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August 06, 2021

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Waste Management Techniques|Agricultural Waste

Chair
Awwal Bamanga
Nigerian Maritime Administration and Safety Agency | Nigeria

Session Introduction

Title: Valorization of Labeo visceral waste by procurement of a potent cell dissociating enzyme

Charu Batav | Barkatullah University | India

Title: Impacts of coal bed methane co-produced water on agricultural soils and experimental restoration technologies

Utpal Majee | Centre for Earth Sciences | India

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Valorization of Labeo visceral waste by procurement of a potent cell dissociating enzyme

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The escalating human population and the massive amount of waste generated from the same is receiving particular attention towards valorization of waste. According to the annual report of FAO, (2018) the human consumption of fish protein has reached 87% in 2016 from 67% during 1960s. Aquaculture alone has contributed to 5.8% annual growth rate among food sectors in the past decade. In this milieu, disposal of fish visceral waste is becoming a major menace to fishery industries exerting a great economic and environmental impact. Being perishable in nature, the organic portion of the waste decomposes rapidly and acts as a breeding ground for microbes. Moreover, the hefty and indiscriminate use of antibiotics and disinfectants in farmed animals is developing resistant strains, thus raising environment and ecological concerns. In order to solve such problem, the present investigation focused upon employing the visceral trypsin as a cell dissociating agent. The efficacy of trypsin obtained from viscera of Labeo rohita upon KB cell line (Doubling time 50 hrs) was assessed in terms of cell viability. The cytotoxic effect of the visceral trypsin at 0.01%, 0.1% and 1% concentration were investigated at three time points (10 sec, 15 sec and 20 sec). Commercial (bovine) trypsin (SS) was considered as control. A time dependent decrease in cell viability upon gradually increasing the concentration was observed in all groups of treatment. Cell viability at 0.01% concentration was found to be 82%, 80% and 75%, viability at 0.1% concentration was found to be 95%, 90% and 97%, and viability at 1% concentration was 93%, 98% and 98% respectively at three time points. The lowest reduction in cell viability (2%) was observed with 1% concentration at 15 sec and 20sec. Although, commercial trypsin was found more efficient than trypsin isolated from waste during this study but the potency of visceral trypsin observed cannot be ruled out. Thus, the application of this enzyme as a cell-dissociating agent suggested it as a comparable candidate with commercial trypsin.

Biography

Charu Batav has completed her Ph.D. at the age of 30 years from Barkatullah University, Bhopal M.P. India. She is the Guest Faculty at the Department of Biotechnology Barkatullah University, M.P. India, since 2013. She has currently 6 publications, and has been serving as a reviewer of the journal Waste Management, Elsevier.

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Impacts of coal bed methane co-produced water on agricultural soils and experimental restoration technologies

Utpal Majee, Chattopadhyay G N and **Chaudhury S**
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Huge quantity of coal bed methane (CBM) has been identified in coal bearing belts of the eastern part of India. Good quantity of coal bed water (CBW) is also being released along with the CBM. Contamination of this water with the nearby agricultural lands frequently damages the soil and consequently the production of agricultural crops. This situation called for some specific management which would allow safer release of this CBW to the nearby lands. In this study, general properties of CBW were assessed and the values of different parameters were compared with irrigation water criteria. The outcomes revealed that the quality of CBW was largely dominated by different salinity and alkalinity attributing properties. CBW affected soils with regard to nearby non-affected soils were also analysed. The electrical conductivity (EC) as well as exchangeable sodium percentage (ESP) of the contaminated soils increased significantly owing to highly saline and alkaline nature of CBW. However, alkalinity was prominent. Organic carbon, N and P showed a declining trend in the CBW affected soils. Reverse osmosis (RO) has been used for partial reclamation of CBW with EC values up to 2 ms cm-1. The study revealed steady improvement of salinity/alkalinity attributes. Major plant nutrients viz. N, P and K were influenced by variations in the degree of reclamation of CBW through RO. In view of the severity of this problem in CBW affected soils, three soil amendments viz. gypsum, organic matter (vermicompost) and Sulphur in reclamation of these CBW affected soils of varying grades were assessed under laboratory condition. Use of gypsum improved ESP, SAR and pH significantly over no amendment treatments. In view of the outcomes, an on-farm trial was conducted. Combined use of gypsum and vermicompost resulted in considerably higher crop yields which was 66.66% higher than current average yield of West Bengal.

Biography

Utpal Majee has completed his PhD from Visva Bharati (founded by Nobel laureate Rabindranath Tagore), Santiniketan, India. Currently, he joined as National postdoctoral fellow at Indian Institute of Science (IISc.), Bangalore. Dr. Majee secured first position in his M.Sc. and received reputed INSPIRE Fellowship for Ph.D. from Department of Science and Technology, Govt. of India. He also has qualified National Eligibility Test (NET) conducted by University Grants Commission of India. Along with that these, he also contributed a good number of researches in reputed international journals.

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Sustainable Development| Solid Waste Management | Ground Water Management|Waste Management

Chair
Reza Zahedi
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Session Introduction

Title: Investment opportunities in the waste management Industry for sustainable economic growth in Africa

Benjamin Anabaraonye | University Of Nigeria | Nigeria

Title: Community Driven Solid Waste Management in Western Indian Himalayan Region: A Case Study of Himachal Pradesh

Rakesh Kumar Singh | G.B. Pant National Institute of Himalayan Environment | India

Title: Study of Fluoride of Ground Water in Southern Rajasthan, India

Chandra Shekhar Kapoor | Govind Guru Tribal University | India

Title: Waste as a Resource: Waste utilization and eco-cultural ethos of India

Satya Prakash Mehra | Rajputana Society of Natural History | India

Title: Removal of textile microfibers from water streams by air flotation

Marielis Zambrano | North Carolina State University| USA

Investment opportunities in the waste management Industry for sustainable economic growth in Africa

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Africa is a continent which has the abundance of human and natural resources, including skills and talents which are needed to maximize the green entrepreneurial opportunities in waste management for our sustainable economic growth locally, nationally and globally. According to recent studies, impact investments are made in companies, and organizations that intend to generate social and environmental impact along with a financial return. This study identifies that impact investment in the waste management Industry in Africa will certainly go a long way in meeting development needs and helping our continent to achieve the sustainable development goals. This study outlines the impact investment strategies to maximizing the waste management industry in Africa and for building resilience and reducing vulnerability for a sustainable future. Through literature and participant observation, it has been discovered that there is an urgent need to educate communities and institutions locally, nationally and globally about the innovative solutions in waste management for sustainable development. This paper is therefore very significant as it explores the impact investment strategies and opportunities, practices and policies for mitigation and adaptation to the impacts of climate change through proper waste management for sustainable economic growth in Africa.

Biography

Benjamin Anabaraonye is a postgraduate student and researcher at the Institute of Climate Change, Energy and Environment Studies, University of Nigeria, Nsukka. He is also an award-winning author, poet and CEO of the Benjy Poetry and Music Global Concepts based in Nigeria. He has received trainings and awards in the field of climate change from the United Nations Institute of Training and Research (UNITAR) and Hamburg University Of Applied Sciences, Germany. His research papers have been featured in international academic journals with high impact factor. Benjamin has attended International Conferences and presented his research papers in the field of climate change adaptation and mitigation with remarkable impact. He is also the founder and host of the Project Green Blog (www.projectgreeninitiative.wordpress.com) which features articles and poems on climate change adaptation and mitigation for global sustainability. Through the Project Green Initiative which is an arm of his company, He conducts research and seminars along with his team on climate change adaptation and mitigation for global sustainability.

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Community Driven Solid Waste Management in Western Indian Himalayan Region: A case study of Himachal Pradesh

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The focus of the study is to develop a systematic management strategy for the solid waste generated in the urban municipal areas of the state of Himachal Pradesh. The state of Himachal Pradesh consists of 12 districts covering 55,673 km2 geographical areas. It is situated in the abode of the Himalayas. Hence hold valuable ecological and economical resources such as water, land, air and forests. The conservation of these resources becomes beneficial as it fed all the low-lying population of the northern parts of India. The Himalayan ecosystems exhibit a great dynamism, and are recognized for its ecological and economic values manifested by ecosystem integrity, adaptability and ecosystem services. But, due to various anthropogenic activities namely, over exploitation, habitat degradation, deforestation, development of roads, different hydropower projects, industries, urbanization, mass tourism, solid waste generation, biomass burning, forest fire, etc., and changing environmental conditions particularly climate change, the important components of ecosystems are facing tremendous pressure and depleting fast. Among the anthropogenic activities, solid waste management has become one of the major problems across the globe. Increasing human population, rapid urbanization and unplanned disposal of solid waste has created a lot of problems across the globe, in India and in the Indian Himalayan region. The unplanned disposal of solid waste by the inhabitants has increased the air, water and soil pollution. The pollution in soil, air and food items have resulted the environmental degradation and deterioration of ecosystem health. On an average, waste generation in India is expected to increase at the rate of 1-1.33 % annually, and by the end of 2047, India will be generating 260 tons of waste annually which is 5 times of current status requiring 1400 km2 of the land to dispose. Solid waste management in India is generally non-systematic. Public participation is must in managing household waste to reduce municipal solid waste in order to develop a proper solid waste management policy. In the state of Himachal Pradesh, the rise in urban population is due to migration from rural to semi-urban and urban settlements. This sudden increase has created a chaos in the solid waste management practices of local urban governing bodies. The unplanned disposal sites in the areas have drawn the focus as it is contaminating adjoining soil and water streams. The study for soil and water contamination due to solid waste was carried out at 7 sites (Manali, Kullu, Mandi, Bilaspur, Hamirpur, Kangra, Chamba) of the 6 districts (Kullu, Mandi, Bilaspur, Hamirpur, Kangra, Chamba) in the state of Himachal Pradesh. The soil and water samples were analyzed for the physical and chemical properties along with heavy metal analysis for the selected sites. Heavy metals were found below detectable limits or below the permissible limits prescribed by national standards in the samples but other chemical parameters indicated the contamination. Solid waste can be managed in a best way by way of people participation, capacity building and awareness programme, reclamation of dumping site by plantation of suitable planting species and solid waste demonstration models, etc. The findings and primary data of this study can be used as a baseline data for the future research and policy planning.

Biography

Rakesh Kumar Singh, presently working as Scientist-F & Head in G.B. Pant National Institute of Himalayan Environment, Himachal Regional Centre, Mohal, Kullu, Himachal Pradesh which is an autonomous R& D Institute of the Ministry of Environment, Forest & Climate Change, Government of India. He has more than 18 years of R& D experience. He published more than 30 Research Papers in various peer reviewed National and International journals, Presented 7 papers in National Conferences, Published 20 popular articles and 01 book chapter. He is a Fellow of the Institution of Electronic and Telecommunication Engineers (IETE), New Delhi, India; member of 04 International professional societies and life member of 17 professional societies of National repute. He participated in various national and international events; he organized various training programmes, conferences and meetings for various groups of stakeholders as a Convener and Coordinator. He is a recipient of "Bharat Shiksha Ratan Award – 2013", conferred by Global Society for Health & Educational Growth, New Delhi.

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Study of Fluoride of Ground Water in Southern Rajasthan, India

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Fluoride is a naturally occurring toxic minerals present in drinking water and study causes dental, skeletal or non-skeletal fluorosis etc. Fluorspar, Cryolite and Fluorapatite are the naturally occurring minerals, from which fluoride finds its path to ground water through infiltration. In the present investigation fluoride were estimated in ground water samples from different districts from southern Rajasthan. The live districts were Udaipur, Dungarpur, Banswara district of southern Rajasthan studied dung summer, rainy, winter season (2019-2020). They were analyzed to adopt the standard method of APHA. To estimate the quality of ground water, fluoride was compared with the standard desirable limit of that parameters stipulated for drinking water as prescribed by BIS and WHO. The analysis also reveals high concentration of fluoride than the desirable limit (<0.6mg/L) in Udaipur. The values of fluoride were also found higher in Dungarpur, compared to Banswara and Udaipur. Mostly cases of fluorosis both of dental and skeletal have clearly observed in Dungarpur. The one way ANOVA test analysis was conducted to determine highly significant value of different districts. All values were found highly significant difference (di=4, 835, p<0.001) in districts.

Biography

Chandra Shekhar Kapoor is a researcher at Department of Environmental Sciences, Mohanlal Sukhadia University. His international experience includes various programs, contributions and participation in different countries for diverse fields of study. His research interests reflect in wide range of publications in various national and international journals. He is the Editorial Board Member of several Journals and serves as a member of various associations, apart from being an author for many books. Her Research Interest would be Air Pollution, Air Quality, Atmospheric Pollution, Air Pollution Studies, Aerosol Science, Environment Engineering & Biotechnology, Studies about various kind of pollutants, Water characteristics and remedial measure.

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Waste as a Resource: Waste utilization and eco-cultural ethos of India

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'Waste' is treated as the discarded matter from the modern society of humans. It is the most common feature of the consumerist world which follows the concept of 'Use & Throw'. On the contrary, the indigenous and the customary laws of the Indian culture nullify the concept of wastage. The eco-traditional approach of Indian society states the utility of every matter into one or the other form for the well being of the nature. Every form of state adds the value for particular format. This is well understood by the concept of '*upyog*' (utilization). The present study reviews the age-old eco-cultural customs and traditions which could prove to be the solutions of present day challenges of waste management. Further, using the concept of eco-traditions, the action research was executed and a concept was developed which could be a proven solution in the field of site-specific interventions for converting waste as a resource especially when it matters with the revenue generation. The approach not only gives a solution for waste management but also provide solutions for the well-being of people and the planet, thus, providing steps towards the UN SDGs 3, 6, 7, 11-15. The present outcomes are based on the investigation of the waste disposal sites with respect to avifauna to develop as conservation sites for birding; executed action for conversion of the waste disposal sites into green (&/or blue) space; and developing a site with a plantation of economic importance through phytoremediation to mitigate the challenges of waste water. The approaches are exemplified from the human settlements (urban, rurban, rural); individual housing; institutional sites; waste dumping sites; and industrial sites. This has also given a new approach of *Enviropreneurship* programme for the youngsters or the small scale units acting as an additional source of income or revenue generation.

Biography

Satya Prakash Mehra is a trained Environmental cum Development Professional with an experience of over 23 years in Asian, African & European nations in association with different platforms in different capacities. He achieved his academic degrees [UG (BSc), PG (MSc), and Doctoral (PhD)] with the Environmental Science as major subject followed by the legal knowledge [LLB, LLM (Human Rights - Env. Rights)] and other associated certificate courses and executed the knowledge in the development sector for the nature conservation and the well being of humans. With the contributions of over 200 as scientific research articles and popular articles, he sensitized the stakeholders towards the challenges. He achieved several honors and awards for his grass root actions in the field of conservation and environment protection.

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Removal of textile microfibers from water streams by air flotation

Marielis Zambrano, Richard Venditti, Joel Pawlak, Ryan Walters, Cassie Bolton and **Erica Castillo-Duran**
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The presence of textile microfibers in our waterways, oceans, sediments, air, and food chain is an emerging issue of which long-term ramifications are not known. Textile microfibers released during home laundering, use, and disposal can significantly contribute to microplastic pollution and are an important environmental issue. Most studies report synthetic microfibers (microplastics) such as polyethylene terephthalate (PET), nylon, and acrylic. Nevertheless, recent studies have also found important amounts of cellulosic and other natural textile fibers in different environments.Wastewater treatment plants (WWTP) are not designed for microplastics removal, but they have a high removal capacity (>98%). Nevertheless, tiny particles and microfibers (< 100 μm) are still released with the effluents. Moreover, there is evidence that both synthetic and cellulosic textile microfibers are present in the WWTP effluents. Besides, the persistent microplastics stay in the sludge that is commonly used as fertilizer. In this study, the goal was to assess the feasibility of using air flotation technologies to remove textile microfibers from water streams. Acrylic, cotton, polyester, and nylon microfibers were produced with controlled size distribution using a Wiley mill. Natural fibers such as cotton were considered even though they are not plastics because they represent a significant volume of textile production. In addition, cotton fibers have different surface chemistry than synthetic fibers due to their nature and the functional finishes commonly applied to improve their properties. The air flotation experiments show that even without using foaming agents, synthetic textile microfibers such as polyester, nylon, and acrylic are removed from water by the air bubbles, > 40% removal efficiency. On the other hand, for hydrophilic fibers such as cotton, the foaming agent must be added to achieve effective removal (>50%). In addition, it was observed that the size of the microfibers affects the removal efficiency of cotton microfibers which can be related to the surface hydrophilic and net negative charge of these microfibers.

Biography

Marielis Zambrano hold a PhD in Forest Biomaterials and a bachelor's degree in Chemical Engineering. She have experience in research development, project management, sustainability, and circular economy.The sustainability world intrigued me, and She is very much believe in the value and importance of this area. As a Ph.D. student, her research area relates to an environmental sustainability hot topic -- the plastic contamination in aquatic environments, specifically, microplastics or microfibers shed during the laundering of textiles. During my research, She have learned about the effects of plastics in the environment and the opportunities in the industry to promote the circular economy. Her immediate career goal is to apply the knowledge obtained during my career in industry and academia to create solutions to plastic pollution.

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