which were selected from two areas- Commercial and Residential area of Dehradun. APTI was determined by combining the four biochemical and physiological parameters; Relative water content (RWC), Total chlorophyll content (TChl), Ascorbic acid content (AA) and Leaf extract pH using a pre-defined formula. Results suggested that, (TChl) and pH were lower, and RWC and AA were higher at heavily polluted area in comparison to the control site. The APTI for the species ranged between 7.57 and 11.51, ideal for sensitive species category (APTI < 16), and the plants are classified as bio indicators of air pollution. API method help to calculated the quantification of environmental performance of plant species with help to APTI and social economical parameters which is also helpful in green belt development. The evaluation of APTI can help in selecting suitable plant species for planting in polluted residential areas and commercial areas, as these species can act as pollution sinks and contribute to maintaining air quality and ecological balance. Green wall systems have also been studied to identify pollution-tolerant plant species for use in high pollution environment. Overall, these studies provide valuable insights into plant tolerance to air pollution and can guide the selection of appropriate plant species for residential areas and commercial areas. The result showed order of tolerance as *Alstonia scholaris*, *Ficus religiosa*, *Syzygium cumini, and Saraca asoca*.

Keywords: Plant tolerance, Air pollution, *Alstonia scholaris*, *Ficus religiosa*, *Syzygium cumini*, and *Saraca asoca*.

Oral Presentation-12

The Impact of Biotechnology on Eco-Friendly Solutions

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ABSTRACT

Biotechnology stands as a pivotal force in the pursuit of sustainable and eco-friendly solutions across various industries. The application of biotechnology spans a wide spectrum, from harnessing microbial capabilities for waste remediation and biofuel production to leveraging genetic engineering for crop improvement and sustainable agriculture. Microorganisms have been ingeniously engineered to break down pollutants, turning them into harmless byproducts and aiding in the cleanup of contaminated sites, thereby significantly reducing environmental harm. Biotechnology contributes extensively to the production of renewable energy sources, notably biofuels derived from organic matter. This approach not only lessens reliance on fossil fuels but also diminishes greenhouse gas emissions, fostering a cleaner and more sustainable energy landscape. In agriculture, biotechnology-driven advancements play a pivotal role in enhancing crop resilience, yield, and nutritional value. Genetic modification techniques enable the development of crops resistant to pests and diseases while reducing the need for chemical pesticides and fertilizers, thereby promoting environmentally friendly farming practices. Moreover, the utilization of biodegradable materials derived from bio-based sources is steadily replacing conventional plastics, offering a viable solution to the global plastic pollution crisis. Bioplastics, synthesized from renewable resources, exhibit properties akin to traditional plastics but decompose naturally, significantly reducing their environmental footprint. By harnessing the power of biotechnology, we pave the way towards a more sustainable, environmentally conscious future.

Keywords: Biotechnology Spans, Microorganisms, Harmless Byproducts, Genetic Modification Techniques.

Oral Presentation-13

Inventorization of Springs in the Bhimtal & Okhalkanda Block of Nainital District of Uttarakhand: A Comprehensive Study

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ABSTRACT

The Kumaun region of Uttarakhand is known for its abundant natural resources, including numerous springs but there is a lack of comprehensive data and understanding of the springs in the region, including their locations, characteristics, and overall health. This study aims to conduct an inventorization of springs in the Bhimtal and Okhalkanda Block of the Nainital district of the Kumaon region of Uttarakhand, with the objective of providing a comprehensive understanding of their distribution, hydrological properties, and socio-environmental significance. The research will employ a multi-disciplinary approach, combining field surveys, hydrological assessments, and community engagement. The primary methods for data collection will include extensive field surveys, involving identifying and mapping springs using GPS technology. Various hydrological parameters such as discharge, water quality, temperature, and surrounding land use will be measured to assess the hydrological characteristics and potential impacts on spring ecosystems. The data collected will be analysed using geographic information systems (GIS) and statistical techniques to generate spatial distribution maps and socio-environmental profiles of the springs in the Bhimtal and Okhalkanda block of the Nainital district. Seven springs were inventoried during this study, four from the Bhimtal block and the remaining three from the Okhalkanda block. The results will provide valuable insights into the current status and vulnerabilities of the springs, contributing to effective water resource management and conservation strategies. This study is expected to contribute to the existing knowledge base on springs in the Kumaun region and assist in the sustainable development and conservation of these vital water sources.

Keywords: Kumaun Region, Natural Resources, Hydrological Properties, Socio-Environmental Significance.

Poster Presentation-14

Removal of Anionic Surfactants from Wastewater using Constructed Wetlands

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ABSTRACT

Surfactants, the commonly known emerging contaminants, are chemicals with cleaning and/or solubilization properties that have extensive usage in household and industrial products. During the COVID-19 pandemic, large quantities of surfactants such as sodium dodecyl sulfate (SDS) were released into the environment. SDS, an anionic surfactant is the most frequently used surfactant. Constructed wetlands (CWs) are eco-friendly treatment process that offers numerous benefits over typical wastewater treatment methods, such as low construction and operating cost, simple design, and easy maintenance. In this study, lab-scale vertical flow constructed wetlands (VFCW) microcosms were designed and amended with *Lantana camara* biochar, and planted with two locally available plant species namely *Canna indica* and *Acorus calamus*. The dose-response relationship was studied in four phases by varying the SDS concentration from 10 to 100 mg/l. The mean SDS removal efficiencies varied ranging from ~ 91% to ~ 98% during the different phases, respectively. The results suggested better performance of planted CWs as compared to the unplanted systems. Therefore, the study concludes both species are effective in SDS removal and provides scope for future researchers to explore their treatment efficiencies for SDS removal on a pilot scale.

Keywords: Anionic surfactants, sodium dodecyl sulfate, constructed wetlands, *Canna indica*, *Acorus calamus.*

Poster Presentation-15

Green Innovation: Transforming Organic Waste into Eco-Friendly Bioplastics for Commercial Applications

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ABSTRACT

Substituting conventional plastics with biodegradable alternatives, primarily owing to their innate ability to break down, emerges as an effective strategy in tackling the prevalent global issue of plastic waste accumulation in our ecosystems. Progressive developments in bioplastic research have resulted in materials showcasing enhanced properties, facilitating their broad applications across various commercial sectors. Bioplastics, sourced from diverse natural reservoirs such as plants, animals, and microorganisms, include polyhydroxyalkanoate (PHA), a biopolymer synthesized through bacterial fermentation, displaying physical and chemical characteristics akin to synthetic plastics. Responding to the escalating demand for environmentally conscious plastics, researchers are actively exploring cleaner production methods, encompassing the modification or derivatization of existing molecules to improve properties and explore novel applications, with the aim of expanding their market presence in the foreseeable future. Projections indicate that by the year 2026, the commercial production capacity of bioplastics is anticipated to reach 7.6 million tonnes, with Europe currently holding a substantial market share of 43.5%. Predominantly utilized in the packaging industry, bioplastics manifest a pronounced focus on applications within this sector. As the volume of bioplastic waste is poised to increase in the upcoming decades, comprehending their fate in diverse environments is crucial for evaluating the overall environmental impact. Achieving complete biodegradation entails optimizing waste management strategies and ensuring appropriate disposal within designated facilities. Future research initiatives should prioritize the exploration of end-of-life management and toxicity assessments of bioplastic degradation products. These endeavors are imperative to guarantee the economic viability and environmental sustainability of bioplastics as viable substitutes for conventional plastics.

Keywords: Microorganisms, Polyhydroxyalkanoate, Bioplastic Waste, Environmental Sustainability.

Poster Presentation-16

Geospatial Based Assessment of Urban Green Space: A Review

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ABSTRACT

The world has undergone unprecedented population growth and urbanization due to increasing urban sprawl, migration, and modernization. By 2050, the global population will be increased by 66% as per the report published from United Nations, and most of the population expansion will occur in developing countries. There is no doubt that trees and forests played a significant role in determining the shape of human evolution and the development of human cultures and societies. Their importance in improving the ecology of cities calls for large-scale plantation of trees for increased forest cover and the development of a more conducive environment for their growth and management. Several studies suggest that the growing population and urbanization are major factors in the transformation of green spaces to impervious surfaces. To enhance the green coverage within the city and its periphery, it is essential to carry out a geospatial analysis. Such an analysis will help to locate areas where immediate action is desired and accordingly develop strategic plan for improving the green space. Through systematic review of published literature, we explored the contribution of Remote sensing technologies towards analysis and assessment of Urban Green Spaces. A bibliometric approach was followed while making use of various online resources like Web of Science and Scopus to assess the growth and changes in geospatial based studies of Urban Green Space during the last two decades. Although it is observed from this review study that there has been a substantial work in this area, but the impact of such studies is minimal in developing countries and a comprehensive review of the current status, challenges and potential in this area is lacking.

Keywords: Urban, Green Space, Geospatial, Remote Sensing, GIS.

abstracts
poster participants

Poster Presentation-1

Characterization of Novel Salt Tolerant Bacterial Strain DKSLT7 from Sambhar Lake, Jaipur, Rajasthan, India

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ABSTRACT

The efficient biological treatment of saline wastewater has been limited by the low activities of microorganisms under saline conditions. High salinity poses unbalanced osmotic stress across the cell wall and even leads to cell plasmolysis. In this work, we aim to isolate salt-tolerant bacterial strains from saline wastewater. The present study aimed to isolate, identify, and screen salt-tolerant bacterial strains from saline wastewater for different environmental and industrial applications. The saline water sample was collected from Sambhar Lake, Jaipur, Rajasthan, India, for salt-tolerant bacterial isolation. The novel salt-tolerant strain DKSLT7 was screened and isolated from Sambhar Lake Jaipur, which was domesticated with salty water for over 300 days. The novel strain has been submitted for molecular sequencing for further identification. The bacterial strain was able to tolerate up to 25% (w/v) of salt (NaCl) hence, an extremely halophile bacterium and thus, could be used for the remediation of industrial saline wastewater and other industrial applications. The results of this study will provide efficient microbial resources particularly salt-tolerant bacterial strain, which is of great significance for protecting the water environment safety and human health.

Keywords: Salinity, Salt Tolerant Bacteria, Saline Effluent Treatment, Halophiles, Bioremediation, Environmental Safety.

Poster Presentation-2

From Biomass to Aromatics: Pioneering Sustainable Vanillin Production via Membrane-Integrated Photo-Microreactor

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ABSTRACT

The quest for sustainable production of organic compounds has captured the attention of the scientific community, who recognize the paramount importance of utilizing bio-based feedstocks. One such compound is vanillin, a highly sought-after aromatic compound found in food and cosmetics. Traditionally sourced from fossil fuels, there is now growing interest in harnessing renewable alternatives, such as extraction from lignin through biotechnological processes. This assertion is well-supported by careful examination of various literature. While the potential benefits are significant, the implementation of biological pathways on a large scale has faced significant roadblocks. However, a new groundbreaking solution has emerged in the form of a revolutionary method that converts lignocellulosic biomass into vanillin using a membrane-integrated photo-microreactor system. This advancement has the potential to revolutionize the production of vanillin and pave the way for more sustainable alternatives. The green chemical industry stands to make significant strides by leveraging renewable biomass as a feedstock. This review not only explores challenges associated with microorganism utilization but also outlines promising strategies for enhancing vanillin production. Emphasis is placed on optimizing processes, constructing pathways, and developing chassis, collectively advancing the prospects of sustainable bio-based aromatic compound synthesis.

Keywords: Vanillin, Waste biomass, Lignin, Biosynthesis, Photocatalysis, Recovery, Membrane integration, Photo-microreactor.

Poster Presentation-3

Sustainable adsorption of malachite Green using sodium alginate beads supported magnetite coir pith composite - isotherm, kinetic and thermodynamics study

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ABSTRACT

This study aims to explore an environmentally friendly approach to removing malachite green dye from synthetic water solutions. The method involves using sodium alginate beads combined with magnetite/coir pith, both derived from natural waste materials. The study examined various operational factors, such as initial dye concentration, pH, temperature, adsorbent weight, and agitation speed. By applying the central composite design of response surface methodology, the process was optimized and the optimal conditions were obtained for the successful removal of malachite green dye. These conditions were a pH of 7, an initial dye concentration of 150 mg/L, 3g of adsorbent weight, and a temperature of 35°C, resulting in an impressive adsorption efficiency of over 98%. The analysis of variance revealed the significant impact of adsorbent weight and malachite green concentration on the overall process. The study demonstrated the beads' reusability, indicating their potential for large-scale wastewater treatment, and offering promising implications for industrial application. Further kinetic, isotherm and thermodynamics parameters were calculated.

Keywords: Agro-waste; Coir pith-based beads; Malachite green; Statistical analysis; Sustainability analysis.

Poster Presentation-4

Revolutionizing Rainwater Harvesting in the Andaman and Nicobar Islands: Assessing Precipitation Patterns, Resource Utilization, and Transformative Technologies

Atul Uniyal[1]*, Tribhuwan Singh Bisht[2], Nitesh Kaushik[3], Er. Harsh Pati Uniyal[4]

ABSTRACT

The main source of replenishable groundwater in India is rainfall, contributing around 60% to the total annual recharge. Dynamic Groundwater Resource Assessment 2023 reported an annual recharge of 449.08 bcm, with an extractable resource of 407.21 bcm after accounting for natural discharge. Groundwater extraction in 2023 increased marginally to 241.34 bcm, compared to 239.16 bcm in 2022. The total annual recharge also saw a rise from 437.6 bcm in 2022 to 449.53 bcm in 2023. As per the Annual Report from the India Meteorological Department (IMD), the total rainfall for the country in the year 2022 (January to December) has been recorded at 1257.0 mm. The Andaman and Nicobar (A&N) Islands receive an average annual rainfall of about 3080 mm. About 95 percent of annual rainfall is received during May-December of which nearly 75 percent is lost as runoff to the sea due to undulated terrains and steep slopes. According to the 2001 Population Census, the Andaman and Nicobar Islands had a population of 356,152, with a growth rate of 26.9% over the decade. Projected estimates suggest a population of nearly 573,500 in 2021, with around 55% residing in rural areas. The islands face a significant challenge in rainwater harvesting due to a high 50% evaporation rate, worsened by humid temperatures. The porous geological composition leads to rapid percolation, resulting in saline water. Open ponds contribute to maximum evaporation, water pollution, and substantial loss. Addressing these challenges requires the development of innovative and transformative rainwater harvesting techniques tailored to the unique environmental conditions of the islands. The overarching goal is to mitigate the adverse impact of high evaporation rates, porous rock structures, and saline contamination on harvested rainwater. Key considerations for transformative techniques include devising mechanisms to minimize evaporation losses and exploring alternative storage solutions/innovative 365 days (individual/institutional) rainwater harvesting modal that mitigate the impact of porous geological formations. This scientific approach seeks to revolutionize rainwater harvesting practices in the region, ensuring a more resilient and reliable freshwater supply despite the prevalent challenges.

Keywords: Rainwater Harvesting, Dynamic Groundwater Resource, India Meteorological Department.

Poster Presentation-5

Green Synthesis of Biogenic Al2O3 Nanoparticles from Agrowaste for Therapeutic Applications

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ABSTRACT

Green chemistry is concerned with creating advanced materials from waste that can be used in a variety of industries. As a result, several kinds of nanomaterials have been applied as agents for diagnosis and treatment. Agrowaste is used to create biogenic nanoparticles, which are sustainable and environmentally benign materials that can be produced at a low cost with no negative side effects. Thus, in this study we synthesize biogenic nanoparticles using waste material i.e., Aluminium (Al) foil and phytoextract i.e. Citrus lemon (Lemon) peel extract as a cost-effective and economical alternative process. In vitro anti-inflammatory, anti-oxidative, and anti-microbial (E. Coli and S. aureus) profiling using synthesized aluminum oxide nanoparticles (Al2O3 NPs) demonstrated significant activity at very low concentrations, i.e., 1 mg/ml. Even so, Al NPs exhibit improved long-term cell growth and proliferation in the mouse fibroblast cell line and have a biocompatible and negligible toxic effect. In conclusion, biogenic nanoparticles function as growth-promoting molecules in cell culture medium by reducing the aging- and inflammation-causing chemicals's toxicity to cells. As a result, the produced biogenic nanoparticles will be an affordable substance with potential applications in regenerative medicine to treat persistent inflammation.

Keywords: Nanoparticle, Phytoextract, Efficiency, Anti-Inflammatory.

Poster Presentation-6

Synthesis of biogenic silver nanoparticles using the extract of *Hibiscus sabdariffa* as a therapeutic agent for bacterial infection

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ABSTRACT

Millions of people succumbed from bacterial infections before the widespread use of antibiotics. Now, the relative safety that these amazing medications have provided to human civilization is in jeopardy because of the growing global resistance to conventional antibiotics brought about by the fast emergence of resistant bacteria. Methicillin-resistant Staphylococcus aureus bacteraemia is one of the most prevalent bloodstream infections worldwide, linked to significant mortality and clinical consequences. Thus, there is a strong need to develop focused and efficient biogenic silver-based solutions. Here, we present the biosynthesis of Ag nanoparticles employing the phytochemical agent that was isolated and refined from Hibiscus sabdariffa extract. Within a range of 10 to 50 µg/mL, the biogenic metal nanoparticles (NPs) have demonstrated promising antibacterial action against S. aureus and MRSA. Additionally, the nanoparticles' anti-biofilm action against the aforementioned strains has showed promise. It was anticipated that the nanoparticles would cause bactericidal mechanism mediated by ROS. Studies on cell viability and in vitro infections support the produced nanoparticles' noticeable biocompatibility and potential for use in healthcare facilities against Staphylococcus infections in the future.

Keywords: Bacterial Resistance; Antibacterial Compounds; Plant Extraction; Therapeutic Application.

Poster Presentation-7

Multi Drug Resistance an Alarming Situation Globally

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ABSTRACT

In the field of medicine, multidrug resistance (MDR) is certainly concerning, especially when it comes to infectious diseases. When microorganisms—such as bacteria, viruses, parasites, or fungi—develop resistance to several medications, it is called multidrug resistance (MDR), which makes it more difficult to treat diseases successfully. This phenomena has broad consequences and presents a serious risk to public health. A comprehensive and cooperative strategy including medical professionals, researchers and the public is needed to create techniques for prevention, surveillance, and effective treatment of multidrug resistance, which poses a severe danger to world health. In order to treat MDR, public awareness initiatives, instruction on the appropriate use of antibiotics, and infection prevention strategies are crucial. Promoting hygienic habits and encouraging the prudent use of antibiotics can help slow the emergence of resistant strains. Research and development activities must be persistent in order to find new antibiotics and alternative treatment approaches for multidrug resistance (MDR). With the development of new medications and treatments it is essential for preventing the spread of resistant strains.

Keywords: MDR, Antibiotics, Public Health, Resistant Strains.

Poster Presentation-8

Isolation and Characterization of Novel Extreme Halophilic Bacterial Strain, Halomonas alkaliphila DKSLT9 from Sambhar Lake, Jaipur, Rajasthan, India

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ABSTRACT

The efficient biological treatment of saline wastewater has been limited by the low activities of microorganisms under saline conditions. High salinity poses unbalanced osmotic stress across the cell wall and even leads to cell plasmolysis. In this work, we aim to isolate salt-tolerant bacterial strains from saline wastewater. The present study aimed to isolate, identify, and screen salt-tolerant bacterial strains from saline wastewater for different environmental and industrial applications. The saline water sample was collected from Sambhar Lake, Jaipur, Rajasthan, India, for salt-tolerant bacterial isolation. The novel salt-tolerant strain was screened and isolated from Sambhar Lake Jaipur, which was domesticated with salty water for over 300 days. The novel strain was identified as *Halomonas alkaliphila* through 16S rRNA sequencing. The bacterial isolate was identified as a new strain and deposited at NCBI Genbank under accession number OR770108 (*Halomonas alkaliphila* strain DKSLT9). The bacterial strain was able to tolerate up to 25% (w/v) of salt (NaCl) hence, an extremely halophile bacterium and thus, could be used for the remediation of industrial saline wastewater and other industrial applications. The results of this study will provide efficient microbial resources particularly salt-tolerant bacterial strain, which is of great significance for protecting the water environment safety and human health.

Keywords: Salt Tolerant Bacteria, Salinity, Wastewater Treatment, Extreme Halophile, Remediation, Environmental Applications.

Poster Presentation-9

Environment and sportgrounds-a case study of environmental impact of golf courses and mitigation measures adopted

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ABSTRACT

The author is a keen golfer. Her visits to the golf courses typically present an image of pristine wide green expanses that give players the opportunity to get some fresh air in very scenic settings. There are the known environmental benefits of golf courses such as providing a habitat for wildlife, protecting topsoil from erosion, absorbing rainwater, improving air quality, discouraging pests, restoring damaged lands, besides improving community's economy and providing health benefits. However, it is not common knowledge that these visual 'environmental lungs' are anything but that, and do absolutely nothing for the environment, if corrective measures are not taken. In fact, as the golf courses guzzle up gallons of water per day to keep the grass green, their environmental impact becomes truly horrendous, right from the stage of construction to upkeep and beyond. Vis-a-vis any other sport, golf requires more per sq ft land per player. This underlying environmental problem has not gone unnoticed and stringent regulations and norms are being gradually brought into place to mitigate the adverse effects on the environment. The paper discusses the adverse affects that need to be addressed. These include aspects of land foot-print, water management, use of Pesticides, protecting biodiversity and wildlife, energy independence, sourcing irrigation from wastewater and modern golf course development. The author also details some key eco-friendly ways to develop and maintain a golf course such as lessening the use of pesticides, effective water irrigation and leveraging solar energy.

Keywords: Rainwater, Discouraging pests, Keen golfer, Irrigation.

Poster Presentation-10

Increasing trend of microplastics contamination in water ecosystems: Important concern to deteriorate aquatic health.

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ABSTRACT

The emergence of microplastics (MPs) as a contaminant has received international attention. In aquatic ecosystems, recent research has concentrated on the occurrence, sources, and toxicology of MPs. Similar to dyes, heavy metals, and organic contaminants, microplastics have been recognized as hazardous constituents for aquatic organisms. These particles exhibit significant variations in dimensions, shapes, densities, chemical compositions, and more. Researchers from all over the world have found prominent microplastics and synthetic materials like polypropylene, polyethylene, polystyrene, polyvinyl chloride, and polyethylene terephthalate in marine environments. Frequently, aquatic organisms are more imperiled by microplastics of a smaller size than those of larger dimensions. It is anticipated that the ongoing consequences and gravity of microplastic pollution on aquatic health attributes will endure for an extended period of time, particularly in light of the escalating worldwide production of plastics. So, more research is needed to consistently evaluate the effects of microplastic pollution on indicators of aquatic health that haven't been studied yet, along with detection methods and remediation techniques.

Keywords: Microplastic, Water ecosystem, Aquatic health.

Poster Presentation-11

Isolation and Characterization of Novel Biosurfactant Producing Bacterial Strain, Bacillus velezensis (BS3) from Petroleum Oil Contaminated Soil of Faridabad, Haryana, India

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ABSTRACT

Oil spills and hydrocarbon contamination pose significant environmental challenges, necessitating innovative and sustainable remediation strategies. Biosurfactants, surface-active molecules produced by microorganisms, have gained prominence as effective tools in the bioremediation of oil-contaminated soil. The present study aimed to isolate, identify, and screening of biosurfactant (BS) producing bacteria from petroleum-contaminated soil to devise an effective bioremediation technology for the management of hydrocarbon contamination. In this study, a novel biosurfactant bacterial strain, Bacillus velezensis (BS3) was isolated for the first time from diesel oil-contaminated soil collected nearby from a petrol pump located in the Faridabad district of Haryana, India. The ability of the bacterial strain to produce BS was screened for hemolysis test, lipase production, oil displacement test, and emulsification activity. Further, the isolated bacterial strain BS3 was characterized based on several morphological and biochemical tests as well as molecular sequencing (16S rRNA gene) analysis. Based on the results, the bacterial isolate was identified as a new strain and deposited at NCBI Genbank under accession number OQ998659 (Bacillus velezensis strain KRBS3). This research abstract provides a concise overview of the promising role of biosurfactant-producing bacteria in remediating oil-contaminated soil. These eco-friendly agents not only enhance the efficiency of hydrocarbon biodegradation but also contribute to the overall sustainability of soil remediation practices.

Keywords: Biosurfactants, Bioremediation, Oil Spills, Hydrocarbon, Bacteria, Environmental Safety.

Poster Presentation-12

Microbial approach for removal of Fe content in Sub-surface Drinking water

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ABSTRACT

Access to clean and safe drinking water is essential for the survival of living beings. However, excessive iron (Fe) contamination in subsurface drinking water is a concern, particularly in rural areas. Removing the excess iron is challenging due to high costs and maintenance requirements. Presence of soluble iron greater than 1 ppm raises concerns as per BIS guidelines. The proposed method in this study, explains the employment of biological removal of iron through iron-reducing/oxidizing bacteria. Initially, a collection drive was conducted throughout the region of Tehri Garhwal and Haridwar District of Uttarakhand collecting a total of 27 samples. The screening for the presence of IOBs (Iron oxidizing bacterial strains) was done using specific medium in broth cultures and thereafter gradient tube method. The initial morphological characterization in the wet lab experiments displayed the bacterial strains in the *Proteobacteria phylum*, with different shapes and cell diameters. The results of media optimization showed maximum growth of bacterial cultures in TSM_1 medium. Further, the Microbial Identification using the 16S approach provided the highest matching sequences for Pseudomonas aeruginosa, *Bacillus subtilis*, *B. velezensis*, *B. cereus*, and Acinetobacter sp. The closest relation was determined through PhyloT software, based on sequence data alignment. The future prospect involves the development of a Microbial-assisted Biofilter for the reduction of Iron in water. The detection and sustainable solution of excess iron in drinking water has been a long-standing issue, and its presence beyond recommended levels can cause serious health problems. While several methods have been proposed to remove excess iron, they are often expensive and require specific maintenance, making them difficult to implement on a larger scale. We must address this issue to ensure that everyone has access to safe and clean drinking water.

Keywords: Microbial Remidiation, Iron Removal, Drinking Water.

Poster Presentation-13

Evaluation of water and soil quality of first village Mana of India: Public utilities related comprehensive study

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ABSTRACT

Keeping the reference of vibrant village development, a comprehensive study on water and soil quality of the first village Mana of India has been studied. Public health is totally associated with water and soil health. In this context, the water and soil samples of Mana village have been collected and analysed in the laboratory as per BIS and APHA guidelines. Twenty five physico-chemical and microbial parameters of fifteen different public utility related water sources such as Naula, River, Spring and Hand pump were analysed. Further, seven soil samples have been collected for their six parameters analysis i.e., Nitrogen, Phosphorous, Potassium, Cation-exchange, Clay content and Organic carbon for their quality evaluation. Investigations revealed that the physico-chemical parameters of water samples were found within the desirable limits and overall quality was found excellent in terms of physico-chemical parameters. However, out of fifteen sampling sites, six water sites namely site number 3,7,11, 12, 13 and 14 were found contaminated with microbial load (Total coliform). Whereas, as per BIS guidelines, the total coliform and faecal coliform contaminations should be absent in drinking water. On the other hand, the results of soil quality evaluation of Mana revealed deficiencies in nitrogen content and have low cation-exchange efficiency, however, some sites showed high concentrations of phosphorus and potassium in the soil collected from Mana village. Overall, the study concludes that such a type of study has not been performed previously. As per results obtained from investigations, the water and soil qualities of Mana village meets the safety standards, there are issues with microbial contamination in certain water samples and imbalances in soil health that require ongoing attention. This study lays the groundwork for informed decision-making, advocating regular monitoring and strategic interventions to safeguard and improve water and soil quality for the community's well-being for their future prospects.

Keywords: Mana village, Water quality, Soil health, Microbial contamination, Public health.

Poster Presentation-14

Nutraceutical Properties of Lion's Mane (*Hericium erinaceus*)

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ABSTRACT

The pharmacological and gastronomic properties of the medicinal fungus Hericium erinaceus have made it popular in Asia, Africa, Europe, and North America. It has a long history of usage in traditional Chinese medicine. Antioxidant, anti-inflammatory, immune-boosting, NGF, Parkinson's, and Alzheimer's disease are just some of the many medical uses for this mushroom. Lion's Mane is an excellent food choice because it is high in protein, carbohydrates, crude fibre, and contains few fats and ash. In addition to the previously mentioned, it includes soluble sugars such as arabitol, glucose, mannitol, inositol, and trehalose as well as minerals, vitamins, vital amino acids, and calcium. Polyphenols, Hericirine, Hericenones A–B, Erinacines A–I, Hericenones C–H, and other physiologically important polysaccharides are abundant in H. erinaceus Blood pressure, cholesterol metabolism, liver issues, cancer, obesity, ulcers, and diabetes are few of the various diseases that these polysaccharides can control and even cure.

Keywords: NGF-Nerve Growth Factor, Antioxidant, Arabitol, mannitol, Parkinson's, Alzheimer's.

Poster Presentation-15

Isolation and Characterization of Novel Hexavalent Chromium reducing Bacterial strain Brevibacterium casei Cr15 from Chromite Mines, Jajpur, Odisha, India

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ABSTRACT

Chromium is an essential micronutrient required for the growth of many microorganisms for the maintenance of normal glucose, cholesterol, and fatty acid metabolism. It is also a priority pollutant and is well known for its mutagenicity, carcinogenicity, and teratogenicity in humans, animals, and plants. Microorganisms are involved in the removal of toxic waste both in the natural environment and in controlled treatment systems. To prevent or minimize the toxic effects of Cr(VI) on the environment and living begins, it is necessary to remove the Cr(VI) or reduce it to far less toxic Cr(III). In this work, we aimed to isolate chromium reduction bacterial strain from wastewater from Chromite Mines. The present study aimed to isolate, identify, and screen the Chromium reduction bacterial strains from chromite wastewater for different environmental and industrial applications. The Chromite wastewater was collected from Chromite Mines, Jajpur, Odisha, India for chromium reduction bacterial isolation. One novel chromium reduction bacterial strain was screened and isolated from Chromite Mines Jajpur. The novel strain was identified as Bervibacterium casei Cr15 strain through 16S rRNA sequencing. The bacterial strain was identified as a new strain and deposited at NCBI Genbank under accession OR708512. The bacterial strain was able to tolerate 1000 ppm and thus could be used for the remediation of industrial saline wastewater and other industrial applications. The results of this study provide efficient microbial resources particularly Cr reduction bacterial strain, which is of great significance for protecting the water environment safety and human health.

Keywords: Chromium reduction, Hexavalent chromium, Ecotoxicity, Bioremediation, Environmental application.

Poster Presentation-16

Phycoremediation of Textile Dyeing wastewater using novel Chlorella sp.

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ABSTRACT

The presence of several refractory and colorful compounds, mostly dyes, in untreated or partially treated textile dyeing wastewater (TDW) causes significant pollution of water and soil resources, which is a worry for the environment. Hence, to comply with the strict environmental requirements globally, TDW must undergo the appropriate treatment and detoxification processes before it can be released into the environment. This work examines how a newly isolated microalgae strain, Chlorella sp., can detoxify and phycoremediate TDW from the textile industry. The microalgae strain Chlorella sp. was identified and described by biochemical and 18S rRNA gene sequencing analyses. A self-fabricated vertical photobioreactor (v-PBR; working capacity: 2 L) was utilized for the treatment of TDW in the phycoremediation process. The operational settings included a 12-hour light/dark cycle under cool-white-fluorescent light illumination at 1000-4000 lux, a treatment duration of 11 days, and temperatures ranging from 25 to 28°C. The dyeing color was eliminated from the textile effluent by 68-77% and the COD by 76-83% in all the cycles that were tested. The results demonstrated that microalgae have effectively adapted to TDW and have achieved a 27% increase in biomass output. A phytotoxicity test was conducted using mung bean seeds to explore the detoxification of TDW (Phaseolus aureus L). Experimental results showed that bacterially treated seeds had lower phytotoxicity and enhanced seed germination, root length, shoot length, root: shoot ratio, and seed vigor index (SVI) when compared to untreated seeds irrigated with TDW at 25, 50, 75, and 100 % (v/v). Chlorella sp., a microalga strain, eased the phytotoxic effects in mung beans, according to the results (Phaseolus aureus L). Therefore, Chlorella sp., a microalga strain, may provide an opportunity to phycoremediate TDW, ensuring the safety of both the environment and human health. Overall, the results suggest the importance of unicellular green microalgae as an environmental conservation system.

Keywords: Textile Dyeing wastewater, Microalgae, Chlorella sp., Phycoremediation, Ecotoxicity, Environmental safety.

Poster Presentation-17

Therapeutic Herbs: An Innovative Approach for Combating Multidrug Resistance Threat

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ABSTRACT

A significant barrier for managing several infectious disorders, such as bacterial, viral, and fungal infections, is multidrug resistance (MDR). It is critical to investigate alternative therapeutic techniques because the overuse and misuse of traditional antibiotics have resulted in the emergence of resistant types of bacteria. A novel strategy that is gaining momentum is the use of medicinal herbs to address multidrug resistance. Since generations, medicinal plants have been an integral part of both conventional and contemporary healing methods. Herbal medicine, often referred to as phytotherapy, is the application of these plants' diverse chemical components with medicinal qualities in medicine. Polyherbal formulations are an incredibly helpful therapeutic option because of their many mechanisms of action, which include biofilm disintegration, immunomodulation, efflux pump inhibition, and synergy with antibiotics. The process of formulating herbal medications includes a series of procedures that include standardizing dosages of herbal extracts, investigating drug-herb interactions (such as when antibiotics and medicinal plants work synergistically), validating scientific findings, and incorporating cultural and traditional knowledge. A promising path to address multidrug resistance is to use medicinal herbs in a novel way. To fully capitalize on herbal therapies in tackling this global health problem, however, thorough scientific research and cooperation between modern and traditional medicine are necessary. To guarantee the efficacy and safety of plant-based medications, appropriate scientific research, standardization, and regulation are required. Modern scientific techniques combined with traditional knowledge can result in the development of safe and efficient polyherbal medicines.

Keywords: Phytotherapy, MDR, Biofilm disruption, Immunomodulation, scientific Validation.

Poster Presentation-18

Visualizing the long-term bactericidal effect of reactive oxygen species due to generation of residual stress during Sono-Fenton process

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ABSTRACT

Water contamination by many pathogenic bacteria is increasing human vulnerability to infectious gastrointestinal diseases in developing countries. As a result, there is an urgent need to investigate novel approaches for the complete removal of water-borne pathogenic bacteria. Presence of the ABR bacteria could increase the chance of transfer of antibiotic resistant genes in water. These genes can be taken up by normal microorganisms and increase its spread.The increase in antimicrobial resistance bacteria in water bodies poses huge health risks and it has limited the therapeutic measures of disease treatment. Since conventional water treatment methods fail to take care of this problem, alternative methods are needed to be discovered which would not promote antimicrobial resistance in bacteria. Advanced oxidation process (AOPs) holds good potential in dealing with this issue. Here, we have analysed the role of Sono-Fenton process in inactivating bacteria from water. The free radicals generated during the process plays very crucial role in bacterial disinfection. Further we examined the residual stress remaining in the system after the treatment. They leave a long term bactericidal effect. We observed this phenomena at three different temperatures. The inactivation pattern of bacteria varied in each case. Role of different parameters affecting the residual stress generation was examined. We also looked into the detection of ROS responsible there.

Keywords: Water disinfection, Bacteria, ROS, Residual stress.

Poster Presentation-19

Role of Water Safety Planning in the Sustainability of Environment and Health of Society

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ABSTRACT

The paper examines the critical nexus between water safety planning, environmental sustainability and public health. Water, a fundamental resource, plays a pivotal role in the well-being of communities, and its safety is paramount for both ecological balance and human health. The work explores the multifaceted aspects of water safety planning and its indispensable contribution to the overarching goals of sustainability. Water safety planning involves a comprehensive approach to managing water resources, encompassing source protection, treatment, distribution, and monitoring. By analyzing the interconnectedness of water safety measures with environmental sustainability, the abstract highlights the profound impact of responsible water management on ecosystems, biodiversity, and the overall health of the planet. The work underscores the direct correlation between water safety and the well-being of societies. Inadequate water safety measures can lead to waterborne diseases, environmental degradation, and socio-economic challenges. Conversely, effective water safety planning contributes to the prevention of waterborne illnesses, preservation of ecosystems, and the promotion of a healthier and more resilient society. As societies face escalating challenges related to climate change, population growth, and urbanization, the abstract advocates for the integration of robust water safety planning into sustainable development strategies. By emphasizing the symbiotic relationship between water safety, environmental integrity, and public health, the work aims to underscore the urgency of prioritizing comprehensive water management practices in the pursuit of a sustainable and healthy future for all.

Keywords: Water Safety Planning, Sustainability, Environment, Health, Society, Healthy Future.

Poster Presentation-20

Phycoremediation of distillery effluent using novel Chlorella sp.

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ABSTRACT

Concerns about water and soil contamination stem from the fact that untreated or poorly treated distillery effluent (DE) contains several refractory and colorful chemicals, and dyes. Therefore, DE needs to be treated and detoxified properly before it can be discharged into the environment so it can meet the stringent global environmental standards. This study investigates the potential of Chlorella sp., to treat DE from distillate byproducts using phycoremediation. The microalgae strain Chlorella sp. was identified and described by biochemical and 18S rRNA gene sequencing analyses. In the phycoremediation procedure, DE was treated using a self-fabricated vertical photobioreactor (v-PBR; working capacity: 2 L). A 12-hour light/dark cycle with cool-white, fluorescent light illumination at 1000-4000 lux, an 11-day treatment period, and temperatures between 25 and 28°C were the operational parameters. All of the studied cycles reduced the COD by 61-32% and the color by 57-93% in the distillery effluent. Microalgae have successfully adapted to DE, according to the results, which show a 23% increase in biomass output. To investigate DE detoxification, a phytotoxicity test was performed using mung bean seeds (Phaseolus aureus L). When compared to untreated seeds irrigated with DE at 25, 50, 75, and 100 % (v/v), experimental results demonstrated that seeds treated with bacteria had less phytotoxicity and improved germination, root length, shoot length, root: shoot ratio, and seed vigour index (SVI). The results showed that the microalga strain Chlorella sp. mitigated the phytotoxic effects in mung beans (Phaseolus aureus L). Hence, a microalga strain Chlorella sp. could offer a chance to phycoremediate DE, protecting ecosystems and people's health. In general, the findings point to the significance of unicellular green microalgae as a system for protecting the environment.

Keywords: Distillery Waste Water, Microalgae, chlorella sp., Bioremediation, Ecotoxicity, Environmental safety.

Poster Presentation-21

Performance of paddy and mustard varieties under Casuarina equisetifolia and Dalbergia sissoo based agri-silviculture systems under partially improved sodic land

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ABSTRACT

A field experiment was conducted at Main Experiment Station (M.E.S.), Acharya Narendra Deva University of Agriculture and Technology, Kumarganj, Ayodhya (U.P.) during kharif season and rabi season of 2022-23 to yield potential of paddy and mustard under agri-silviculture system in partially improved sodic land. The trial was laid out randomized block design (R.B.D.) with four replications in three treatments. Under Casuarina equisetifolia based agri-silviculture system, paddy grain yield was found maximum (1.91 t/ha) for Sarjoo-52 followed by BPT-5204 (1.85 t/ha) variety. About 21.98% higher grain yield was found in open area than the system in the Sarjoo-52 variety, while under Dalbbergia sissoo based agri-silvi system, Sarjoo-52 variety of paddy also showed higher grain yield (1.97 t/ha) followed by BPT-5204 (1.89 t/ha). About 20.81% higher grain yield was found in open area than the system in the variety Sarjoo-52. Yield of mustard under C. equisetifolia and D. sissoo based agri-silviculture system, Varuna variety showed maximum grain yield (1.04 t/ha) followed by NDR-8501 (0.99 t/ha) under C. equisetifolia based agri-silvi system. About 23.20% higher grain yield was obtained in the open area than the system in Varuna variety. Higher grain yield (1.02 t/ha) was found in Varuna variety followed by NDR-8501 (0.95 t/ha) under D. sissoo based agri-silviculture system. 20.60% higher grain yield was obtained in the open area than the system in Varuna variety.

Keywords: Casuarina equisetifolia, Dalbergia sissoo, Paddy, Mustard, Agri-Silviculture System.

Poster Presentation-22

Isolation and Characterization of Novel Crystal Violet Degrading Brucella sp. CVS04 for Bioremediation Application

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ABSTRACT

Crystal Violet (CV), a triphenylmethane dye, has been extensively used in human and veterinary medicine as a biological stain, as a textile dye in textile processing industries, and also to provide a deep violet color to paints and printing ink. Despite its many uses, CV has been reported as a recalcitrant dye molecule that persists in the environment for a long period and poses toxic effects on the environment. It acts as a mitotic poison, a potent carcinogen, and a potent clastogene promoting tumor growth in some species of fish. Thus, CV is regarded as a biohazard substance. Therefore, the present study aimed to isolate, identify, and screen the crystal violet degrading bacterial strains from textile effluent for bioremediation applications. The collected textile wastewater sample was used for the screening and isolation of crystal violet degrading bacterial strains. In this study, a potential crystal violet degrading bacterium was isolated and named CVS04 which was further identified as Brucella sp. CVS04 through 16S rRNA sequencing analysis. The bacterial strain was identified as a new strain and deposited at NCBI Genbank under accession OR841528. The bacterial strain was able to degrade 500 ppm and thus could be used for the remediation of industrial textile effluent as well as crystal violet dye. The results of this study provide efficient microbial resources particularly dye-degrading bacterial strain, which is of great significance for protecting the water environment safety and human health.

Keywords: Crytal violet, Dye, Toxicity, Hazard, Bioremediation, Environmental Safety.

Poster Presentation-23

Millet: A health-beneficial miracle crop

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ABSTRACT

Millets are the members of the family poaceae, are small seeded, annual cereals crop grown under marginal and low fertile areas of temperate, sub-tropical and tropical region. India is the largest producer of millets in the world after USA and China. Two varieties of millet namely Pearl millet (Bajra) and Sorghum (Jowar) together contributes ~19% in the world production in 2020. Millet contains 7-12 protein, 2-5% fat, 65-75% carbohydrates and 15- 20% dietary fibre. It contains niacin that can help lower cholesterol, B6 and folic acid, and minerals like calcium, iron, potassium, magnesium and zinc. Millets have non- starchy polysaccharides and low glycaemic index, are easy to digest, gluten free and non- allergenic. They are good for individuals affected with diabetes and reduce risk of gastro-intestine disorders. Millets are rich in lecithin and are excellent for strengthening the nervous system. It contains antioxidants like polyphenols, tannins, anthocyanins, phytosterols and pinacosanols that slow aging and prevent metabolic diseases. Its consumption decrease level of triglycerides and C- reactive protein, thereby preventing cardiovascular disease. Enhanced millet production and consumption directly facilitates improving malnourishment and correcting the slow growth in correction of nutritional disorders such as anemia, surging lifestyle disorders such as diabetes, hypertension, metabolic syndrome, gluten intolerance etc.

Keywords: Glycaemic index, Anthocyanins, Phytosterols, Pinacosanols, Triglycerides.

Poster Presentation-24

Roadmap to a Plastic-Free Future: Advancing Conservation through Innovative Infrastructure

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ABSTRACT

In the pursuit of sustainable infrastructure, the integration of plastic waste into road construction stands as a groundbreaking solution to both the burgeoning plastic crisis and the imperative for eco-friendly development. The discourse begins by unraveling the intricate challenges posed by plastic pollution, emphasizing the pressing need for inventive strategies in waste management. By exploring the incorporation of discarded plastic in road materials, the presentation elucidates how this approach not only diverts plastic from landfills but also addresses the quandary of its persistent environmental impact. Central to the discussion is the analysis of the carbon footprint associated with conventional road construction methodologies. Plastic roads emerge as a compelling alternative, showcasing a tangible reduction in carbon emissions and positioning themselves as a climate-conscious choice in the realm of infrastructure development. A critical examination of the durability and longevity of plastic roads forms another cornerstone of the presentation. Through case studies and empirical evidence, we gain insights into how these roads withstand the rigors of diverse climates and heavy traffic, promising not only environmental benefits but also economic advantages through reduced maintenance requirements. However, adequate application of the waste plastics in road construction will provide roads and pavements with adequate rheological properties and reliability. Also, it will minimize the problem of dumping of waste plastics on the landfills that could pose threat to the environment. Moreover, it spotlights community engagement as a catalyst for successful plastic road initiatives, underscoring the importance of collaboration between stakeholders, local communities, and governing bodies in fostering sustainable practices.

Keywords: Sustainable Infrastructure, Burgeoning Plastic Crisis, Spotlights Community, Fostering Sustainable Practices.

Poster Presentation-25

Unveiling Antibacterial Efficacy and Mechanism of a Novel Biogenic Silver Nanoparticle: Assessing Biocompatibility with Mammalian Cell Lines

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ABSTRACT

The rise in contagious diseases and the emergence of drug-resistant microbes pose significant public health risks. Consequently, there's growing interest in exploring alternative treatments like nanoparticle-based therapy. In our study, we investigated the antibacterial properties of silver nanoparticles (Ag NPs). We developed a green synthesis method using Andrographis paniculata plant extracts to create these Ag NPs, which were characterized as having cubic and spherical shapes through Transmission Electron Microscope (TEM) analysis. An EDAX investigation confirmed the presence of Ag elements in the NPs, while Dynamic Light Scattering (DLS) was used to assess their size distribution. The synthesized NPs exhibited antibacterial effects against Staphylococcus aureus at concentrations of 100 and 200 µg/mL. These antibacterial effects were attributed to the generation of reactive oxygen species (ROS) by the Ag NPs. We conducted cytotoxicity tests on 3T3 primary murine fibroblast cells to evaluate the NPs antibacterial efficacy and toxicity, concluding that these synthesized Ag NPs hold promise for various biological applications.

Keywords: Nanoparticle; Bacterial resistance; Antibacterial activity; Reactive oxygen species; cytotoxicity.

Poster Presentation-26

Green Nanotechnology for Cleaner Water: A Sustainable Approach

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ABSTRACT

The escalating global demand for potable water in the face of increasing pollution and scarcity has necessitated innovative and sustainable solutions. Green nanotechnology has emerged as a promising avenue for addressing water quality challenges while upholding environmental sustainability. This abstract outline the principles, applications, and ecological significance of utilizing green nanotechnology for achieving cleaner water. Green nanotechnology integrates the exceptional properties of nanomaterials with environmentally conscious practices to develop efficient water treatment methodologies. At the nanoscale level, these materials exhibit high surface area, enhanced reactivity, and remarkable catalytic capabilities. Leveraging these attributes, innovative filtration systems, advanced membranes, and nanocomposite materials are engineered to selectively eliminate contaminants from water sources. Heavy metals, pathogens, and organic pollutants are effectively targeted, elevating the quality of treated water. A fundamental advantage lies in the reduced energy consumption associated with nano-enabled processes, contributing to cost-effectiveness and diminished carbon footprint. The application of nanomaterials extends the longevity and efficacy of water treatment systems, fostering long-term sustainability and resource conservation. Moreover, the utilization of biodegradable and non-toxic nanomaterials derived from renewable sources underscores the eco-friendly nature of green nanotechnology, mitigating adverse environmental impacts and ensuring safe disposal practices. While acknowledging the potential risks associated with nanomaterials, stringent regulatory frameworks and comprehensive risk assessments are imperative to ensure their safe deployment without detrimental consequences to human health or the environment. In conclusion, green nanotechnology presents an unparalleled opportunity to address water pollution concerns sustainably. By harnessing the unique properties of nanomaterials within eco-conscious frameworks, it promises efficient water treatment solutions while minimizing environmental degradation. Embracing this approach can pave the way for universal access to clean water, facilitating a healthier and more sustainable future for generations to come.

Keywords: Green Nanotechnology, Biodegradable, Carbon Footprint, Nanomaterials, Environmental Degradation.

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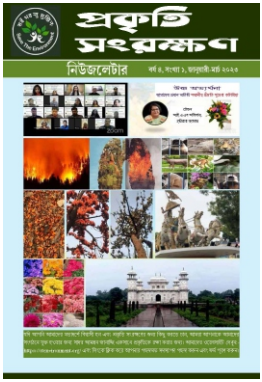

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