

TEQIP III Sponsored
INTERNATIONAL CONFERENCE ON
MATERIALS FOR ENVIRONMENT, SUSTAINABLE
SOCIETY AND GLOBAL EMPOWERMENT
(MESSAGE – 2019)



Jointly Organized by



**Department of Nanotechnology,
Visvesvaraya Technological University**



**National Environmental Science
Academy New Delhi, India**

In Association With



**Aryabhata Knowledge
University Patna, Bihar**



**Biju Patnaik University of
Technology, Rourkela, Odisha**



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FOREWORD

It is our great pleasure to extend our heartiest welcome to all the delegates of TEQIP-III sponsored one day International Conference on “**MATERIALS FOR ENVIRONMENT, SUSTAINABLE SOCIETY AND GLOBAL EMPOWERMENT (MESSAGE - 2019)**” organized by **Department of Nanotechnology, Visvesvaraya Technological University (VTU), Center for Postgraduate Studies, Muddenahalli, Chikkaballapur - 562101.**

This conference aims to provide a platform for researchers, industries, NGOs to promote collaborative approach for development of new and innovative domain in materials science and engineering and their applications in creating a sustainable society and for global empowerment in the areas of energy, biotechnology and environmental sciences. This is the time where the interdisciplinary studies are highly essential for the overall survival. The invited talks will be delivered by experts among the globe.

All the scientific events get life through the participation of eminent academicians, scientists, industrialists and research scholars. We are delighted to acknowledge the presence of galaxy of renowned researches in the symposium from all over the world who would be adding flavor and fragrance to the academic deliberations.

We express our profound sense of gratitude to the **Vice-Chancellor, Registrar, Registrar (Evaluation)** and other officers of Visvesvaraya Technological University, Belagavi for their support. We also express our sincere thanks to the **Coordinator** and **all the faculty members** of VTU PG Center, Muddenahalli for their support.

We are extremely grateful to all the delegates who enthusiastically registered and came to birth place of Bharat Ratna Sir M. Visvesvaraya Muddenahalli to make this conference a grand success. Their active participation would throw enough light to decide the mandate for the century. We are sure that the participation of such active and devoted scientists, technologists and industrialists in the deliberations of the conference will add new dimensions to research in this area with emphasis on interdisciplinary collaborative approach to serve mankind in the years to come.

We once again heartily welcome you all to **Bharat Ratna Sir M. Visvesvaraya's** birth place **Muddenahalli** and fruitful deliberations in the event.



Dr. Sushil K Singh



Dr. Dinesh Rangappa



Dr. Prasanna D Shivaramu



Dr. Lokesh S. V.



Visvesvaraya Technological University



Visvesvaraya Technological University (VTU) is one of the largest Technological Universities in India with two decades of Tradition of excellence in Engineering & Technical Education, Research and Innovations. It came into existence in the year 1998 to cater the needs of Indian industries for trained technical manpower with practical experience and sound theoretical knowledge. University has very successfully achieved the tremendous task of bringing various colleges affiliated earlier to different Universities, with different syllabi, different procedures and different traditions under one umbrella. The university having 218 affiliated colleges, 1 constituent college and 17 Autonomous colleges with undergraduate courses in 35 disciplines, PG program in 94 disciplines and Ph.D & M.sc (Engg.) with research programs in 592 departments, over 4 lakhs Engineering Students study in the various institutes affiliated to the University. The University has 13 Quality Improvement Programme (QIP) centers in various affiliated colleges and 16 extension centers for offering PG programs. The University has revised the syllabus for UG and PG from the academic year 2014-15. It has four regional centers across the State of Karnataka in Belagavi, Bengaluru, Kalaburagi and Mysuru respectively. University is comprised of a multi-disciplinary and multi-level institution offering wide ranging programmes in engineering, technology and Management. The University is making steady progress in developing and providing best technical environment for education and will continue to serve the nation in coming years. Equipped with the extremely rich resources of an outstanding student body and faculty strong partnerships with business, industry, and government and support from alumni and friends, VTU is designing a future of global preeminence, leadership, and service. VTU is the first university in the country to adopt Innovative steps in the examination reforms by adopting Digital Evaluation System in the year 2011-12 followed by online services like delivery of question papers to affiliated colleges (Question Paper Delivery System-QPDS), result announcement, photocopy availability, PG courses thesis valuation, Ph.D. thesis valuation and Examination Results announced on Mobile Phone through SMS.



VTU has established Centre of Excellence at various places in Karnataka in different scopes to bring a change in the technology and society.

- VTU Bio-Fuel Information and Demonstration center at Belagavi.
- VTU center for Nanotechnology at Bengaluru
- VTU National Academy for Skill Development at Dandeli in Uttar Kannada District
- Parisar Chair at Belagavi
- VTU Innovation Clubs at VTU and in Affiliated Engineering Colleges.
- VTU Institute of Advanced Technologies at Muddenahalli
- E-Learning Center at Mysuru, and
- VTU Bosch Center of Competence at Mysuru

The VTU have worldwide electronic presence by establishing data network interconnecting VTU campus at Machhe, four regional offices and all the affiliated colleges of VTU in a secure private network and open up access to this network to the worldwide communities for collaborative learning using Internet technology.

The campus network uses the state of art network tiered architecture with Edge and Core switches and scalable distributed network topology. This network will meet the computing demand of PG students in the campus, provide eLearning environment, access to digital library, support examination, administration work and more importantly have sufficient bandwidth for Videoconferencing from any network access point.

Today, we're still changing the world. Since those early beginnings students and alumni have gone on to design and engineer the tools, buildings, and products that helped define their generations. And tomorrow's VTU students will do the same.



About National Environmental Science Academy (NESA)



National Environmental Science Academy was founded by Late Prof TRC Sinha and it was registered in 1988 at Patna under Societies Registration Act XXI of 1860. The present Head Quarter is at New Delhi. The main objective of the Academy is to bring awareness about the environment among the masses by arranging lectures, demonstrations, training programmes, seminars, symposium, conferences, publishing journals, etc. Its major aims and objectives include promotion of environmental sciences among young minds and researchers, setting up regional and state Chapters for dissemination of information on environment, to hold Annual Conference, to organise national/international level conferences, symposium, seminars, meetings and workshops on themes of environmental concerns and to publish policy papers, synthesis volumes, proceedings, journals, newsletter, transactions and other publications for the promotion of Environmental Sciences. Various eminent personalities had graced the Academy as its President including Dr. K.C. Bose, Dr. B.S. Attri and Padmabhushan Dr. S. Z. Qasim. Prof. Javed Ahmad (Former Dean, Faculty of Science), Jamia Hamdard, New Delhi is the present President of the Academy. NESA has organized around 32 conferences. Annual Awards offered are (1) **NESA FELLOWSHIP AWARD** (2) **NESA EMINENT SCIENTIST AWARD** (3) **NESA SCIENTIST OF THE YEAR AWARD** (4) **NESA ENVIRONMENTALIST AWARD** (5) **NESA GREEN TECHNOLOGY INNOVATIVE AWARD** (6) **NESA YOUNG SCIENTIST AWARD** (7) **NESA JUNIOR SCIENTIST AWARD**. NESA publication include monthly NEWSLETTER, INTERNATIONAL JOURNAL ON AGRICULTURAL SCIENCES ISSN NO. 0976-450X | NAAS R A T I N G 2 . 6 0 ; INTERNATIONAL JOURNAL ON ENVIRONMENTAL SCIENCES ISSN NO. 0976-4534 |NAAS RATING 3.06; INTERNATIONAL JOURNAL ON BIOLOGICAL SCIENCES ISSN NO. 0976-4518 | NAAS RATING 3.14; INTERNATIONAL JOURNAL ON CHEMICAL SCIENCES ISSN NO. 0976 - 4526; INTERNATIONAL JOURNAL ON PHYSICAL SCIENCES ISSN NO. 2230-9683; INDIAN JOURNAL OF UNANI MEDICINE ISSN NO. 0974-6056 and Environmental Abstracts.



About Aryabhata Knowledge University

Aryabhata Knowledge University (AKU), Patna has been established by Government of Bihar for the development and management of educational infrastructure related to technical, medical, management and allied professional education in the state. The objective of the university is to promote the professional education infrastructure to meet the national standard through well advanced course, infrastructure and quality faculty. Colleges and institutions imparting professional education such as Engineering and Technology including information Technology, Nano technology & Biotechnology, Management, Medicine, Health technology, Public Health Pharmacy, Optometry, Nursing, Education, Law etc. are affiliated with Aryabhata Knowledge University.



About the Department of Nanotechnology

The department of nanotechnology was established in the year 2012. The department encompasses highly qualified dedicated faculties who imbibe and nurture the students with all practical skills apart from the Teaching-learning process. The courses offered by the department are M.Tech in Nanotechnology and Ph.D. in nanotechnology. Currently more than 25 students are working for their Ph.D.

The faculty members of the Department of Nanotechnology are having ongoing funded research projects from various funding agencies of both state and central Government and also International Collaborative Research Projects.

Facilities available in the Department

1. State of the art Nanomaterials Synthesis Lab
2. X-ray Diffractometer
3. Scanning Electron Microscope
4. Atomic Force Microscope
5. FT-Infrared Spectrometer
6. UV-Vis-NIR Spectrophotometer
7. TG-DTA
8. Spray Pyrolysis
9. Chemical Vapor Deposition Unit
10. Spin Coating Unit
11. Dip Coating Unit
12. Ball Milling
13. Battery Fabrication and Testing Facility



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- Ms. Amulya G, Dept. of Nanotechnology, VTU

DAY 1: THURSDAY, 19 th DECEMBER, 2019									
09.00 am - 10.00 am	REGISTRATION								
10.00 am - 11.15 am	INAUGURATION & AWARD CEREMONY								
11.15 am-12.00noon	TEA BREAK / POSTER SESSION (PP-001 to PP-060)								
12.00noon - 12.45 pm	Key Note Address – 1 <i>“Designing of Non-flammable Sodium-ion Batteries for Large Scale Stationary Storage Systems”</i> Prof. Palani Balaya FACerS, Academician, World Academy of Ceramics, Department of Mechanical Engineering, National University of Singapore, SINGAPORE								
TECHNICAL SESSION - I Session Chair: Prof. S. K. Muttagi Scientific Officer, VGST									
12.45 pm – 01.20 pm	Plenary Lecture – 1 <i>“Prospective of geopolymer (green cement) as an alternate to ordinary cement for construction material for the sustainable environment”</i> Prof. Vinay Kumar Jha Professor, Central Department of Chemistry, Tribhuvan University, Kirtipur, Kathmandu, NEPAL								
01.20 pm - 02.15 pm	LUNCH BREAK / POSTER SESSION(PP-001 to PP-060)								
	<table border="1"> <thead> <tr> <th>TECHNICAL SESSION – II Hall 1 Session Chair: Dr. S. Anand Kumar, Department of Mechanical Engineering, IIT-J</th> <th>TECHNICAL SESSION – III Hall 2 Session Chair: Dr. K. Mantelingu, DOS in Chemistry, UoM</th> </tr> </thead> <tbody> <tr> <td>02.15 pm - 02.45 pm</td> <td> Invited Talk – 4 <i>“Adopting sustainable technologies for eco-friendly living... A small attempt to save environment”</i> Dr. Sridhara. N. Thermal Systems Group, Mechanical Systems Area, Isite, U.R. Rao Satellite Centre, ISRO, Department Of Space, Bengaluru-560037 </td> </tr> <tr> <td>02.45 pm - 03.15 pm</td> <td> Invited Talk – 5 <i>“Smart polymeric systems for advanced applications: Where we are and where we go?”</i> Dr. Prashantha Kalappa Professor, Research and Development Centre, Adichunchanagiri University, B.G Nagara - 571448, Mandya District, Karnataka </td> </tr> <tr> <td>03.15 pm - 03.45 pm</td> <td> Invited Talk – 6 <i>“Prospect of Nano fertilizers for safe seed spices production”</i> Dr. Gopal Lal Director, ICAR-National Research Centre on Seed Spices Tabiji, Ajmer-305 206, Rajasthan, India </td> </tr> </tbody> </table>	TECHNICAL SESSION – II Hall 1 Session Chair: Dr. S. Anand Kumar , Department of Mechanical Engineering, IIT-J	TECHNICAL SESSION – III Hall 2 Session Chair: Dr. K. Mantelingu , DOS in Chemistry, UoM	02.15 pm - 02.45 pm	Invited Talk – 4 <i>“Adopting sustainable technologies for eco-friendly living... A small attempt to save environment”</i> Dr. Sridhara. N. Thermal Systems Group, Mechanical Systems Area, Isite, U.R. Rao Satellite Centre, ISRO, Department Of Space, Bengaluru-560037	02.45 pm - 03.15 pm	Invited Talk – 5 <i>“Smart polymeric systems for advanced applications: Where we are and where we go?”</i> Dr. Prashantha Kalappa Professor, Research and Development Centre, Adichunchanagiri University, B.G Nagara - 571448, Mandya District, Karnataka	03.15 pm - 03.45 pm	Invited Talk – 6 <i>“Prospect of Nano fertilizers for safe seed spices production”</i> Dr. Gopal Lal Director, ICAR-National Research Centre on Seed Spices Tabiji, Ajmer-305 206, Rajasthan, India
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02.15 pm - 02.45 pm	Invited Talk – 1 <i>“Oxide Nano materials for Global Empowerment”</i> Dr. B. M. Nagabhushan Professor, Department of Chemistry & Vice president of LSIKC M.S. Ramaiah Institute of Technology (MSRIT), Bangalore- 560054								
02.45 pm - 03.15 pm	Invited Talk – 2 <i>“Li-ion battery Manufacturing in India: Opportunities and Challenges”</i> Dr. K. Ramesha Scientist, Functional Materials Division, CSIR-Central Electrochemical Research Institute, Karaikudi, Tamilnadu								
03.15 pm - 03.45 pm	Invited Talk -3 <i>“Greenhouse gas emission from agricultural ecosystem: Emission andMitigation with reference to climate change”</i> Prof K. K. Baruah Dean School of Life Sciences, School of BioSciences and School of Env and Earth Sciences, Royal Global University. Adjunct Prof Cotton University. Retired Prof and Dean of Tezpur Central University, Assam								
03.45 pm - 04.15 pm	TEA BREAK / POSTER SESSION (PP-001 to PP-060) Session Chair:								
04.15 pm - 06.00 pm	<table border="1"> <thead> <tr> <th>TECHNICAL SESSION – IV Oral Presentation OP-01 to OP-10 Session Chair: Dr. Kumara M. N. Department of Chemistry, UoM</th> <th>TECHNICAL SESSION – V Oral Presentation OP-11to OP-20 Session Chair: Dr. Ananda Kumar C. S., Department of Nanotechnology, VTU</th> </tr> </thead> </table>	TECHNICAL SESSION – IV Oral Presentation OP-01 to OP-10 Session Chair: Dr. Kumara M. N. Department of Chemistry, UoM	TECHNICAL SESSION – V Oral Presentation OP-11to OP-20 Session Chair: Dr. Ananda Kumar C. S. , Department of Nanotechnology, VTU						
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06.15 pm - 07.30 pm	CULTURAL PROGRAMME								
07.30 pm	BANQUET DINNER								
	END OF DAY ONE								

TECHNICAL SESSION –VI Session Chair: Prof. Sushil Kumar Singh, Scientist "F" Solid State Physics Lab, DRDO, New Delhi		
10.00 am - 10.35 am	Plenary Lecture – 2 <i>“Advanced Ceramics – Materials & Applications”</i> Shyam S Rao Sr.VP -Industrial Ceramics Division -HSR -CUMI	
10.35 am - 11.10 am	Plenary Lecture - 3 <i>“The importance of carbohydrates as biomaterials in day to day life”</i> Prof. K. M. Lokanatha Rai University of Mysore, Mysuru	
11.10 am - 11.45 am	Plenary Lecture – 4 <i>“Nanotechnology - Applications in Environmental Science and Engineering”</i> Prof. K. S. Lokesh Registrar, JSS Science & Technology University, Mysuru	
11.45 am – 12.15 pm	TEA BREAK / POSTER SESSION (PP-061 to end)	
	TECHNICAL SESSION – VII Hall 1 Session Chair: Dr. K.S. Anantha Raju, Prof., DSCE Bengaluru	TECHNICAL SESSION – VIII Hall 2 Session Chair: Dr. Nagaswarupa H.P., Department of Chemistry, Davangere University
12.15 pm - 12.45 pm	Invited Talk – 7 <i>“Synthesis of Metal oxide Heterostructures by Hydrothermal method and their applications”</i> Dr. Sreekantaswamy S Director, College Development Council, University of Mysore, Mysore	Invited Talk -9 <i>“Application of metal oxide nanomaterials for lithium ion battery and Hydrogen generation”</i> Dr. G. Nagaraj Dept. of Chemistry, Siddaganga Institute of Technology, Tumkur
12.45 pm - 01.15 pm	Invited Talk – 8 <i>“Photocatalytic Materials for Sustainable H 2 Production from Wastewater”</i> Prof. M. V. Shankar, CChem, FRSC Professor, Department of Materials Science and Nanotechnology Yogi Vemana University, Kadapa, Andhra Pradesh	Invited Talk -10 <i>“New hopes to overcome the challenges in Quantum Dot Sensitized Solar Cells”</i> Dr. R. Geetha Balakrishna Director, Center for Nano and Material Sciences, JAIN University, Bangalore
01.15 pm – 02.00 pm	LUNCH BREAK / POSTER SESSION (PP-061 to end)	
	TECHNICAL SESSION – IX Hall 1 Session Chair: Dr. Chandra Shekara K T, Institution of Excellence , UoM	TECHNICAL SESSION – X Hall 2 Session Chair: Dr. Vijay Kumar M S, Department of Chemistry, UoM
02.00 pm - 02.30 pm	Invited Talk –11 <i>“Application and potential of CRISPR/Cas9 guided genome editing for minimizing early embryonic loss”</i> Dr. Sukanta Mondal Principal Scientist, Animal Physiology Division, ICAR- National Institute of Animal Nutrition and Physiology (NIANP), Bangalore	Invited Talk –13 <i>Production of Silica Nanoparticles from Rice husk and their Possible Applications</i> Dr. Rakesh Kr Singh University Centre of Nanoscience & Nanotechnology, under school of Engineering and Technology of Aryabhata Knowledge University Patna
02.30 pm - 03.00 pm	Invited Talk –12 <i>“Survivability and Growth Enhancement of X. helleri by L. camara based Carotenoid Incorporated Formulated Feed”</i> Dr. Bela Zutshi Aquatic Biology, Fish Toxicology and Environmental Biology Section, Bangalore University	Invited Talk –14 <i>“Resources recycling through urban mining: Recovery of valuable metals from e-waste by hydrometallurgical method”</i> Dr. J. Manjanna Deputy Registrar , Rani Chennamma University, Belagavi
03.00 pm - 04.00 pm	TECHNICAL SESSION – XI Oral Presentation OP-21 to OP-26 Session Chair: Dr. S. V. Lokesh, Department of Nanotechnology, VTU	TECHNICAL SESSION – XII Oral Presentation OP-27 to OP-32 Session Chair: Dr. Prasanna D Shivaramu, Department of Nanotechnology, VTU
04.00 pm - 04.15 pm	TEA BREAK	
4.15 pm - 05.00 pm	AWARD FUNCTION and VALEDICTORY	



Keynote Address - I

Dr. Palani Balaya

Associate Professor

Department of Mechanical Engineering

National University of Singapore.

email: mpepb@nus.edu.sg

Title: Designing of Non-flammable Sodium-ion Batteries for Large Scale Stationary Storage Systems

For centuries, researchers have been trying to solve the energy issue for human civilization. With growing consideration on environmental problems, people are trying to harvest energy from alternative energy resources such as solar, wind and tide, where energy storage system (ESS) becomes mandatory to address their intermittency.

Currently lithium-ion batteries (LIBs) are preferred for ESS. High power density LIBs addressing intermittency of renewables uses lithium titanate as anode but is expensive (\$300-400/kWh). Besides, lithium is a scarcity. Sodium, on the other hand, is the sixth most abundant element on the Earth's crust. Sodium-ion batteries (NIBs) operating at ambient temperature are expected to be durable, safe and inexpensive (less than \$200/kWh). Regardless of the relatively lower energy density of NIBs, they can be effectively employed in smart grid applications, where the weight and footprint requirement are not severe.

In this talk, a comprehensive study on electrolyte, anode and cathode for an industry-standard non-flammable NIB will be presented. More specifically, investigations on thermal stability and related solid-electrolyte interphase (SEI) studies on hard carbon (HC) anode material, and two types of cathode, modified $\text{Na}_3\text{V}_2(\text{PO}_4)_3$ (NVP) and O3-type layered oxide will be discussed. We will also present performance of 18650-type commercial cells fabricated using modified NVP as cathode with HC as anode. Heat generation and associated internal resistances of such 18650 type cells will also be discussed.



Profile:

Just after graduating from Hyderabad University, India (1993) in the area of Solid State Ionics, **Dr. Palani Balaya** joined IISc, Bangalore as a Research Associate (1994-1996) and worked on insulating materials. He later joined the Inter University Consortium Mumbai, as a Scientist (1996-2001) before moving to Max Planck Institute for Solid State Research, Stuttgart as a Guest Scientist (2001-2006) to work in the area of Nano-ionics. Dr. Palani Balaya joined the Faculty of Engineering, NUS as an Assistant Professor in January 2007. Since July 2014, he works as an Associate Professor at NUS. His research areas include energy conversion and storage. Specifically, he works on fast chargeable lithium-ion battery for EV applications, sodium-ion battery for micro-grid and solar housing applications. He served as a **Topical (Battery, Fuel Cell, Capacitor) Editor** for the Journal of Solid-State Electrochemistry (Jan. 2013-Oct. 2017). He has been elected as an **Academician** by the World Academy of Ceramics, Italy in Sept. 2019. He was also elected as a **Fellow** of the American Ceramic Society (ACerS) in March 2019. He was recognized by ACerS as an **ACerS Global Ambassador** (2016), recipient of **Global Star Award** (2015) from ACerS, **Late Shri Har Mahandar Singh Chhatwal Memorial Award** (2015) from Indian Ceramic Society, **Shell Ideas360 Passionate Mentor** (2015) from the Shell Companies in Singapore, the **Max Planck Fellowship** (2001), etc. He has served in **Inter-governmental Panel on Climate Change (IPCC)** as a **Co-ordinating Lead Author** for preparing a **Special Report on Renewable Energy Sources and Climate Change Mitigation**, in 2011. He has also served in **International Advisory Board** for several conferences on Energy Storage and successfully organized numerous conferences/symposia on **Batteries and Energy Storage** in Singapore, USA, Canada, Mexico etc.,. Up to date, he has published about 100 articles in peer reviewed international journals, filed/granted 25 patents and delivered 90 Invited/Keynote/Plenary talks since 2007.





Department of Nanotechnology
Global Empowerment
Sustainability
International Conference
MESSAGE-2019
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PLENARY LECTURE



LIST OF PLENARY LECTURES

Plenary Lectures Number	Name of the Presenting Author	Title of the abstract	Affiliation
PL-I	Prof. Vinay Kumar Jha	“Prospective of geopolymers (green cement) as an alternate to ordinary cement for construction material for the sustainable environment”	Professor, Central Department of Chemistry, Tribhuvan University, Kirtipur, Kathmandu, NEPAL
PL-II	Shyam S Rao	“Advanced Ceramics – Materials & Applications”	Sr.VP -Industrial Ceramics Division -HSR -CUMI
PL-III	Prof. K. M. Lokanatha Rai	“The importance of carbohydrates as biomaterials in day to day life”	University of Mysore, Mysuru
PL-IV	Prof. K. S. Lokesh	“Nanotechnology - Applications in Environmental Science and Engineering”	Registrar, JSS Science & Technology University, Mysuru





Plenary Lectures - I

Professor Dr. Vinay Kumar Jha
Professor, Central Department of Chemistry,
Tribhuvan University, Kirtipur,
Kathmandu, NEPAL

Title: Prospective of Geopolymer (Green Cement) as an Alternate to Ordinary Cement for Construction Material for the Sustainable Environment

Varieties of cements are in use for a long in several construction related works. Although these cement materials have played major role in the development of infrastructure and urbanization, there are two major drawbacks with the sustainability of cement materials which are CO₂ emission during the production and deteriorating their strength in adverse environment.

The geopolymer can give the solution to overcome from these drawbacks. In comparison with Portland cements, green cement possesses some common and individual characteristics and its properties are favorable for the sustainable development of our existing modern society. Geopolymer offers several interesting properties such as abundant raw and inorganic waste resource, little CO₂ emission, less energy consumption, low production cost, high early strength, fast setting, find silent applications in many fields of industries such as civil engineering, automotive and aerospace industries, non-ferrous foundries, metallurgy, plastics industries, waste management, art & decoration and retrofit of buildings.

There is no other existing and proven technology in the world today rather than geopolymer which offers such hope for saving the world's atmosphere (Davidovits, Pioneer of Geopolymer). In my talk, I would like to give some focus on the chemistry of geopolymerization, various approaches for the preparation of geopolymers, comparative study of coal fly ash based geopolymer and ordinary cement, various sources of raw and inorganic waste materials and its properties. Some examples of geopolymers prepared using fly ash, brick-dust, waste construction materials, red soil and other inorganic wastes at low temperature will be shown in my talk.

Keywords: Cement; CO₂ emission; Construction material; Green cement; Geopolymer; Energy consumption



Profile:

Prof Dr. Vinay Kumar Jha holds a Ph. D in Industrial Chemistry from Tokyo Institute of Technology, Tokyo, Japan. He started his carrier as Assistant Lecturer Tri-Chandra M. Campus Tribhuvan University, Kathmandu Nepal Teaching from 1995-96. He worked as Teaching Assistant Central Department of Chemistry Tribhuban University, Kathmandu, Nepal 1996-97. Later he moved to Sendai for a postdoctoral program at Graduate School of Environmental Studies, Tohoku University.



He worked as Foreign Research Faculty at Environment Science and Technology, Okayama University, Okayama, Japan (Prof. Dr. Michihiro Miyake's Lab) and also worked as a visiting Professor Centre for Geo-Environmental Science Faculty of Engineering and Resource Science, Akita University, Japan. Currently, he works as a Professor at Central Department of Chemistry Tribhuvan University, Kathmandu, Nepal.

He is a recipient of Monbukagakusho Graduate Fellowship in 2004 from Ministry of Education, Culture, Sports, science and Technology, Japan. He handled various projects under the University Grants Commission. Nepal.



Plenary Lectures - II

Dr. Shyam S Rao
Carborundum Universal Limited,
Industrial Ceramics Division,
Hosur – 635 126, Tamil Nadu, India

Title: Advanced Ceramics – Materials & Applications

Carborundum Universal Limited Industrial Ceramic Division has been dealing with design & development, manufacturing & supply of technical ceramic products for critical and demanding applications. The products include different grades of sintered alumina ceramics (90% to 99.8% Al_2O_3 composition, partially/fully stabilized ZrO_2 ceramics, reaction-sintered aluminium titanate and reaction infiltrated SiC ceramics. It has also one of the largest facilities to manufacture metallized ceramics globally. The products are being formed by various processes like conventional moulding, iso-static pressing, ceramic injection moulding, extrusion, slurry casting etc. and are being sintered at very high temperature. These products are being used for various industrial and advanced applications. The applications include wear-resistant, corrosion-resistant, thermal & thermal shock resistant, automotive, renewable energy application, electrical insulation & ballistic protection etc.

It can broadly be classified into three segments namely

- Wear Resistant Ceramics
- Engineered Ceramics
- Metallized Ceramics

Calcined alumina is used as a major raw material for the manufacturing of high-alumina technical grade of ceramics for structural and functional applications. The performance of high alumina sintered products are determined by the quality of input alumina, its chemical composition, sintering additives/aids and degree of sintering. The degree of sintering to manufacture a defect-free product is related to the manufacturing process such as extent of uniform mixing & milling, uniformity in preparation of deflocculated slurry for spray-drying, quality of spray-drying for production of ceramic



granules for subsequent forming process, uniformity in sintering etc. The selection of right quality of alumina with unit crystal size, particle size, α -alumina content, low alkali content & reactivity and compatible sintering aids related to applications are the critical to quality. CUMI uses the best classes of selective calcined alumina and compatible different kind of sintering additives to manufacture 90% to 99.8% high alumina sintered products for diversified applications. It uses a very high optimum temperature sintering process to develop the right kind of microstructure with the help of various tunnel and batch kiln, vacuum sintering process in conjunction with on-line process control. CUMI-IC also has also partially/fully stabilized zirconia, reaction sintered Al-titanate, reaction-bonded SiC products.

CUMI is now venturing into advanced ceramics for space applications. CUMI has already state-of-the-art thick-film metallized technology on ceramics which has well been accepted globally among various Customers. Now, CUMI is venturing into thin-film metallized technology on Ceramics for dielectric and electronic applications. CUMI R&D has successfully completed collaborative development project with CSIR – NAL as well as a ToT from SAC – ISRO which has set the platform to foray various thin-film metallized ceramic products. Tape caster & physical vapour deposition (PVD) facility by sputtering along with other auxiliary equipment are being added into CUMI facility. Various products including ceramic substrates and multi-layer co-fired ceramic (MLCC) products will be discussed during the presentation. CUMI is now staking a major claim as technologically advanced and one of the most admired technical ceramic company in the world.



Profile:

Dr. Shyam S Rao has completed his B Tech in Metallurgical Engineering, IITBombay, India in the year 1985, he completed his MS in Materials Science, Rutgers University, New Jersey, USA in the year 1988, he completed his PhD in Materials Science, Rutgers University, New Jersey, USA in the year 1992, he completed his Executive Education in Advanced Management, National University of Singapore in the year 2011. He joined Carborundum Universal Ltd (CUMI) Industrial Ceramics in 1999 as Sr. Manager – Manufacturing & Technical, currently working as Sr. Vice President and Business Unit Head of Industrial Ceramics Division. His granted patent is "**A Method for Producing Ceramic Grain Reinforced Metal Matrix Composites**" **5648/CHE/2014 dated 10th November 2014**, he had applied in India for 5 patents in 2017 and he has published 5 international journals. He is the professional membership in Indian ceramic society Karnataka chapter as chairman



His Awards and Recognitions:

- Indian Ceramics Society – Best Chapter Award – December 2019
- Diamond Jubilee Technology Award 2018 by CSIR – September 2019
- Frost & Sullivan Manufacturing Excellence Award – Dec 2018
- TPM Excellence Award by JIPM – March 2018
- 2016 – Industrial Ceramics Division (ICD) CUMI recognized as one of top 25 Innovative Companies in India by CII
- 2015 - Murugappa Group Level Recognition for Passion
- 2012 – Amulya Award given by Karnataka State Innovation Council & Department of Industries and Commerce in recognition of having filed a patent application on A Method & Apparatus for High Temperature Glazing Using Microwave Heating
- 2010 – ICD recognized Best Supplier by Schneider Kolkatta
- 2010 – L&D Leader Award given by Murugappa Group for leading the learning and leading initiatives “fostering innovation”
- 2009 – ICD Best Newcomer of the Year Award from ABB Germany
- 2007– Award given by Indian Ceramic Society, Bangalore Chapter for significant contribution to the Ceramic Industry
- 1991 – First Prize, Doctoral Technical Presentation, The Materials Society, NJ, USA
- 1991 – Second Prize, Technical presentation, Conference on Advanced Composites, Cocoa Beach, Florida, USA



Plenary Lectures - III

Dr. K. M. Lokanatha Rai

Professor of Chemistry (Rtd),

Visiting Professor, Vignanabhavana

University of Mysore, Manasagangotri, Mysuru, 570 006, India

Title: The importance of carbohydrates as biomaterials in day to day life.

Carbohydrates are probably the most abundant constituents of many foods and are the source of a large part of the heat and mechanical heats of the body. Although the carbohydrates are usually thought of as a source of heat and energy, it should not be overlooked that they also occur as a part of protoplasm and must be essential for the building of body tissue. They make up much of our food, clothing, shelter, medicine and are vital to national economics as they are to our diet. Industrially, cellulose and its derivatives are among the most important products of biological origin. In the form of cotton and linen cloth, rope and paper, cellulose products have been in use for a long time. Starch is used in the manufacture of various adhesives or glues for book-binding, wallpaper adhesives, paper sack production, tube winding, gummed paper, envelope adhesives, school glues and bottle labeling. Most of acidic polysaccharides exhibit interesting and very useful visco-elastic properties when dissolved in water at very low levels. This gives many foods and various liquid consumer products, like lotions, cleaners and paints, for example, a viscous appearance when stationary, but fluidity when the slightest shear is applied.



Profile:

Dr. K. M. Lokanatha Rai has completed his B. Sc., in St Philomina College, Puttur, DK in the year 1976, M.Sc., in University of Mysore, MGM, in the year 1978 and Ph. D., University of Mysore, MGM, in the year 1984 (Guide: Prof. C. Anjanamurthy, Title: Synthesis in the field of Podophyllotoxin). He worked as Lecturer, University of Mysore, MGM, 1982, Reader, University of Mysore, MGM, in the year 1995, he worked as Professor, University of Mysore, MGM, from 2003 to Dec. 2016 and worked in PDF, Bar Ilan University, Israel 1987-89(Guide: Prof. Alfred Hassner Title: synthesis of small ring heterocles via cycloaddition reactions). He guided for Ph. D students, awarded 23 Ph. D work and one Ph. D working. He guided for 5 M. Phill students. He visited country like Israle, Japan, Cairo (Egypt). Published 47 national, 157 international, 7 books(monographs), 2 pergamon publ, 2 springer publ, 1 jai publ, 1 Univ. of Mysore prasaranga, Kannada, 1 Vandana publication in 2017, Citations -around 2867, H-index 28, i-index 60 (including books, Merc Index and Reagents in Org. synthesis ed by Feischer). He honoured Bharatha Rathna Dr. Radhakrishnan Gold Medal award (Sept. 2018) for Outstanding Individual Achievement in Education and Reasearch and Bharatha Rathna Dr. Abdul Kalamn Gold Medal award (July. 2019) for Outstanding Individual Achievement in Education and Reasearch. Editorial board: Internatiol Journal of Biomedical Sciences (New York) since 2007. He is coordinator for 5 Yrs in Integrated course in Chemistry 2007-12, M. Sc Course in Organic chemistry 2007-14, Chief Coordiator, UPE 2014-16, Chief Coordiator, CPEPE 2014-16, Chairman, DOS in Chemistry 2014-16 and Coordiator SAP, DOS in chemistry 2014-16. He is working as Visiting Professor, Vijnanabhavana. University of Mysore, Manasagangotri, Mysuru-570 006 since 2017- till date and Visiting Professor, Mangalore University, PG Centre, Chikaluar, Kodagu since 2017- till date





Plenary Lectures - IV

Prof. K.S. Lokesh
Professor & Registrar
JSS Science and Technology University,
Mysuru - 06

Title: Nanotechnology – Applications in Environmental Science and Engineering

Environmental Science and Engineering area deals with the problems associated with pollution, pollution prevention and control aspects. Off late, the developments in Science and Technology areas and the change in the life style of people have led to abuse/overuse of natural resources as well as discharging the unprecedented waste materials.

It is a big challenge for those who are involved in this area. In the 21st century, Nanotechnology has become a Technology of the century finding its applications in variety of areas starting from simple to complex areas like Medicine, Defense, Pollution Prevention and Control.

Nanotechnology applications in the field of Environmental Science and Engineering have evolved over a period of time and currently Nanotechnology is being used in variety of water and waste treatment facilities, recovery, reuse and regeneration options. The advantage of Nanotechnology, in particular, is to develop the advanced materials which will have exclusive properties of giving more area for lesser volume.

The toxic and hazardous waste pollution along with oil spills in oceans are being addressed using the materials developed by Nanotechnology. The most advanced water treatment facilities such as pressure filters, ultrafiltration & membrane filters, reverse osmosis, etc are the outcome of exclusively developed nanomaterials.

Though the applicational aspects of Nanotechnology are very well studied and understood, the other side of its implications needs to be studied for the sake of its sustainability. This poses a big challenge for Environmental Scientists and Engineers of 21st century.



Profile:

Prof. K.S. Lokesh was born on 13th August 1960 at Tumakuru and had his early education in Tumakuru. He obtained his BE Degree in Civil Engineering from Bangalore University in the year 1982. He joined as Lecturer in Civil Engineering at S J College of Engineering, Mysuru during Sept. 1982. He obtained M.Tech., degree from IIT Kanpur in the year 1987 and got his Ph.D from University of Roorkee (currently IIT Roorkee) in Environmental Engineering in 1996.



He was a British Council Fellow (May to July 1999) at University of Loughborough, UK and Mellon Visiting Professor at Connecticut College, New London, USA (January to July 2009). He had undergone special training in the area of Environmental Economics as a World Bank fellow at IIT, Bombay, Mumbai (2003) and Research Methodology at ASCI, Hyderabad (2000)

He is a Resource Person to various Engineering Colleges, Industries, Govt. and Non-Govt. organizations & Autonomous Institutions. He is serving as a Member on various bodies such as Governing Councils, Board of Governors, Academic Council, BoS, BoE, Faculty of Engineering of Universities and institutions. He has visited 12 countries, presented research papers and Chaired technical sessions at International Conferences. He is a trainer and involved in developing training modules for in-service engineers, training institutions and NGOs.

He has delivered over 765 invited talks and guest lectures across the country. He has over 37 years of teaching and 29 years of research experience. He has guided 15 Ph.D, 136 M.Tech., theses, 5 M.Sc (Env. Sci.) and 54 Undergraduate projects!

He is the Founder Associate of Dept. of Environmental Engineering during 1987 and Dept. of Biotechnology during 1999 in the state of Karnataka.

He has attended over 142 National and International conferences, workshops, seminars, short term courses. He has organized over 50 technical seminars and workshops. He has completed 11 sponsored research projects and 26 consultancy projects. He has been awarded with many awards and affiliations. His hobbies are swimming, gardening, photography and travelling.



Department of Nanotechnology
Global Empowerment
Sustainability
International Conference
MESSAGE-2019
Society
Technological University
Visvesvaraya

INVITED TALK



LIST OF INVITED TALKS

Invited Talk Number	Name of the Presenting Author	Title of the abstract	Affiliation
IT-01	Dr. B. M. Nagabhushan	Oxide Nano materials for Global Empowerment”	Professor, Department of Chemistry & Vice president of LSIKC M.S. Ramaiah Institute of Technology (MSRIT), Bangalore- 560054
IT-02	Dr. K. Ramesha	Li-ion battery Manufacturing in India: Opportunities and Challenges	Scientist, Functional Materials Division, CSIR-Central Electrochemical Research Institute, Karaikudi, Tamilnadu
IT-03	Prof K. K. Baruah	Green house gas emission from agricultural ecosystem : Emission and Mitigation with reference to climate change	Dean School of Life Sciences, School of BioSciences and School of Env and Earth Sciences, Royal Global University, Adjunct Prof Cotton University, Retired Prof and Dean of Tezpur Central University, Assam
IT-04	Dr. Sridhara. N.	Adopting sustainable technologies for eco-friendly living... A small attempt to save environment”	Thermal Systems Group, Mechanical Systems Area, Isite, U.R. Rao Satellite Centre, ISRO, Department Of Space, Bengaluru-560037
IT-05	Dr. Prashantha Kalappa	Smart polymeric systems for advanced applications: Where we are and where we go?	Professor, Research and Development Centre, Adichunchanagiri University, B.G Nagara - 571448, Mandya District, Karnataka
IT-06	Dr. Gopal Lal	Prospect of Nano fertilizers for safe seed spices production	Director, ICAR-National Research Centre on Seed Spices Tabiji, Ajmer-305 206, Rajasthan, India
IT-07	Dr. Sreekantaswamy S	Synthesis of Metal oxide Heterostructures by Hydrothermal method and their applications	Director, College Development Council, University of Mysore, Mysore
IT-08	Prof. M. V. Shankar	Photocatalytic Materials for Sustainable H ₂ Production from Wastewater	Professor, Department of Materials Science and Nanotechnology Yogi Vemana University, Kadapa, Andhra Pradesh
IT-09	Dr. G. Nagaraj	Application of metal oxide nanomaterials for lithium ion battery and Hydrogen generation	Dept. of Chemistry, Siddaganga Institute of Technology, Tumkur
IT-10	Dr. R. Geetha Balakrishna	New hopes to overcome the challenges in Quantum Dot Sensitized Solar Cells	Director, Center for Nano and Material Sciences, JAIN University, Bangalore
IT-11	Dr. Sukanta Mondal	Application and potential of CRISPR/Cas9 guided genome editing for minimizing early embryonic loss	Principal Scientist, Animal Physiology Division, ICAR- National Institute of Animal Nutrition and Physiology (NIANP), Bangalore



IT-12	Dr. Bela Zutshi	Survivability and Growth Enhancement of <i>X. helleri</i> by <i>L. camara</i> based Carotenoid Incorporated Formulated Feed	Aquatic Biology, Fish Toxicology and Environmental Biology Section, Bangalore University
IT-13	Dr. Rakesh Kr Singh	Production of Silica Nanoparticles from Rice husk and their Possible Applications	University Centre of Nanoscience & Nanotechnology, under school of Engineering and Technology of Aryabhata Knowledge University Patna
IT-14	Dr. J. Manjanna	Resources recycling through urban mining: Recovery of valuable metals from e-waste by hydrometallurgical method	Deputy Registrar, Rani Chennamma University, Belagavi





Invited Talk - 01

Dr. B.M. Nagabhushana

Professor and HOD, Chemistry

M.S. Ramaiah Institute of Technology,

Bangalore-560 054.

bmnshan@yahoo.com

Title: Oxide Nano Materials for Lobal Empowerment

Nano-materials are the foundation of major technological advances. The field of nano-structured materials is widening in several directions. Nano-materials are extremely important materials for a wide range of applications. Nanotechnology has the potential to change every part of our lives. Nanotechnology affects all materials; ceramics, metals, polymers, and biomaterials. In the coming decade nanotechnology will have an enormous impact. Future advances could change our approaches to manufacturing, electronics, information technology and communications technology making previous technology redundant and leading to applications which could not have been developed or even thought about, without this new approach. The study of metal oxides has attracted the attention of materials scientists due to their optical, electrical, magnetic, mechanical, and catalytic properties, which make them technologically useful.

Synthesis of nano-metal oxides with tailored made *morphologies* has in recent times generated amongst *Material Chemists* because of the challenges addressed by the normal wet chemical routes over the sophisticated physical techniques. In wet chemical methods by changing the reaction conditions *as-synthesized* products with various representative morphologies could be obtained. The interest in nano materials stems from the fact that the new properties are acquired at this length scale and equally important that these materials change with *morphology*. Recently, there has been a growing interest in synthesis of efficient nano-materials with better properties. To achieve this, material must have fine size, narrow size distribution, non-aggregation, smooth surface and spherical morphology.

In this talk, the preparation of nano metal oxide materials with different wet chemical methods and their different properties will be discussed in detail.



Profile:

Dr. B.M. Nagabhushana is having a work experience in research of 20 years, and 33 years in teaching field. He working as research guide for 5 students and 4 M. phill student, and 8 students have completed PhD under him. His area of specialization in synthesis of nano materials, charecterisation and its application. He has published more than 200 international and national conference journal paper, has H- 36- intdex



He is the reviewer for following journal:

- Indian Journal of pure & Applied Physics
- Powder technology
- Journal of Spectroscopy
- Sensors & Actuators: B. Chemical
- International Journal of Chemistry and Material Science
- Journal of Rare Earths
- Environmental Engineering and Management Journal
- Journal of Luminesce
- Indian Journal of pure & Applied Physics
- Transnational Journal of Agriculture and Soil Sciences
- Journal of Rare Earths Journal of Pure & Applied Chemistry Science
- journal of pure & applied chemistry
- Research on Chemical Intermediates
- Journal of Asian Ceramic Societies

He has received 17 best paper presentation awards and he have applied for 4 patents. He is the member of following professional society/professional affiliation:

- 1) Vice president of Luminescence Society of India: Karnataka Chapter (LSIKC)
- 2) Life Member of ISTE (No-17747; 1999)
- 3) Life member of Luminescence Society of India (LSI)
- 4) Life member, Forum of Chemistry Teacher in Engineering Colleges, Karnataka
- 5) Life member The Bangalore Science Forum
- 6) Life member of Karnataka Environmental Research Foundation
- 7) Life Member of Electrochemical Society of India
- 8) Member of Baratha Jnana Vignana Samithi (BGVS)
- 9) Member of Material Research Society of India
- 10) Member of Baratha Jnana Vignana Samithi (BGVS)
- 11) Mocroelectronics and Engineering
- 12) Life member of Svadeshi Vijana Andolana - Karnataka.
- 13) Life member of Kannada Saaskruthika Sangha, NAL, Bangalore



Invited Talk - 02

Dr. K. Ramesha, CSIR-CECRI

Senior Principal Scientist

CECRI Madras Unit, CSIR Madras Complex, Taramani, Chennai

E-mail: ramesha.cecricri@gmail.com, ramesha@cecricri.res.in

Title: "Li-ion battery Manufacturing in India: Opportunities and Challenges"

Recently Lithium-ion (Li-ion) battery technology has emerged as an alternative for lead-acid, Nickel cadmium and Ni-metal hydride batteries for many applications. These are rechargeable batteries with numerous advantages over the conventional lead-acid batteries including higher energy and power density, lower self-discharge rate, high charging efficiency and long cycle life. Li-ion batteries are commonly used in small portable electronic devices such as computers and mobile phones. Lithium ion batteries are the obvious choice for powering electric vehicles (EVs) although there are several challenges for enhancing their energy density, safety, affordability and reliability especially for enabling electric vehicles with longer ranges, faster charging. The battery represents arguably the most important and most technically challenging component of the electric vehicle (EV) ecosystem. Within the battery market are intriguing issues such as battery type and chemical compilation; performance and efficiency; cost; market demand and environmental concerns.

India is one of the leading consumer electronics market worldwide. Automotive industry is a flourishing industry bringing in more than 22% of the manufacturing GDP as per 2012 according to MEMMP 2020. The minimum estimated storage required for EVs estimating 10% penetration by 2030 is greater than 300 GWh. The main mode through which above requirements can be met are through enabling Lithium ion battery manufacturing in India. India is already importing these Lithium ion batteries in the millions per month and we cannot depend on imports to meet this demand. It is irony to note that in spite of India's huge consumption of Li-ion cells there is no captive production in our country. Hence, it is the need of the hour and mandate to have a strong stake as well as self-reliant Indian Li-ion technology to cater to the in-house demand by import substitution resulting in saving of huge



foreign exchange. The main challenges are technology availability, cost of production and market prize of the battery produced and more importantly raw material supply chain.

The prototype Li-ion batteries of 18650 cylindrical type and pouch cells are being developed at CECRI using Indigenous electrode materials. These efforts can only fulfill our research curiosity and can boost our confidence in building technology, however what is needed is a big effort of setting up large scale (MW or GW) manufacturing facility. Li-ion battery production challenges and opportunities available will be discussed in this talk.





Profile:

Dr K. Ramesha received M.Sc degree in Chemistry from Mangalore University in the year 1993. He obtained his Ph.D. degree from Indian Institute of Science (IISc), Bangalore in the area of Solid State and Structural Chemistry in the year 2000. He did his post-doctoral studies at University of Maryland, USA, followed by at University of California, USA and Los Alamos National Laboratory, USA. He returned back to India in 2006 and worked at JNCASR, Bangalore before joining CSIR-CECRI as senior scientist in the year 2008.



Dr K. Ramesha is currently Senior Principal Scientist at CSIR-CECRI (Central Electrochemical Research Institute) and Professor at AcSIR (Academy of Scientific and Innovative Research). His research group is located at CECRI-Madras Unit, CSIR Madras Complex, Chennai. His current research interest is in the area of materials for energy storage. His group works on Lithium-ion batteries and other futuristic systems such as Sodium-ion, Lithium-Air, Lithium-sulphur, all-solid-state batteries, etc. He is also part of several national ambitious mission projects on energy storage & battery development for solar and EV applications. He is part of Lithium-ion battery manufacturing facility at CECRI-Chennai under the 'make in India' initiative. Besides, he is guiding several students towards their PhD degree. His group has published few important papers including two research papers in the highly acclaimed journal "*Nature Materials*" showing for the first time a new mechanism which enables doubling the capacity of Li-ion batteries.



Invited Talk - 03

Kushal Kumar Baruah
Department of Environmental Science,
Royal Global University,
Guwahati, Assam

Title: Green House Gas Emission from Agricultural Ecosystem: Emission and Mitigation with Reference to Climate Change.

Climate change is one of the most important global environmental challenges in the history of mankind. Methane (CH_4) and nitrous oxide (N_2O) the two potent greenhouse gases (GHGs) emitted from agriculture are identified as key driver of climate change. Here we provide a comprehensive analysis aimed at regulation of GHG emission and transport from rice and wheat agriculture. Identification of physiological and anatomical traits of a cultivar associated with transport process of GHGs can provide better understanding of the mechanism of emission reduction of GHGs. Series of experiments were conducted at Tezpur University and Assam Agricultural University campus to understand the dynamics involved with emission of CH_4 and N_2O from rice and wheat ecosystem. Physiological parameters like leaf area index (LAI), stomatal conductance and transpiration rate were identified to be associated with emission and transport of GHG to atmosphere. Stomatal frequency and size of xylem vessels play a key role in the conduit of CH_4 and N_2O . Foliar application of plant growth hormones was found to alter the plants' physiological and anatomical characteristics and regulate the transport and emission of methane and nitrous oxide. Different bio-organic (green manure) and inorganic (copper nano particle, slow release N fertilizer) treatments were found to be effective in emission reduction. Identification of suitable varieties with efficient physiological processes for transport regulation of GHGs without compromising the grain productivity can be an effective environment friendly biological mitigation option of greenhouse gas emission reduction.

Keywords: Climate change, methane, nitrous oxide, physiology, anatomy



Profile:

Prof. K. K. Baruah is currently working as Dean, School of Environment and Earth Sciences, School of Biosciences and School of Sciences in Royal Global University, Guwahati, Assam. Prior to that he was Prof. and Dean at Tezpur Central University, Assam. Prof. Baruah has long experience in teaching, administration and research including as Prof. and Head of Department of plant physiology at Assam Agriculture University, Assam.



A gold medalist in M.Sc. and Ph.D. He did his Ph.D. from Punjab Agriculture University, Ludhiana, Post Doctorate from Moscow state university. Worked as visiting scientist at LT Institute of Atmospheric Physics, Beijing, China and National Physical Laboratory, New Delhi.

He has published about 14 research papers in national and international journals. Published 2 books, completed several research projects. 15 students got PhDs under his supervision. Recipient of several awards. Prof Baruah is member of several academic societies.



Invited Talk - 04

Mr. Sridhara

Deputy Project Director

U.R. Rao Satellite Centre, ISRO,

Department of Space, Bengaluru-560037

Title: Adopting Sustainable Technologies for Eco – Friendly LivingA small attempt to save environment

Humans evolved living in the caves... to... hut... to... modern day's house. The very purpose of shelter, in its form, transformed it into the pride of luxury. The present day life style of humans demanded more and more degradation of natural resources, with little or no concern towards its effective utilization. This has resulted in one of the cause for environment degradation, which is happening exponentially and if it continuous, it will be irrecoverable loss to this planet earth.

Here is a family in Bengaluru, like any one, also desired to have a house for them, but it's different....in its kind.....a greenhouse....

A deep concern towards the environment protection, resulted in, conceptualizing their house, in the form of an ecofriendly house, by adopting sustainable technologies, with less impact to the ecology.

Since, earth is the only known place, with abundant natural resources for humans to survive; all humans are blessed and it's every one's responsibility to use it effectively and preserve the same for future generation also.

It's possible for everyone to adopt some of these simple available sustainable technologies and contribute towards saving the environment.....



Profile:

Mr. Sridhara, a Mechanical Engineer, from Kuvempu University, Shivamogga, started his career as a lecturer.



In the year 2000, he was appointed as an Executive Trainee Engineer, at Hindustan Aeronautics Limited (HAL), Bengaluru and worked in Quality Systems of Aircraft Engines.

In the year 2001, he was appointed at Vikram Sarabhai Space Centre, ISRO, Thiruvananthapuram. He was responsible for the design and development of Engine Gimbal Control System for gsLV mark3, launch vehicle and realization of gas turbine motors for hydraulic control system of PSLV and GSLV. In 2005, he moved to U R Rao Satellite Centre, Bengaluru.

He is the focal point for Technology Development Programme and indigenization of thermal control materials. He has contributed significantly, towards participation of Indian industries, to achieve self-reliance. He was Project Manager for GSAT-16, GSAT-17 and GSAT-29.

Presently, he is Deputy Project Director, Space Docking Experiment Mission and Project Manager for Human Space programme (GAGANYAAN). He has more than 35 international journal publications...



Invited Talk - 05

Dr. Prashantha Kalappa
Professor
Adichunchanagiri University

Title: Smart Polymeric Systems for Advanced Applications: Where we are and Where We Go?

Recent developments in polymeric materials, blends and their nanocomposites systems have shown that these novel materials can improve design of newer materials for various applications from biomedical to energy harvesting systems. Improvements in the mechanical properties, structural stability and multi-functionality are the key factors that dictate the applicability of polymeric materials. In this presentation, we will summarize the research results obtained on bio foams, shape memory and piezoelectric polymers, blends and nanocomposites fabricated via melt extrusion method. This talk highlights the different processing approaches to prepare different types of nanocomposites and blends based on thermoplastics in order to understand the morphological, interface, thermomechanical, piezoelectric and (thermochromic) shape recovery behaviour under large strain, such as integration of additional functions and novel blending routes toward permanent and temporary net points. This talk highlights the different approaches to understand the thermomechanical and shape recovery behaviour under large strain, such as integration of additional functions and novel blending routes toward permanent and temporary net points. Multiphase polymeric systems and their systems illustrate that tunable properties can be constructed by simple blending routes to achieve higher shape recovery under large strain, high ductility and improved piezoelectric properties. Future developments in additive manufacturing (3D Printing) of multifunctional and multistimuli-sensitive polymeric systems will also be discussed.



Profile:

Prof. Prashantha Kalappa is a **Professor** at Adichunchanagiri University, Mandya District, India. Before moving to India, he was a Professor at the Polymers and Composites Technology & Mechanical Engineering Department, Institut Mines-Télécom, Lille-Douai, France (Formerly known as Ecole Nationale Supérieure des Mines de Douai, France). He has also served as Dean for International Scientific affairs in the same institute. Prof. Prashantha's research mainly focuses on Advanced Smart Polymers, Biopolymers, Nanocomposites and Blends Their synthesis, processing, 3D printing, rheology, morphology and Structure-property relationships. Prof. Prashantha received **Doctor of Science** from University of Lille, France for the contributing in the field of Advanced Polymeric Materials. Prof. Prashantha has published 80 research papers in peer-reviewed international journals and presented in a number of international conferences. He was also in charge of national and regional projects, programs with industries and European Projects (Horizon 2020 and Interreg). He has successfully supervised 5 PhD and 10 MS students and 5 more PhDs and 3 MS students are currently working under his guidance. Dr. Prashantha has visited more than 25 countries and delivered many key note and invited lectures at International conferences.





Invited Talk - 06

Dr. Gopal Lal

Director, ICAR-National Research Centre on Seed Spices

Tabiji, Ajmer-305 206, Rajasthan, India

e-mail: glal67@yahoo.com

Title: Prospect of Nano Fertilizers for Safe Seed Spices Production

Seed spices “*High value low volume crops*” are the most remunerative commodities of the arid and semi-arid regions of India. The seed spices constitute an important group of agricultural commodities and play a significant role in our national economy. This group includes crops like coriander, cumin, fennel, fenugreek, ajwain, nigella, dill, celery, anise, caraway etc. Seed spices are generally grown in sandy loam soil which is considered to be poor in fertility. Leaching of nutrients are more in sandy loam soil resulting in loss of nutrients. Besides, use of chemical/synthetic fertilizers leading to deterioration soil ecosystem, environment pollution. In this context, nano fertilizers could be the most prominent alternative source of nutrition for seed spices. Nano technology deals with particle size of 10^{-9} meter. The smaller size of particles resulting in increased surface area, which allows the particle to be in more contact with plant parts like roots and leaves. As a result, there would be efficient uptake of fertilizers as per plant need. Smart delivery system of fertilizers could able to increase the yield of seed spices. Moreover, application of nano fertilizers would not harm soil fauna and flora. So, nano fertilizers could increase the yield of the plants in safe sustainable manner and reduction of pesticide residue in finished product for domestic as well as export purposes.

Key words: Seed spices, nano-fertilizers, sustainability, pesticide residue



Profile:

Dr. Gopal Lal did his Ph.D. in Horticulture in 1996 from RAI, Bikaner. He Joined as Assistant. Professor in 1996 in RAU, and moved to ICAR in 2002 on the post of Senoir scientist and then to CAU in 2008 on the post of Professor, PHT. Later he joined as a Principal Scientist at ICAR-NRCSS, Ajmer in Dec. 2008. He elevated to the post of Director in April 2017. He has also worked as a Member of Rajasthan Farmer's Commission during 2011 to 2013.



He has guided about 15 students for PG and Ph.D. thesis. He has published more than 150 research papers, has 75 book chapters and more than 150 technical articles.

He has also published 6 authored and 16 edited books and souvenirs, more than 30 technical bulletins and training manuals.

He has developed about 15 varieties of seed spices as developer and standardized more than 60 technologies on different aspects of horticultural crops including seed spices.

Handled more than 10 externally funded projects and many institutional and inter institutional projects. He is having exposure to USA and Turkey.

He is a life member of 16 professional societies and fellow of 04 societies. Recipient of 04 national level awards including Dr. RS Paroda Award of CHAI, New Delhi and Best Scientist Award of Indian Society of Seed Spices.



Invited Talk - 07

S. Srikantaswamy

Research and Development Centre
Adichunchanagiri University, B.G Nagara - 571448,
Mandya District, Karnataka

Title: Synthesis of Metal oxide Heterostructures by Hydrothermal method and their applications

Recently, scientific and research community have shown their great interest on metal oxide nanostructures and their applications due to their easy, safe, environmentally friendly, cheap synthesis procedure and technological applications in the fabrication of devices for energy harvesting and storage, photonics, sensors as well as medical and biological applications. Recently, scientific community have shown their great interest on metal oxide nanostructures and their applications due to their easy, safe, environmentally friendly, cheap synthesis procedure and technological applications in the fabrication of devices for energy harvesting and environmental purification as well as medical and biological applications. In this work, we have synthesised various heterostructures Metal oxides were fabricated via hydrothermal method. The products were characterized using X-ray diffractometry (XRD), Fourier-transform infrared spectroscopy (FTIR), dynamic light scattering (DLS), high-resolution transmission electron microscopy (HR-TEM), energy dispersive spectroscopy (EDS) and Brunauer–Emmett–Teller (BET) techniques. The composition, morphology and structural features of the nanoparticles were found to be size-dependent due to the temperature response in the particular time log during hydrothermal synthesis. X-ray diffraction and Fourier-transform infrared spectroscopy analyses endorse the successive formation of the various heterostructures. Photocatalytic degradation of the dyes and phenol were performed by altering the catalyst and dye concentrations under direct sunlight irradiation. The results show that the photocatalytic activity is affected by the conduction band (CB) and valence band (VB) positions rather than surface area of heterostructure nanocomposites. The results showed that the toxic dyes were degraded within a short time span. The synthesized materials were found to be highly stable in the visible light-driven



degradation of the dyes and antibacterial activity against and exhibited less toxicity against the *Musmusculus* skin melanoma cells (B16-F10). The fusion of these advantages paves the way for further applications in energy conversion, biological applications as well as in environmental remediation.





Profile:

Dr. S. Srikantaswamy has made novel and significant contributions to Materials Science, Environmental Earth Science, Hydrothermal Technique of Crystal growth, especially in the field of Carbon Nanotube. His research is characterized by both novelty and innovation, and has led to a substantial body of published work which has received extensive citations. His most important contributions have been towards the synthesis of new materials for Photocatalytic, Biological, Electrical, Opticaletc. He has also worked extensively on Bioremediation of heavy metals in environment. Dr. Srikantaswamy received his Ph.D degree in Geology in the year 1989 and later 1994 onwards he is working as faculty of University of Mysore. During 1994 to 2003 teaching work was carried in Geology and subsequently engaged in teaching and Research in Environmental Science and Materials Science, University of Mysore. Both Environmental Science and Materials Science departments are newly started, Dr. Srikantaswamy actively taking part in the development of curriculum for the students and he is working on various research works like the pollution problems of water, Solidwaste and sediments by using emerging technologies. Dr. Srikantaswamy was invited to work as visiting scientist at Japan during 1998–2000 in Tokyo Institute of Technology and Research Institute of Solvothermal Technology, Takamatsu, Japan which is one of the exceptional Research Institute in the world and worked on research work in field of Nanotechnology, especially Carbon nanotube. He travelled widely and visit many countries. Apart from the research activities of his own group, Dr. Srikantaswamy has developed several national and international collaborative research programmes. At present he is the Director of College Development Council, University of Mysore and also, he is the Co-ordinator of M. Tech in Materials Science, Center for Materials Science and Technology, University of Mysore. Recently Dr. Srikantaswamy received Prof. W. D. West Memorial Award – 2018-2019 in the 106th Indian Science Congress held at Lovely professional university, Jalandar during 03-07 January 2019 for the excellent research work in the field of Experimental Mineralogy, Crystallography and Earth Materials. His research works especially on Carbon based material are highly cited. Over 150 Research papers published in international journals including one major Review in International Journals. Over 05 book chapter and 04 books have published by him in the field of Environmental science, Materials Science and Earth science. Fifteen research scholars have successfully completed their Ph.D





under his guidance and six research scholars are currently pursuing their Ph.D work under his supervision. He has organized many national conference/seminar/workshops and chaired national and international conference and seminars. Besides he has presented more than 170 research papers in various countries and delivered Plenary and also invited talk.





Invited Talk - 08

Dr. M.V. Shankar

Professor,

Department of Materials Science and Nanotechnology

Yogi Vemana University, Kadapa, Andhra Pradesh

Title: Photocatalytic Materials for Sustainable H₂ Production from Wastewater

Photocatalytic water splitting is a promising avenue to mitigate environmental issues. To date, several hundreds of catalytic materials including composites and elemental-semiconductors have been developed. Development of core/shell structured photocatalyst with ultra-thin shell is of great importance towards enhanced H₂ production reactions. This process often works well under ambient conditions and produces H₂ via detoxifying industrial wastewater, which ensures the environmental cleaning and energy production is a novel approach to reform industrial waste. Sulfide ions present in industrial wastes either as S²⁻ or hydrogen sulfide (H₂S) are toxic having an unpleasant odor. Petrochemical industry releases H₂S containing (15-20%) wastewater as a by-product, and their treatment process produces elemental sulfur. Also, sewage treatment plant releases the wastewater containing sulphide ion with concentration greater than 1200 mg/L. At present, a large amount of energy being spent for this treatment, whereas photocatalytic process can be effectively utilized to recover H₂ gas. Recently our group reported, metal chalcogenide-based core-shell type photocatalysts have attracted much interest to improve efficiency and suppressed the photo-corrosion.

My talk will be focused into synthesis of metal chalcogenide-based semiconductors such as CdS or Cu₂S particles as the core wrapped-up with thin layer of TiO₂-shell for improved surface and interface control of photo-excited electrons for H₂ production. The photocatalysts were thoroughly characterized for its crystal structure, morphology, surface chemical composition and charge-carrier transfer properties etc. The batch photo-reactor used to evaluate the performance in an aqueous solution containing Na₂S/Na₂SO₄ promoted oxidation reaction for H⁺ generation. The control over shell thickness directly influenced the



optical and surface-interface properties, resulting in the enhanced H₂ production for an optimized catalyst with UV-visible light to H₂ production efficiency of 10.3 %. The challenges and opportunities in experimental work on photocatalytic H₂ fuel production will be discussed. My talk will facilitate the young scientists to design and develop highly efficient photocatalyst systems to realize the potential application for H₂ fuel production.

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Profile:

Dr. M.V. Shankar is a professor of Materials Science and Nanotechnology in Yogi Vemana University, Kadapa, Andhra Pradesh, India. He is leading Nanocatalysis and Solar Fuels research group in YV University. Renowned for his outstanding research work in the field of Photocatalysis for Hydrogen fuel production and multi-functional application of nanomaterials. He has authored/co-authored 101 publications having h-index of 29, average impact factor of 4.25 with 4709+ citations. He has chaired many national and international conferences, seminars, symposia, workshops and DST-INSPIRE programs. He has delivered several keynote and invited lectures. Dr. Shankar has very good R&D collaborators in the area of energy, environment and health care applications.



He has successfully completed one major research project in collaboration with Dr.V. Durga Kumari (Scientist G), CSIR-IICT, Hyderabad sponsored by Ministry of New and Renewable Energy, New Delhi during 2011-2015. Following the successful outcome, the same funding agency sponsored second project in collaboration with Dr.M. Sathish, Senior Scientist, CSIR-CECRI, Karaikudi during 2016-2019. Based on active R&D activities and reputed publications he was invited by National Institute of Solar Energy (NISE), Gurugram in February 2016 to join the team mitigation of air pollution through usage of clean solar fuels. It is worth to highlight that Dr.Shankar's laboratory is a nodal point for photocatalytic hydrogen production utilizing natural sunlight. Among the several peer reviewed publications some of the high impact factor journals are Applied Catalysis B: Environmental, Journal of Catalysis, Chemical Communications, ACS Sustainable Chemistry and Engineering, ChemSusChem, Catalysis Science and Technology, Journal of Colloids and Interface Science, Nanoscale and Solar Energy Materials and Solar Cells, International Journal of Hydrogen Energy etc.

He is an active member of various national and international organizing committees and societies, and serves as lead guest editor for International Journal of Hydrogen Energy (Elsevier), guest editor, editorial board member and reviewer on various prestigious international journals. He is recipient of several awards, including Chartered Chemist and Fellow of Royal Society of Chemistry (FRSC), London. Besides, R&D activities he took active part in university administration as Nodal Officer (RUSA), Controller of Examinations, Director (IQAC), Deputy Director of Admission, Head of the Department and Chairman Board of Studies. Dr. Shankar's research work has been highlighted in national news papers and TV channels, earning the mark of exceptional work.



Invited Talk - 09

Dr. G. Nagraj

Dept. of Chemistry,
Siddaganga Institute of Technology,
Tumkur

Title: Application of metal oxide nanomaterials for lithium ion battery and Hydrogen generation

My research group involved in revolutionize in the emerging research areas like electrochemical energy storage devices and photocatalytic hydrogen generation via water splitting reaction. Rechargeable lithium-ion batteries (LIBs) are one of the propitious emerging technologies which revolutionized the transportation, communication, and stationary energy storage sectors owing to its outstanding cycle life, high specific energy density, environmentally benign, and no memory effect. However, the nearer vicinity of the graphite potential to that of $\text{Li}^{+1}/\text{Li}^0$ favours undesirable Li plating on anode surface which encourages researchers to design promising anode materials. My research group extensively designed some anode materials which delivered better stable specific capacity. We have designed some promising transition metal oxides which acts as anode materials for lithium ion battery like Black TiO_2 , MoO_2 , MoO_3 , MnCO_3 , Ta_2O_5 , and NiO . And also, we have designed some promising cathode materials for lithium ion battery like $\text{VO}_2(\text{B})$, V_2O_5 , $\text{Na}_x\text{V}_2\text{O}_5$, $\text{Fe}_2\text{V}_4\text{O}_{13}$ and ZrV_2O_7 .

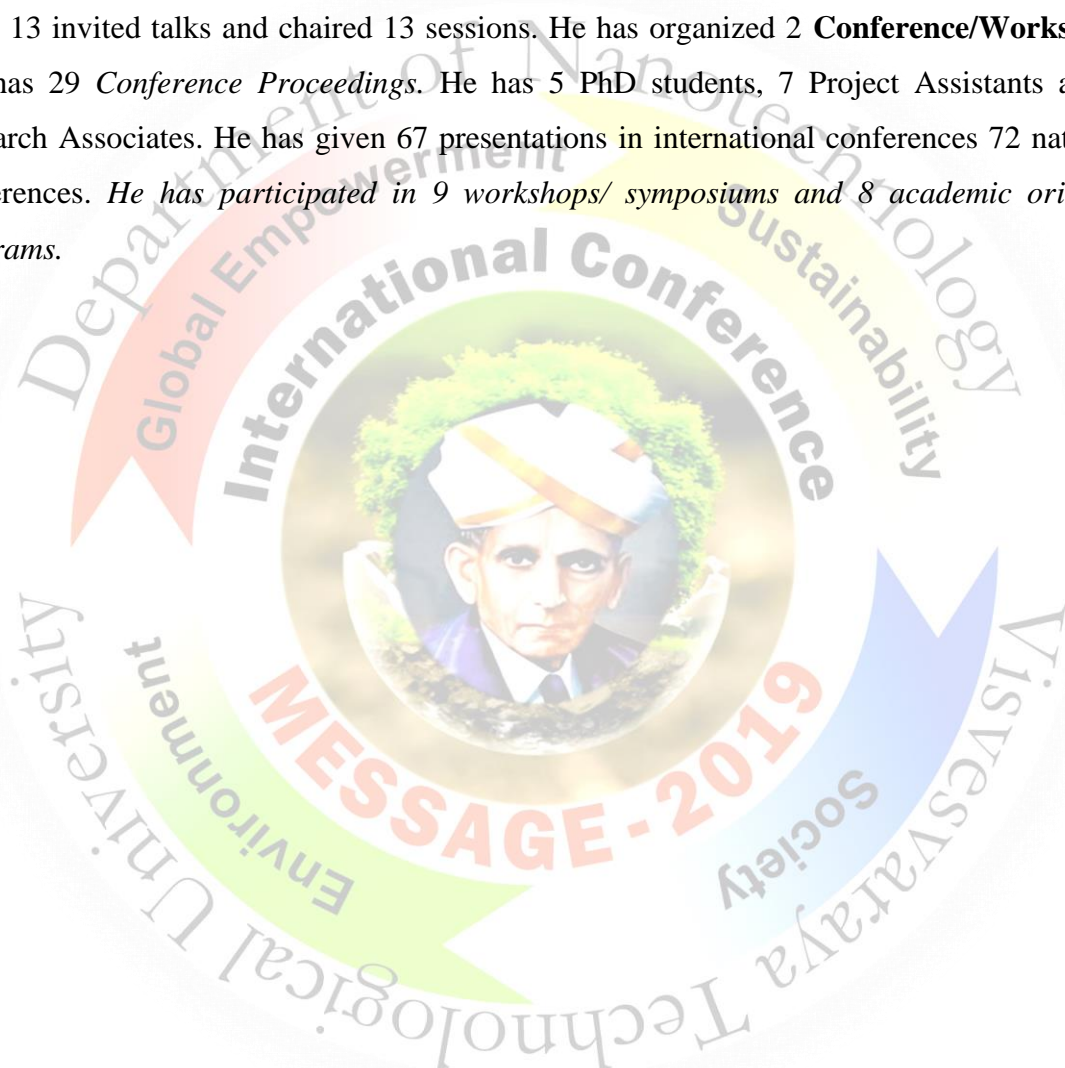
Another alternative and promising energy generation systems is the photocatalytic water splitting reaction. Photocatalytic watersplitting process is an economical approach to convert solarenergy into renewable and storable hydrogen and oxygen. H_2 is asuperb energy carrier, no environmentally harmful gases areproduced during the combustion process of H_2 and hydrogenpossess highest energy density per unit weight (120 MJ/kg) and is the cleanest source of energy so it could be the ultimatefuel for posterity. Designing efficient photocatalyst for hydrogen generation is challenging issue where photocatalyst should have suitableband gap and band postion, porosity, morphology and crystallinity. We have designed some efficient photocatalyst like TiO_2 , ZnO , BiVO_4 , CuO/TiO_2 , Ta_2O_5 and $(\text{MnFe})_2\text{O}_3@/\text{Ta}_2\text{O}_5$.

Finally, sustainable energy resources like hydrogen fuel and rechargeable batteries will provide better sustainability for present and future generation



Profile:

Dr. G. Nagraj has completed BSc at Govt. First Grade College, Tumkur and Master of Science at Bangalore University and received PhD. from Bangalore University, published his PhD thesis on 09-14-2016. He has got two post-doctoral fellowships one from IPC, IISc, Bangalore and second from UFRGS, Brazil. He has given 2 inaugural talks, 13 invited talks and chaired 13 sessions. He has organized 2 **Conference/Workshops** and has 29 *Conference Proceedings*. He has 5 PhD students, 7 Project Assistants and 2 Research Associates. He has given 67 presentations in international conferences 72 national conferences. *He has participated in 9 workshops/ symposiums and 8 academic oriented programs.*





Invited Talk - 10

Prof. Geetha Balakrishna
Director,
Center for Nano and Material Sciences,
JAIN University, Bangalore

Title: New hopes to overcome the challenges in Quantum Dot Sensitized Solar Cells

The performance of quantum dot sensitized solar cells (QDSSC) still remains as low as ~13%, though it possesses unique distinguished features compared to conventional silicon cells. The future of QDSSC can be optimistic if concerns of charge transfer, recombination and stability can be worked upon. We report an integrated approach of an efficiently hybrid composite as photo anode material to address better photon absorption and electron transport, a solid-state electrolyte for stability and 2DTMC as counter electrode for back electron transfers.



Profile:

Prof. Geetha Balakrishna, presently the Director of “Centre for Nano and Material Sciences”, Jain University, is a doctorate in Chemistry (2005). She is a Fulbright fellow, a prestigious fellowship offered combinedly by Govt of India and United States of America. She has a vast exposure to renowned laboratories across the world and was visiting scientist at, Massachusetts Institute of Technology, USA, National University of Singapore, University of Notre Dame, USA, Ircelyon University, France, University of Hainan, China and also JNCASR at Bangalore. Her passion for research in interdisciplinary sciences has allowed her to establish Center for Nanosciences under VTU in 2008, Center for Nanobiosciences in 2010 under Jain University and Center for Nano and Material Sciences where she continues to be the director till date. Her major areas of research involve photochemistry and nanomaterials. She has guided many students on their research projects leading to Doctoral and Post Doctoral degrees in specific syntheses of various nano composite materials, membranes, quantum dots which are active to photons and hence applicable to liquid junction solar cells, sensors, water filtration/purification, disinfection, desalination and metal ion separation. The outcome of this has been reflected as publications reaching close to 100 in high Impact international journals of repute. She is a fellow/member of many renowned scientific world bodies such as Material Research Society (MRS), Association of Hazardous Materials, Indian Chemical Society, American Chemical Society (ACS) and American Nano Society (ANS). She has presently been nominated the regional coordinator of Global Materials Network from India and is the commission member of International Union of Material Research Society. She has seven patents to her credit and has successfully completed many funded projects of thrust importance from DST, Nanomission, Ministry of Drinking Water Resources, Ministry of New and Renewable Energy, Naval Research Board, and Board of Research in Nuclear Sciences. She is also the recipient of young scientist awardee in 2010 from Govt of India and Nehru fulbright awardee for Academic and Professional Excellence in 2017. And more recently has also spun off a company in May 2019 with technologies involving photocatalytic biofuel production and liquid liquid separations.





Invited Talk - 11

Dr. Sukanta Mondal

Principal Scientist,

Animal Physiology Division,

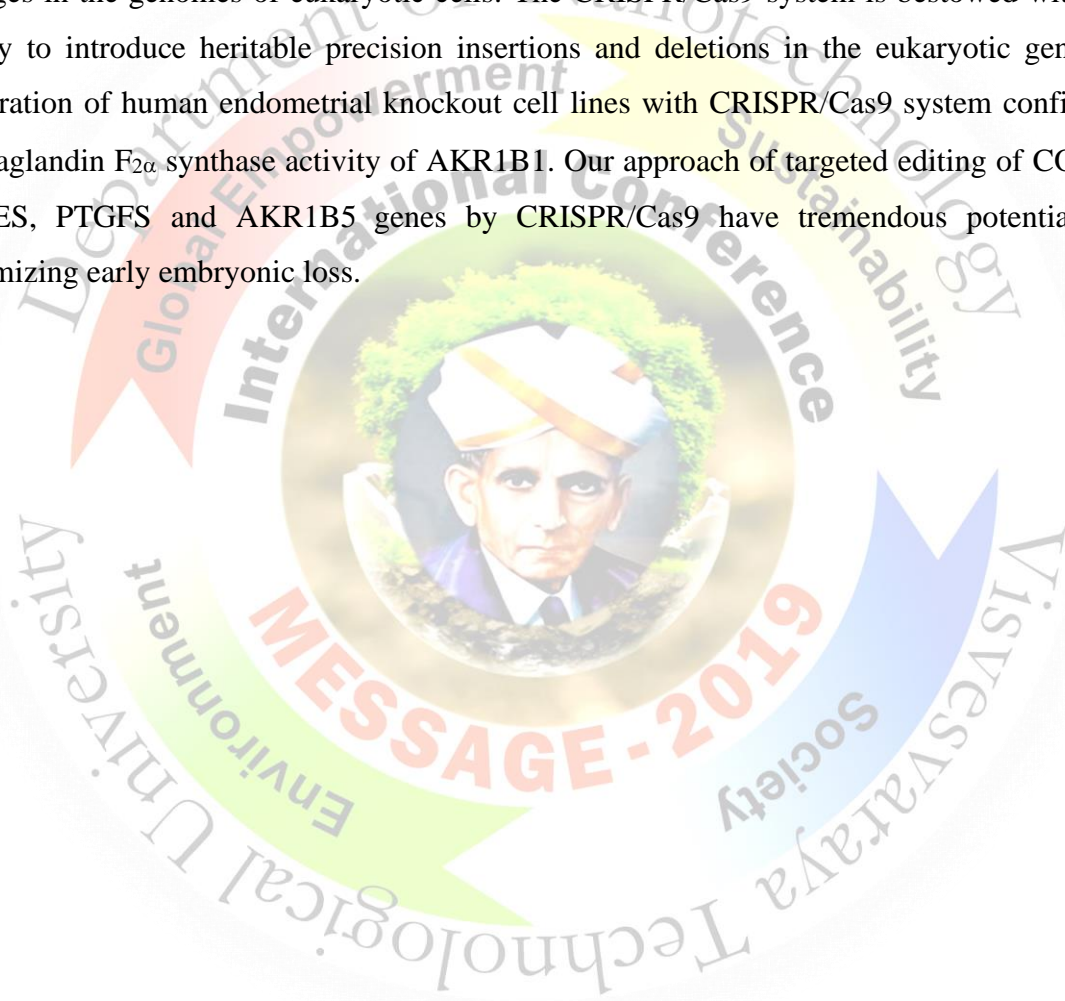
ICAR- National Institute of Animal Nutrition and Physiology (NIANP), Bangalore

Title: Application and potential of CRISPR/Cas9 guided genome editing for minimizing early embryonic loss

Early embryonic mortality is one of the major factors of reproductive failure that causes considerable challenge to the livestock industry. Indian livestock economics is seriously affected by embryonic wastages and hence its control is the greatest concern to the scientists and policy makers. More than 40% of the total embryonic mortality occurs between days 8 and 17 of pregnancy in bovine. Embryonic losses are reported to be 20-30% in sheep and more than 70-80% of the total embryonic mortality occurs between days 8 and 16 of pregnancy. The survivability of embryo during early embryonic life in mammals is mostly dependent on the concerted events where the uterus and terminally differentiated embryos exchange signals culminating in maternal recognition of pregnancy (MRP). The major reason for embryonic mortality is failure of cellular and molecular dialogues at embryo-uterine interface. Understanding and unraveling the secrets of implantation, embryo development and reciprocal signaling networks between the embryo and uterus will lead to alleviation of the problems of infertility. Prostaglandins (PGs) play an important role in regulation of estrous cycle, recognition of pregnancy and implantation through autocrine, paracrine and endocrine actions. The candidate genes responsible for their biosynthesis, transport and signal transduction are among the first to consider for involvement in embryonic wastage. A comprehensive understanding and unraveling uterine function and embryo uterine dialogue will facilitate management strategies to improve embryonic survival. The first limiting step in the generation of PGs is the transformation of arachidonic acid by prostaglandin synthases 1 and 2 (PTGHS-1, -2 or COX-1, -2). Downstream enzymes such as PGE synthase (PTGES) and PGF synthase (PTGFS) catalyze the conversion of PGH₂ to PGE₂ and PGF_{2α}, respectively. Relatively little is known about the biosynthetic pathways leading to the



formation of PGE₂ and PGF_{2α}. Studies with COX-1 and COX-2 knockout mice demonstrated that COX-2, but not COX-1, is crucial for normal ovulation, implantation, and decidualization. Most prostaglandin F_{2α} synthases (PTGFS) identified to date are aldoketoreductases (AKRs). Aldoketoreductase 1B5 (AKR1B5) was the most likely PTGFS involved in the production of PGF_{2α} in bovine endometrium at the time of luteolysis. Recent advances in the development of novel, robust and efficient genome editing technologies based on programmable nucleases have substantially improved our ability to make precise changes in the genomes of eukaryotic cells. The CRISPR/Cas9 system is bestowed with the ability to introduce heritable precision insertions and deletions in the eukaryotic genome. Generation of human endometrial knockout cell lines with CRISPR/Cas9 system confirmed prostaglandin F_{2α} synthase activity of AKR1B1. Our approach of targeted editing of COX-2, PTGES, PTGFS and AKR1B5 genes by CRISPR/Cas9 have tremendous potential for minimizing early embryonic loss.





Profile:

Dr. Sukanta Mondal is currently working as Principal Scientist, Physiology Division, ICAR-National Institute of Animal Nutrition and Physiology, Bangalore, India. He did Ph.D. from Indian Veterinary Research Institute, Bareilly in 2006 on his work on molecular



characterization of prostaglandin synthase genes in buffalo. He joined National Institute of Animal Nutrition and Physiology, Bangalore in 1997 as Scientist. He became Senior Scientist in 2006 and Principal Scientist in 2012. His major research interests involve cloning, characterization and expression of genes regulating early embryonic loss, molecular characterization and expression of hormone receptors, impact of stress on maternal recognition of pregnancy etc. He is a noted environmental physiologist who has deciphered the molecular basis of climate change impact on maternal recognition of pregnancy and embryo survival in sheep. He was instrumental in developing ideal heat stress and nutritional model in sheep. He has published over 130 research publications in various National/International journals and presented more than 30 papers at various National/International Conferences. He has delivered invited lectures in different conference throughout the country and abroad.

Dr. Mondal's pioneering and path breaking contribution in hormone receptor as well as sheep and buffalo genomics has been recognized nationally and has received several prestigious awards like Prof. G. P. Talwar Midcareer Scientist award (2014), Rashtriya Gaurav award (2014), Prof. G. K. Pal award (2013), Fellow of Indian Chemical Society (2013), Fellow of Society for Applied Biotechnology (2012), Fellow of Indian Association of BioMedical Scientist (2010), Dr. K. Anji Reddy award (2011), Prof. P. B. Sen Memorial Oration award (2008), Biotechnology Overseas Associateship award (Long term, 2007-08), ISSRF Young Scientist Award (2006), 2000 Outstanding Scientists of the 21st Century and 21st Century Award by the International Biographical Centre, England, UK as well as ABI's Research Board of Advisors by American Biographical Institute, Inc, USA. Dr. Mondal has been bestowed with several fellowships including National Scholarship (Govt. of India), S J Jindal Trust fellowship, Junior Research Fellowship (NDRI), Senior Research Fellowship (IVRI) and CRBR Postdoctoral fellowship (Canada). He is serving as Joint Secretary, National Environmental Science Academy, Executive member, Physiological Society of



India and Editorial board member of Indian Association for Animal Production. He is Associate Editor of journals viz., American Journal of Biochemistry and Molecular Biology, Asian Journal of Biotechnology, Asian Journal of Cell Biology, Current Research in Poultry Science and Biotechnology etc.





Invited Talk - 12

Dr. Bela Zutshi

Professor, Ex-Chairperson (2016-18)

Department of Zoology, Bangalore University &

Ex-Director, Centre for Women's Studies, Bangalore University, Bangalore- 560056

Title: Survivability and Growth Enhancement of *X. helleri* by *L. camara* based Carotenoid Incorporated Formulated Feed

Aquaculture of freshwater and marine species of finfish, shellfish and ornamental fish is a growing global industry. Ornamental fish production is a popular and a profitable business in India and many countries all over the world. Approximately 80% of ornamental fish species are tropical. They are reared as pets, kept for relaxation at home or business decoration or as a hobby. Thus keeping in view their statistical demand the present study was conducted for 100% survivability and better growth performance of red swordtail (*Xiphophorus helleri*) live bearer ornamental fishes with the help of dietary supplementation of carotenoid pigment, β - carotene from flower of *Lantana camara*, incorporated in a formulated diet. Due to the degrading effect of synthetic pigment on the aquatic environment there is a need to use natural pigment source as an alternative additive in diet. Aquaculture feed industry require such cost effective natural and environmentally safe source of feed for better growth and survivability of fish. Accurately and proportionately formulated feeds are significant part of successful aquaculture and carotenoids play a major role in commercial aquaculture. A pilot study was conducted on the juveniles of control and experimental swordtail ornamental live bearer fish in ratio of 1male: 3female with initial weight of 0.8g were kept in 3 replicates each in 50L tank fed with customized formulated diet (D1) (control) and the same feed incorporated with carotenoid pigment (50mg/1000g of feed) (D2) and (100mg/1000g of feed) (D3) (experimental) from powdered flower of *Lantana camara* for a period of 60 days. Significant improvement was observed in health conditions and growth performance. No mortality due to attack of any infection or otherwise when fed with different feed regimes viz., D1, D2 and D3 and so the effect of basic diet (formulated diet ingredients) is worth mentioning. A significant increase in the growth aspects of body weight gain



(BWG), specific growth rate (SGR) of weight and length was recorded in fish fed with D3, whereas feed conversion ratio (FCR) and condition factor (CF) showed a decrease in those fed with D3 when compared with control group ($P < 0.05$) and D2. The detail results are mentioned in the paper.

Keywords: Platy fish, carotenoid source, *L.camara*, formulated feed, growth performance





Profile:

Dr. Bela Zutshi has experience in Teaching 21 years in PG, Department of Zoology, Bangalore University, in the field of Aquatic Biology, Fish Toxicology, Environmental biology and experience in Research 31 years in the feild of Aquatic Biology, Environmental biology, Fish Biology. She published More than 40 Research papers in peer reviewed and Springer and Elsevier & 75 Abstracts. She written and Authored a Book “Pollution status of Lakes in Bangalore” Vol.1, 2014. she Guided M. Phill and Ph. D students in the field of Aquatic Biology and Fish Toxicology, Nanotechnology. Chairperson and Member BOE, BOS and other exam related committees in Bangalore University and other universities in Karnataka. She is a Life Member of Academic Scientific Bodies, and Societies as Asian Fisheries Society; Indian Science Congress; ZSI; Aquatic Biodiversity Conservation Society, Fellow of Acad. Environ. Bio., Nat. Enivron Academy; NESAs etc.



Delivered a Keynote Address: World Environment Day, 2010 at Instt. Of Engineers, Bangalore; Zoological Society, DKM College, Vellor, 2011; Talk on Status of Lakes in Bangalore, 2013, Rotary Club, Basavangudi, Bangalore; World Environment Day, 2012 at KLE College of Arts and Science; Resource Person: UGC Refreshers Course, 2009, 2011 & 2017. She Adjudicated & awarded more than 20 thesis of candidates from various universities in India. Receipt of Various Awards as Best paper Presentation, 1989; Young Scientist, 1998 Environmentalist of the Year award 2003, NESAs; Distinguished Scientist, 2009. NESAs; Distinguished Scientist of year, 2015 International Foundation for Environment and Ecology in association with Confederation of Indian Universities, New Delhi; Award of Academic Excellence, Bangalore University; Shiksha Rattan Purskar, New Delhi, 2010, Teachers Day Award 2018, ...many other. She has handled TWO Major Research Project, UGC in subject, Aquatic Biology and Fish Toxicology. She PRESENTED RESEARCH PAPER (Orally) in more than 35 National and 28 International Conf and Seminars. Chaired sessions at many National and International Conference; Japan 2009, at Austin, Texas, USA Nov. 2011. Keynote Speaker and Moderator: Osaka, Japan. Visited Places as Boston, Texas USA; Kusatsu, Otsu, Yokohama and Shiga, Osaka, Japan; Scotland, U. K; etc for her research presentation. & Organised Seminars, Workshops, nat. & Int.conf from 2010 to date.



Invited Talk - 13

Dr. Rakesh Kr Singh

University Centre of Nanoscience & Nanotechnology,
Under school of Engineering and Technology
Aryabhatta Knowledge University Patna

Title: Production of Silica Nanoparticles from Rice husk and their Possible Applications

The silica particles obtained from Agriculture waste - rice husk were found in nano-range when synthesized chemical based coprecipitation and leach processes. The mesoporous nanosilica obtained from rice husk can be further used in drug delivery as they have low toxicity as well as high drug loading capacity, so they are used in controlled and target drug delivery system. Mesoporous silica has been widely used as a coating material also. Industries such as Electronics, Cement and Rubber are highly dependent on silica. This is a growing concern because of the environmental impact of sourcing and refining of silica. Thus, a green source of silica from Agriculture waste is of vital importance to meet the growing demand for silicon in the industry. India is rich source of Silica. A strong acid leaching treatment used in RHNS production is significantly hazardous to Environment and human life, and also increases the processing cost. Therefore, we use an Environment friendly process (Citric acid leaching) to obtain high-purity nanosilica in large scale from rice husk for commercialization purpose also.

In this talk we will discuss synthesis, Characterization of Nanosilica from rice husk using modern scientific tools and possible some applications for the development of country India.



Profile:

Dr. Rakesh Kr Singh, 41 years, born at Kasamra Village of Purnea district of Bihar, did Ph.D and Post-Doctoral work in Nanoscience field and worked on Ferrite Magnetic nanoparticles, Nanoaluminate, Nanochromite and presently working on Ayurvedic bhasma & nanomedicine, Food nanomaterials and synthesis of Silica



nanoparticles from rice husk and some others related work. At present Dr. Rakesh is Head(academic), University Centre of Nanoscience & Nanotechnology, under school of Engineering and Technology of Aryabhata Knowledge University Patna(Joining date 2nd Sep. 2013).

He has also Worked as an Asst. Professor of Physics in NAAC- A Grade with CGPA 3.81/4 & College with Potential for Excellence (CPE) status, accorded by UGC, institute-Patna Women's College, Patna university, Since August 2004 to 1st September 2013. Apart from Teaching-Learning & Evaluation and Co-curricular activities, he has guided and worked in UGC-Sponsored Research Projects under 'College with Potential for Excellence' (CPE) status scheme, Basic Scientific Research (BSR), UGC- Govt. of India, Special scheme, Minor Research Project(MRP) (Total Projects: CPE : 09, MRP:01 and BSR : 07 = 17).

He has been the Organizing secretary/ Conveners/ Coordinators of more than 60 conferences/ Seminars/ of International/ National repute along with keen interest in innovative Science teaching in class room through low cost / No cost experiments. Such innovative practices help in demystifying Science, developing Scientific thinking and create science especially Physics learning interesting. He has published more than 70 publications and has experience of more than 14 years at B.Sc., M.Sc., M. Tech, and Ph.D. level. Total 6 Ph.D. students awarded degree/completed work in the field of Food-Bio Nanotechnology and Ayurvedic Bhasma as a Nanomedicine and 6 Ph.D. are working under his supervision. 21 M. Tech students completed their project thesis/ awarded degree, in the field of Food-Bio nanotechnology, Nano-Electronics, Nanotechnology in Environment & Agriculture. He has also guided more than 40 students in research project at UG level under potential for excellence and Basic scientific research scheme of UGC scheme.



He has received many recognitions, such as : Senior Resource Person of Utsahi Physics Teachers/ Anveshika Coordinator, coordinated by **Prof. H.C.Verma, Dept. of Physics, IIT Kanpur** in May 2009(www.hcverma.in), Young Scientist Award in 1st Global Bihar Science Conference held at Patna Science College, Patna University in May 2008, Master Resource Person of International Year of Physics – 2005, International year of Astronomy – 2009 (Trained by DST, Govt. of India and proclaimed by united nations) and invited by DST, Govt. of India to attend the Interactive meet of Nobel Laureates' and Science Icons of European Union, Germany held Vigyan Bhawan, New Delhi on 8th February 2007. Recently in 23-25 Aug. 2016 at Stockholm, Sweden in European Advanced Material Congress-2016, Dr. Rakesh presentation on “Ayurvedic Bhasma & Nanomedicine- An Ancient Wisdom” and his presentation was highly appreciated at European Advanced Material Conference and Executive Chairs felicitated to him.

Over the last 10 years, Dr. Rakesh is also working for Revitalization of Science education and inspire for research in academic institutions and in this process, he interacted more than 5,000 students and 1000 teachers across the country. He is member of various academic bodies such Post-Graduate Research council, Board of studies, Coordinator/ Executive council member of National Anveshika Network of India, coordinated by Prof. H.C.Verma, IIT Kanpur and Society for Scientific Values, Delhi, Coordinated by Prof. K.L.Chopra, former director, IIT Kharagpur of and most importantly he Established a world class Nanomaterial research laboratory at Aryabhata Knowledge University, Patna as a Professor in charge-Establishment and at present he is carrying out the responsibility of head(Academic) of the nanoscience center for Post-Graduate studies and Doctoral Research.



Invited Talk - 14

Dr. J. Manjanna
Deputy Registrar,
Rani Chennamma University,
Belagavi

Title: Resources recycling through urban mining: Recovery of valuable metals from e-waste by hydrometallurgical method

The increasing public concern on environmental sustainability has resulted in stricter regulations worldwide, for the adequate destination of hazardous residues from electronic wastage. These regulations have impelled the researchers to find suitable e-waste management and resource recycling techniques. For instance, Li-ion batteries (LIBs) are used extensively in most of the portable electronic devices and recently in electric motor vehicles. Therefore, equally large amounts of spent LIBs have to be handled after their lifetime. Environmentally benign hydrometallurgical process is investigated here for the recovery of Co and Li from the cathode active materials of spent LIBs [Fig.1]. A mixture of chelating agent (L = citric acid, tartaric acid, iminodiacetic acid, maleic acid etc.) and reducing agent (ascorbic acid) are used to dissolve the typical cathode material, LiCoO_2 [1-5]. Almost complete dissolution occurred in each case at $80\text{ }^\circ\text{C}$ in about 6 h. On the other hand, we found the rapid dissolution under microwave irradiation [6]. Furthermore, we have observed the selective leaching of Li from LiCoO_2 by oxidation of Co(III) to Co(IV), using oxidative reagents at room-temperature [7]. The formation of Co(III)- and Co(II)-L is evident from the UV-Vis. spectra of the dissolved solution as a function of dissolution time. Thus, the reductive-complexing & oxidative dissolution mechanism is proposed here. The periodically collected samples were syringe filtered and estimated for Co and Li ions using AAS and flame photometer, respectively. The dissolution rate constants were determined using cubic rate law. The dissolved Co and Li ions were precipitated, selectively: Li as $\text{LiHC}_2\text{O}_4 \cdot \text{H}_2\text{O}$ or Li_2CO_3 and Co as Co-oxalate / citrate/ ascorbate. The Co_3O_4 was formed on heating the Co precipitate at $600\text{ }^\circ\text{C}$ for 2 h. It is important to note that LiCoO_2 was re-synthesized here by



thermal decomposition of Co-oxalate ($\text{CoC}_2\text{O}_4 \cdot 2\text{H}_2\text{O}$) and $\text{LiHC}_2\text{O}_4 \cdot \text{H}_2\text{O}$ at 750°C for about 24 h.



Fig. 1. Photographs of the LIB after dismantling & products before and after selective precipitation.

Ref.:

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- [5] GP Nayaka *et al.*, *Waste Management* 78 (2018) 51.
- [6] DM Patil *et al.*, *J. Environ. Manage.* 256(2020) 109935.
- [7] DM Patil *et al.*, *Hydrometallurgy* (2018) in review.



Profile:

Dr. J. Manjanna obtained M.Sc. (1995) in Chemistry & Ph.D. (2001) in Industrial Chemistry from Kuvempu Univ. He worked in BARC, Mumbai for his Ph.D. degree and then as K S Krishnan Research Associate (2002-2004). He moved to Japan as a Postdoctoral researcher (2004-2010) under JSPS and JST fellowship at Hokkaido University., Iwate Univ., and Univ. of Tokyo. He joined Kuvempu University in Jan 2010 as Assistant Professor in the Dept of Industrial Chemistry & worked as a Coordinator for Nanoscience & Technology (M.Tech.) programme. He moved to RCU in Sept 2013 as Associate Professor of Chemistry.



He teaches Inorganic & Physical Chemistry to M.Sc. students & supervising Ph.D. Scholars working on material chemistry aspects including nanomaterials for energy devices, environmental remediation and biomedical applications. He has published over **70 Int. journal** papers & three patents (one Japanese and two Indian). Presently, his citations are about 1550 & h-index-25.

He has received research funding from BRNS/DAE, DST and VGST. He is a Chairman and members of Board of Examiners (BoE) & Board of Studies (BoS) in many Universities. He has organized National and International Seminar/ Conference. He is active in teaching, research and administration.



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LIST OF ORAL PRESENTATIONS

Oral Number	Name of the Presenting Author	Title of the abstract	Affiliation
OP-01	Bhavya M. B.	Controlled Synthesis Of Anisotropic Gold Nanorods For The Detection And Degradation Of Pesticides	Centre for Nano and Material Sciences, Jain University, Jain Global Campus, Ramanagara, Bangalore 562112, India
OP-02	C. Satyanarayana	Bio efficacy of tolfenpyrad 15% ec against pests complex of grapes crop	Department of Entomology, College of Horticulture, Bidar – 585 403, Karnataka
OP-03	John Sushma Nannepaga	Synthesis and characterization of curcumin loaded magnesium oxide nanoparticles: ph dependent in vitro release behaviour of curcumin and its antioxidant activity	Department of Biotechnology, Sri Padmavati Mahila Visvavidyalayam, Tirupati - 517 502, India
OP-04	P. S. Brahmanand	Post-flood Management Options for Sustainable Agriculture in Flood-prone Regions of India	ICAR-Indian Institute of Water Management, Bhubaneswar, India
OP-05	K. S. Kiran	Crystal and Molecular docking studies of bicyclohexyl diols with focal adhesion kinase inhibitors	Department of physics, School of Engineering and Technology, Jain Deemed to be University, Bangalore, Karnataka, India
OP-06	P. K. Pattajoshi	Noise Pollution Monitoring & Its Hidden Dimensions	Manager(Environment & Safety), Alumina Refinery, NALCO DAMANJODI, Odisha-763008
OP-07	Jyoti Ranjan Rout	Evaluation of combined toxicity of copper and cadmium in <i>Withaniasomnifera</i> L.	School of Biological Sciences, AIPH University, Bhubaneswar-752101, Odisha, India.
OP-08	G. Suhasini	Biodiversity Of Mosquitoes (Diptera: Culicidae) In Different Habitats Of Karimnagar District, Telangana, India.	SSR Govt. Arts & Science College, Karimnagar
OP-09	S. Jagadeeshbabu	Synthesis and Characterization of visible light active TiO _{2-x} photocatalyst for Enhanced Photocatalytic Hydrogen Generation	Visvesvaraya Center for Nano Science and Technology, Visvesvaraya Technological University, Muddenahalli, Chikkaballapura, Karnataka, India
OP-10	Poornima V. Matti	Incidence Of Invasive Pest, Fall Armyworm <i>SpodopteraFrugiperda</i> (J.E.Smith) And Its Natural Enemies In Maize Ecosystem Of Belgaum District	Agricultural research station, Sankeshwar-591314 University of Agricultural Sciences Dharwad
OP-11	ZebaParveen	Hording And Billboards A Source Of Visual Pollution In Cities And Public Places	Associate Professor/Head Department Of Zoology/Principal, Bi Bi Raza Degree College for Women's Gulbarga
OP-12	B. M. Manohara	Dosimetric application of CdSiO ₃ nanopowder prepared via Low temperature Solution combustion technique	Department of Physics, Government First Grade College, Davanagere - 577004, India
OP-13	Udayabhanu	Ultrasonic waves assisted one pot synthesis of Cu/CuO-TiO ₂ nanocomposites for stable Li-ion battery application	Energy Materials Research Laboratory, Department of Chemistry, Siddaganga Institute of Technology, Tumakuru-572103 (Affiliated to VTU Belagavi)
OP-14	Thanuja K. Naganna Gowda	Synthesis And Characterization Of Anacardic Acid Encapsulated TiO ₂ and ZnO Nanoparticles and Their Biomedical Properties	Department of Chemistry, Bangalore Institute of Technology, Bangalore, VTU, Karnataka.



OP-15	S. Meena	Synthesis of MnFe ₂ O ₄ nanoparticles by solution combustion method and the study of its electrochemical and photocatalytic properties	Department of Science, Research Center, East West Institute of Technology, Bangalore- 560 091
OP-16	Alex Y	Synthesis of sustainable, eco-friendly nano-fuel derived from waste plastics obtained by pyrolysis method and studies on performance and emission characteristics of four stroke diesel engine operating with the blended diesel	Saintgits College of Engineering, Kottayam
OP-17	Rajanandhiremath	Productivity and soil health of rice based cropping systems under organic management	Department of Agronomy, College of Horticulture, Thrissur, Kerala
OP-18	S.T. Girisha	Biogenic synthesis of AuNPs by endophytic <i>Cladosporium</i> sp. for anticancer efficacy	Dept. of Microbiology and Biotechnology, Bangalore University, Bengaluru, India
OP-19	Mrunal V. Kangralkar	Synthesis of Fe nanoparticles by <i>Terminalia arjuna</i> bark extract and degradation of rose bengal (RB)	Dept. of Chemistry, Rani Channamma University, Belagavi 591156, Karnataka
OP-20	Manojit Bhattacharya	Computational analysis of novel antigenic epitopes within the outer membrane protein sequences of <i>Aeromonashydrophila</i>	Department of Zoology, Fakir Mohan University, Vyasa Vihar Balasore-756019, Orissa, India
OP-21	Dr. V. Jaisankar	Green Synthesis Of Biodegradable Super Absorbent Polymeric Hydrogel/Silver Composite As Water Reservoir For Agriculture	Associate Professor, PG and Research Department of Chemistry, Presidency College (Autonomous), Chennai 600 005, Tamil Nadu, India
OP-22	K.T. Chandrashekara	Shankapushpi Nanoparticles Inhibit Alzheimer's Effect	Institution of Excellence, VijnanaBhavana, University of Mysore, Manasagangotri. Mysuru, INDIA-570 006
OP-23	T. Pramod	Influence of betel nut concentration in the matrix of polycarbonate and abs on the mechanical characteristics	The Energy and Resources Institute, Bengaluru, India
OP-24	Amulya. G.	In vivo copper oxide nanoparticles conjugated antitumor activity of <i>Celastruspaniculatus</i> on breast cancer	R & D center, Department of Biotechnology, Acharya Institute of Technology, Acharya Post, Bengaluru-560 107
OP-25	Manjunatha.B. C.	Synthesis And Characterization Of Hexagonal Calcium Aluminates	Department of Physics, S.J.C.Institute of Technology, Chickballapur-562101, Karnataka, India
OP-26	Shivakumar Gowda	"Green synthesis of chitosan silver nanocomposites and their antifungal and toxicity studies"	Division of Plant Pathology, Indian Institute of Horticultural Research, Hessarahatta Lake Post, Bangalore-560089, India.
OP-27	Banu Deshpande	Milling And Physical Characteristics Of Rice Grains Of High Protein Aerobic Rice Genotypes	UAS, GKVK, Bengaluru
OP-28	S. K. Sahoo	Hydrothermal synthesis of single crystalline nano ceria using different neutralizing agent	High Energy Materials Research Laboratory, Pune-411021, India
OP-29	Chitrabanu C. P.	synthesis of silver nanoparticles mediated by simarouba saponin extract and their catalytic and biological application	Department of Nanotechnology, Center for postgraduate studies, Bangalore Region, Visvesvaraya Technological University, Muddenhalli, Chikkaballapur-562101, India



OP-30	Uma B.	Synthesis of Novel CuO/ZnO Nanocomposite: Characterization, Photocatalytic and Antibacterial studies	Department of chemistry, Dayananda Sagar College of Engineering, Bangalore-560 078
OP-31	Murthy M.	NiS-RGO Nano hybrid material for Energy storage Application	Department of Nanotechnology, Center for postgraduate studies, Bangalore Region, Visvesvaraya Technological University, Muddenhalli, Chikkaballapur-562101, India
OP-32	Sujnani kadakolmath	Importance of sustainable solutions in smart cities	VTU Belagavi, Karnataka, India





Oral Presentation | OP-01

Controlled Synthesis of Anisotropic Gold Nanorods for the Detection and Degradation of Pesticides

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Abstract

Pesticide plays an important role in the agriculture. Excess usage of pesticides became necessary in order to fulfill the hunger of the huge population and also to preserve the food for future. Presence of pesticides even at low concentration, human health deteriorates and leads to many diseases. The rapid and ultra-low detection of pesticides along with degradation and complete removal demands the design of potential substrates. Here, we have used anisotropic gold nanorods (Au NRs) as the potential substrate for the detection and degradation of two common and broad-spectrum pesticides; Chlorpyrifos (CPF) and Malathion (MLT) and detected them at 0.15 ppt within two seconds. Upon addition of pesticides to Au NRs, colour changes are visually observed. Under certain environmental conditions, CPF and MLT degraded and adsorbed on the surface on Au NRs. The degraded moiety of CPF and MLT on the surface of Au NRs forms side to side and end to end interaction, respectively leads to long range assembly. This shows no external agent is required, only CPF and MLT analytes are quite enough for the proper assembly of Au NRs and this assembly is responsible for the ultra-low detection of pesticides. Assembly of Au NRs is confirmed by TEM analysis and degradation is supported by FT-IR, Raman and GC-MS analysis. As this method is quick, it is helpful to confirm onsite detection of pesticides rapidly and also detected them simultaneously. This technique demonstrates that Au NRs are extremely potential for the detection and degradation of pesticides.

Keywords: Gold nanorods, Chlorpyrifos, Malathion, Pesticides, degradation, Side to side interaction and End to end interaction.



Oral Presentation | OP-02

Bioefficacy of Tolfenpyrad 15% EC against Pests Complex of Grapes Crop

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Abstract

In a field trail carried out at farmer's field, College of Horticulture, Bidar UHS, Bagalkot, Karnataka to evaluate the bio-efficacy of six insecticides with different modes of action viz., Tolfenpyrad 15% EC @ 150 g.a.i/ha, Imidacloprid 17.8 [SL @71.8](#) g a.i./ha, Fipronil 80% WG @ 40g a.i./ha, Buprofezin 25%SC@ 375 g.a.i./ha, Lamda cyhalothrin [4.9% CS@12.5](#)g a.i./ha, Methomyl 40 SP@ 500g a.i./ha and an untreated control during rabi 2016-17 season, the Tolfenpyrad 15% EC @ 150 g. a.i/ha was significantly superior over other treatments by recording lowest grape pests complex viz., 6.73 thrips/3 leaves , 5.20 jassids/3 leaves, 92.00 mealy bugs/vine and 1.93 flea beetle/vine. Whereas, significantly highest pest population was registered in untreated control. Highest fruit yield was recorded in Tolfenpyrad 15% EC @ 150 g.a.i/ha (16.44 t/ha). Lowest fruit yield was recorded in untreated control (7.30 t/ha).

Keywords: Bioefficacy, Grape pests, Tolfenpyrad,



Oral Presentation | OP-03

Synthesis and Characterization of Curcumin Loaded Magnesium Oxide Nanoparticles: Ph Dependent In Vitro Release Behaviour Of Curcumin and Its Antioxidant Activity

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Abstract

Curcumin is an active natural polyphenol component of *Curcuma longa* using in several different fields, such as food, textile, and the pharmaceutical industry because of its anti-inflammatory and antioxidant properties. In present study, we have aimed to synthesize Curcumin loaded magnesium oxide nanoparticles as magnesium is main constituent of human body used to load and unload Curcumin molecules by Mg (OH)₂ precipitation followed by calcinations technique. Curcumin loaded MgO (Cu MgO) nanoparticles can be primarily confirmed by UV-Visible analysis at 360-380nm and 420-440 nm represents the magnesium oxide and the Curcumin. Fourier transform infrared peaks suggested that magnesium oxide and Curcumin are compatible with each other. X-ray diffraction confirmed the reduced crystal formation of Curcumin encapsulated in the metal oxide nanoparticles. SEM analysis has shown the average particle size was found to be in the range of 429-611nm. In vitro release studies of CuMgOs was observed at different pH conditions (3, 5 and 7.4) compared to the Curcumin solution for 5 day period with the maximum release rate of 88% with controlled drug release was observed at acidic pH 3 along with the 82 % of in vitro antioxidant activity which is compared with the Ascorbic acid. The studies confirmed that CuMgOs were prepared using precipitation followed by calcinations technique resulted in promising drug delivery system for control drug release with improved bioavailability with good stability provided by the metal oxide coating.

Keywords: Curcumin, CuMgOs, Antioxidant activity, In vitro drug release.



Oral Presentation | OP-04

Post-flood Management Options for Sustainable Agriculture in Flood-Prone Regions of India

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Abstract

Sustainable agriculture faces severe threat from higher frequency and magnitude of flood events. In India, about 40 million ha of cultivated land is flood-prone area affecting 113 million people. Post-flood management plan is one of the climate-resilient tools which provides cushion to the farmers by better preparedness for timely sowing/planting of alternate crops. It was prepared and implemented in severely flood affected regions of Gaihat block, Muzaffarpur district of Bihar, India during 2018. The flood depth and duration was estimated using time series satellite data, GIS and DEM. The alternate crops like maize, brinjal, tomato and cauliflower as per the plan were cultivated by the affected farmers during post-flood period. Maize exhibited better climate resilience in terms of disease and pest resistance and higher productivity compared to wheat in post-flood environment. The maize hybrid (Shaktiman-3) resulted in an average grain yield of 2.82 t ha⁻¹ in post-flood environment and its yield varied between 2.56 t ha⁻¹ to 3.15 t ha⁻¹ in different farmers' fields. The farmers could generate additional net returns of about INR 16,700 ha⁻¹ due to timely sowing of maize and implementation of post-flood management plan compared to control *i.e.* flood damaged field without intervention. Similarly, the average fruit yield of brinjal, tomato and cauliflower was 13.3 t ha⁻¹, 16.7 t ha⁻¹ and 14.1 t ha⁻¹ resulting in the additional net returns were INR 36,500 ha⁻¹, INR 33,200 ha⁻¹ and INR 37,700 ha⁻¹ respectively. Overall, the post-flood management interventions resulted in enhancement of benefit:cost ratio from 1.55 to 3.08. The interventions of this study would help in providing integrated flood management strategies in agricultural sector in India and thereby fulfilling the sustainable development goals.

Keywords: Post-flood management; sustainable agriculture; flood-prone regions



Oral Presentation | OP-05

Crystal and Molecular Docking Studies of Biscyclohexyl Diols with Focal Adhesion Kinase Inhibitors

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Abstract

In the present study crystal structure of 3-hydroxy-2-((2-hydroxy-4, 4-dimethyl-6-oxocyclohex-1-enyl) (4-methoxyphenyl) methyl)- 5, 5-dimethylcyclohex-2-enone was determined using single crystal X-ray diffraction. Cyclohexane is a non planar molecule the shape of which vaguely resembles a chair. The conformation of cyclohexane molecule is constantly changing, with the atom on the left which is currently pointing down flipping up, and the one on the right flipping down. Further the structural feature was extrapolated to molecular docking studies with focal adhesion kinase (FAK) domain using Autodock to study its anticancerous property. The compound exhibited considerable bacterial inhibition of lower to moderate concentrations. We conclude that these derivatives can be used in medicine and have enormous potential as pharmaceutical agents due to their biological activities. The above titled receptor gain functional and structural insights into their mechanism of inhibition and explore its potential as an anticancer agent.

Keywords: Bis cyclohexyl diols, Docking, Focal adhesion kinase



Oral Presentation | OP-06

Noise Pollution Monitoring & Its Hidden Dimensions

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Abstract

Scientifically speaking, Sound is the form of energy that gives the sensation of hearing and is produced by longitudinal mechanical waves in elastic matter. But “Noise” is interpreted as that sound which is undesirable, unwanted or harmful to human health or usually referred to that sound which can cause threat to the quality of life. In industry, Noise is considered as a physical hazard from occupational point of view and as a pollutant from environmental point of view. Its ill effect is not only confined to hearing impairment only, as we generally mean. Broadly speaking, Noise threat to human life from two major aspects: Auditory effects leading to hearing impairment and non auditory effects leading to ailments like disorder in nervous system, cardiovascular system and allied health problems. Sources of industrial noise are numerous but most can be considered from industrial operations, transportation, construction, and related activities. Industrial noise sources include factories, business, extractive industries, construction, agricultural, and other industries. Industrial noise is usually considered mainly from the point of view of environmental health and safety, rather than nuisance as sustained exposure can cause permanent hearing damage.

Monitoring of Noise emission is of paramount importance from legislative aspects, having few missing dimensions. Attempts have been made to review, analyse and focus on these hidden dimensions in monitoring this silent killer.

When two sounds are being emitted at the same time, their total combined intensity is not the numerical sum of the decibel levels of each sound. Thus if two machines are both emitting noise levels of 90dB(A), the sum total noise level is 93 dB(A). That means, A doubling of the sound level results in an increase of 3dB(A).



Similarly, when two identical industrial noise sources are side-by-side producing a record noise at 100 dB (A) the reduction in noise from shutting of one the noise sources is about 3 dB(A) resulting in 97 dB(A.)

When one doubles the distance from a noise source, the recorded noise level is reduced by 6 dB (A) This is also called as “Rule of 6”.

First indication of hearing loss occurs with a reduction in the ability to hear at 4 kHz frequency range. This enables the audiologist to assess as primary symptom of hearing loss, if any.

Many regulatory bodies worldwide like American Conference of Government and Industrial Hygienists (ACGIH) set the permissible values called as Threshold limit Values (TLV) with respect to noise based on duration of exposure per day or week.

Hearing damage can be induced by continuous exposure to levels in excess of 85 dB(A) but an individual's response varies within a population. Continuous exposure to levels in excess of 90 dB(A) will result in 20% of the exposed population suffering from Noise Induced Hearing Loss (NIHL) .

Unless a sound is a pure tone, which is unusual, most noises are made up of sounds of many frequencies and intensities, and when assessing it for health or annoyance reasons it is useful to understand what the levels are over a range of frequencies.

Industrial noise varies in its intensity with respect to time, nature of job and is often intermittent in nature. Some sort of average is therefore needed to evaluate the noise dose with respect to the human ear. Therefore equivalent continuous sound level (L_{eq}) has been established for this purpose, which is defined as the steady sound pressure level over a period of time has the same energy content and consequently the same hearing damage potential, as the actual fluctuating noise.



Oral Presentation | OP-07

Evaluation of combined toxicity of copper and cadmium in *Withania somnifera* L.

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Abstract

In the present study, the *Withania somnifera* L. seedlings were grown under *in vivo* condition and then the healthy plantlets were transferred to a mixture of sterilized sand, soil and cow-dung manure in the ratio of 1:1:1 (v/v) for two months. To investigate the toxicological effects of interactive metals, the sustainable plants were treated with a binary mixture of Cu and Cd in different concentrations (0, 25+200, 50+100, 100+50 and 200+25 mg/ kg of soil as Cu+Cd, respectively) for 15 days under natural environmental conditions. Initial symptoms of toxicity were noticed in growth parameters (root length, shoot length, leaf length and total number of leaves per plant) when treated with increasing but specific concentrations of combined metals. Root and leaf samples of treated plants were examined for catalase (CAT), superoxide dismutase (SOD) and guaiacol peroxidase (GPX). Both the increment and decrement trends of variations of enzyme activities were detected which confirmed through in-gel activity under combined treatments of Cu and Cd. Expression study was analyzed by taking the catalase gene (*RsCat*, *Catalase1*, *Cat1*) specific primers through reverse transcriptase polymerase chain reaction (RT-PCR). It was found that only *RsCat* gene responded strong expression with an increasing combination of Cu and Cd, which indicates the plant's stress tolerance mechanisms. Combined accumulation of both the metals resulted in an abnormal enzymatic response which considered as one of the most sensitive biochemical indicators to detect the phytotoxicity in plants.

Keywords: Antioxidant enzymes, cadmium, combined toxicity, copper, phytotoxicity, *Withania somnifera* L.



Oral Presentation | OP-08

Biodiversity of Mosquitoes (Diptera: Culicidae) In Different Habitats of Karimnagar District, Telangana, India.

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Abstract

Mosquitoes are diversified taxonomical group of insects that inhabit water habitats play an important role in the ecological food chain, and many of them are biters and transmitters of human and animal diseases like malaria, yellow fever, filariasis, dengue etc. Mosquito diversity was studied in five areas of the Karimnagar, viz Kothapalli, Rekurthi, Arepally, Seetampet and Chithakunta in indoor and outdoor habitats. An intensive survey on the seasonal prevalence and biodiversity of mosquitoes (Culicidae: Diptera) of 5 villages Kothapalli, Rekurthi, Arepally, Setampet and Chithakuntain Karimnagar district was conducted. Amongst the total 1245 individuals' mosquitoes collected, 608 mosquitoes from outdoor and 437 from indoor environments. Four species were identified as follows *Anopheles culicifacies*, *Culex quinquefasciatus*, *Aedes aegypti* and *Aedes albopictus*. The biodiversity indices in terms of ShannonWiener and Evenness indices were also evaluated. It was 1.7251 and 1.6534 during September to November 2019 respectively, while the Evenness index was 0.9755 and 0.9153 during September to November 2019 respectively. The mosquito populations outnumbered in the month of October 2019 which favours the population growth of mosquitoes. We conclude that outdoor habitates, viz. open type drainage, sewage canal, ditches, cattle sheds and construction sites are better habitats for the sustenance of *Anopheles* and *Culex* mosquitoes and plastic container in indoor habitat for *Aedes* mosquitoes.

Keywords: Biodiversity, *Anopheles culicifacies*, *Culex quinquefasciatus*, *Aedes aegypti*, *Aedes albopictus*, Shannon–Weiner index



Oral Presentation | OP-09

Milling and Physical Characteristics of Rice Grains of High Protein Aerobic Rice Genotypes

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Abstract

Introgression rice genotypes from land rice varieties has resulted in enhancing total grain protein content to approximately 14 percent in new genotypes using BPT 5204 (sonamasoori variety) as female parent to develop Recombinant Inbred Lines (RIL'S) under aerobic condition without affecting the yield and also with good micronutrient profile. Milling and physic chemical characteristics were assessed for six high protein rice genotypes compared with released check variety HP-9 (Paustic-9). Six high rice genotypes collected for study namely HPR 565, HPR 801, HPR 814, HPR 930, HPR 1241 and HPR 1630 were procured from Department of Plant Breeding and Genetics, UAS, GKVK, Bengaluru. Most of the varieties had high head rice recovery (88.6 to 92.5%) and lower broken percentage (7.4 to 11.0%). All the genotypes yield the rice grains which are considered as grade one quality and may perform well in marketability with good milling determinants for both producers as well as consumers. Physical characteristics indicated the higher mean grain length range of 4.9 to 5.6, lower breadth range of 1.5 to 1.9 and consequently higher L/B ratio range of 2.5-3.5 depicting the good quality grains though they are classified as broad grains. HPR 1630 was the only variety that classified as slender grain. According to dimensional properties HPR 565, HPR 801, HPR 1630 and HP 9 were categorized as fine type and others were of common type. 1000 kernel weight indicated all the rice genotypes yield grains as moderately heavy, which is a good indicator for marketability for producer as well as marker of satiety for consumer. The high protein rice genotypes have the potential to enhance the nutrition of poor rural family diet where rice is predominant source of energy and protein.

Keywords: Aerobic rice, High protein rice genotypes, Milling, Headrice recovery, Physical characteristics



Incidence of Invasive Pest, Fall Armyworm *Spodoptera Frugiperda* (J.E.Smith) and its Natural Enemies in Maize Ecosystem Of Belgaum District

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Abstract

Fall armyworm (FAW), a voracious agricultural pest native to north and south America, was first detected on the African continent in 2016 and has subsequently spread throughout the continent and across Asia. It is prevalent in several countries such as Brazil, Argentina and the USA, instigating economic losses in a variety of crops such as maize, soybean, cotton, beans and a number of weeds. Because of its wide host range, *S. frugiperda* is one of the most harmful pests threatening annual crops in tropical regions. It has been predicted that FAW could cause up to \$US13 billion per annum in crop losses throughout sub-saharan Africa. The incursion of fall armyworm as an invasive pest into Asia was reported for the first time in India from Shimogga by Sharanbasppa and his co workers in 2018. Thus roving surveys during 2018-19, were conducted for the occurrence of *S. frugiperda* in different maize growing areas of Belgaum district of Karnataka. An attempt was made to record incidence of FAW in 6 talukas viz., Hukkeri, Gokak, Chikkodi, Khanapur, Savadatti and Ramadurga of Belgaum district. In each taluka 2 villages were selected. Surveys were revealed that occurrence of FAW on maize, i.e. on younger crop (20-45 days old) was heavily infested ranging from 20-30 per cent damage than the older crop. We recorded few natural enemies on FAW, in our survey of which namely larval endoparasitoid, *Campoletis chloridae* Uchida (Hymenoptera: Ichnemonidae) and entomopathogenic fungus *Metrhizium rileyi* (Farl.) Kepler, Rehner & Humber (2014) was also found to be associated with fall armyworm and caused 10% larval infection in August-September.



Oral Presentation | OP-11

Hording and Billboards A Source of Visual Pollution in Cities and Public Places

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Abstract

Visual pollution is the term given to unattractive or unnatural visual elements of a vista, a landscape, or any other thing that a person might not want to look at. Commonly cited examples are houses, automobiles, traffic signs, road signs, highways, roadways, billboards, litter, graffiti, overhead power lines, utility, contrails, skywriting, buildings, weeds and advertisements. These are usually considered visual pollution when placed in a landscape or surrounding where the person seeing them things that they do not fit. For example big billboards n a countryside village or graffiti on an old eighteenth century house can be seen as visual pollution.

Keywords: Visual pollution, poisonous chemicals, heavy metals, toxic substances.



Dosimetric Application of CdSiO₃ Nanopowder Prepared via Low Temperature Solution Combustion Technique

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Abstract

Undoped CdSiO₃ nano powder has been synthesized by a low temperature solution combustion technique using oxalyldihydrazide (ODH) as a fuel and fumed silica as silica source. The powders were well characterized by powder X-ray diffraction (PXRD), scanning electron microscopy (SEM), transmission electron microscopy (TEM), Fourier Transform Infra-Red spectroscopy (FTIR) and UV-visible spectroscopy. The PXRD peaks of as-formed sample are broad and amorphous in nature; therefore it is further calcined at 800 °C for 2 h and its PXRD results shows that the sample had a good crystallization with Single phase. The average crystallite size was calculated using Debye- Scherer's formula and Williamson–Hall (W–H) plots and found to be in the range 32-43 nm. The SEM and TEM results reveal that the undoped CdSiO₃ nanopowder were porous and agglomerated with irregular nanopowder. FTIR spectroscopic analysis is to confirm the materials and to identify the chemical functional groups in the sample. The absorption peaks for undoped CdSiO₃ nanopowder were found to about 256 nm as observed in UV-Visible spectra. The structural defects present in the material band gap (E_g) value were 5.5 eV. A well resolved thermoluminescence (TL) glow peaks in the range of (110-160) °C are observed in UV-irradiated undoped CdSiO₃ nanopowder. Single glow peak was seen at 160 °C and TL intensity increases linearly with UV dose in the samples. In the present study the kinetic parameters were determined by three different standard methods namely Luschik, Halperin – Braner and Chen's method. Glow curve de-convolution of CdSiO₃ nanopowder exposed to UV dose (UV dose: 30 min) was used for the estimation of kinetic parameters. Hence the presence of deep traps in undoped CdSiO₃ nanopowder recommends that the prepared sample may be used as a radiation dosimeter.

Keywords: Nanopowder; X-ray diffraction; Transition electron microscopy; Energy gap; Thermoluminescence



Ultrasonic Waves Assisted One Pot Synthesis of Cu/CuO-TiO₂ Nanocomposites for Stable Li-Ion Battery Application

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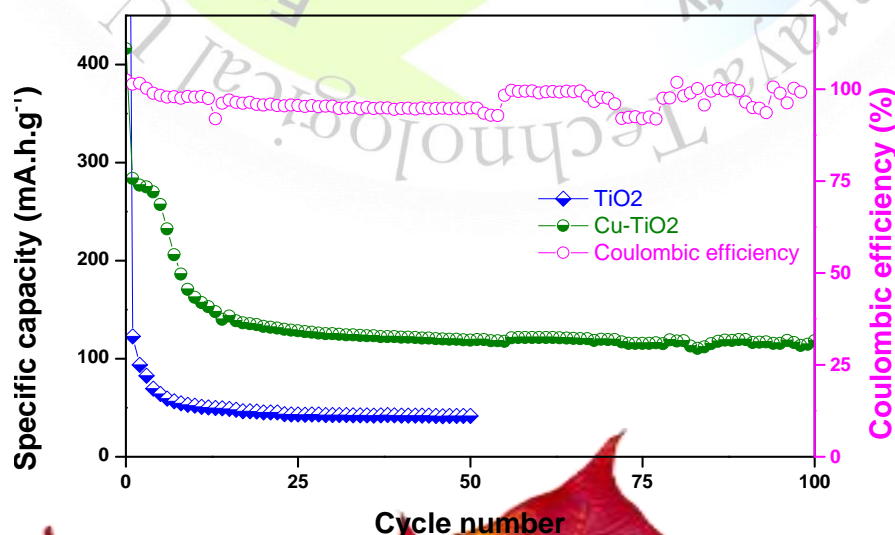
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Abstract

Pure TiO₂ and Cu-doped TiO₂ nanoparticles are synthesized by the bio mediated green approach using the Tea leaves extract. The extract containing biomolecules acts as capping agent, which helps to control the size of nanoparticles and inhibit the agglomeration of particles. Copper is doped in TiO₂ to enhance the electronic conductivity of TiO₂ and its electrochemical performance. The Cu-doped TiO₂ nanoparticle-based anode shows high specific capacitance, good cycling stability, and rate capability performance for its envisaged application in lithium-ion battery. Among pure TiO₂ and Cu-doped TiO₂, Cu-doped TiO₂ anode shows the highest capacity of 117 mAh g⁻¹ after 100 cycles and more than 95% of coulombic efficiency at C/10 current density. The improved electrochemical performance in the Cu-doped TiO₂ is attributed to the synergetic effect between copper and Titania. The results reveal that Cu-doped TiO₂ nanoparticles might be contributing to the enhanced electronic conductivity, providing an efficient pathway for fast electron transfer.

Keywords: Copper oxide, TiO₂, Ultrasonic, Tea leaves, Li ion Battery.





Oral Presentation | OP-14

Synthesis And Characterization Of Hexagonal Calcium Aluminates

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Abstract

The comparative study of Aluminum substituted calcium hexaferrites samples with chemical composition $\text{CaAl}_x\text{Fe}_{12-x}\text{O}_{19}$ where, $x= 0, 2, 4, 6$ have been chosen for their studies on structural and magnetic properties. Structural and Morphological properties are studied by X-ray Diffraction technique and Scanning Electron Microscopy (SEM). The XRD pattern confirmed that the formation of single phase hexagonal ferrites with space group $P6_3/mmc$ 167: R-3c. The SEM results confirms that the sample exhibit relatively well defined hexagonal like grains with an average particle size between 24 to 30nm. Magnetic characterization of the samples is carried out using Vibrating Sample Magnetometer (VSM). The saturation magnetization (M_s), Remanence (M_r) and Coercivity (H_c) found to decrease with an increase in aluminum which is attributed to the occupation of sub lattice spin-up and spin-down sites by Aluminum ions. The samples have a better signal-to-noise ratio, as the particle size was less than 50nm, when calculated by Debye-Scherrer formula and may be suitable for recording media.

Keywords: Hexaferrites, Magnetoplumbites, solution combustion, X-Ray Diffraction, SEM, VSM.



Oral Presentation | OP-15

Synthesis of $MnFe_2O_4$ Nanoparticles by Solution Combustion Method and The Study of Its Electrochemical and Photocatalytic Properties

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Abstract

In this study, $MnFe_2O_4$ nanoparticles (NPs) were synthesized by solution combustion route using Oxalyldihydrazone (ODH) as a fuel to attain single powder with single phase. To assess crystalline phases in the prepared nanoparticle, the samples were analysed by X-ray Diffraction (XRD). Morphology and particle size were determined by scanning electron microscopy (SEM). DRS study was used to calculate the band gap for the synthesised $MnFe_2O_4$. The electrochemical nature of $MnFe_2O_4$ nanoparticles has been assessed by various electrochemical techniques, like cyclic voltammetry, sensor and electrochemical impedance spectroscopy. The nanoparticle was evaluated as photocatalyst for the degradation of Methylene blue dye under solar light which shows 97% of degradation. The results obtained confirm synthesised $MnFe_2O_4$ can be utilised as semiconductors, sensors and in energy storage devices.

Key words: $MnFe_2O_4$ nanoparticles; Solar light; Electrochemical studies; Photocatalytic performance



Synthesis of Sustainable, Eco-Friendly Nano-Fuel Derived from Waste Plastics Obtained by Pyrolysis Method and Studies on Performance and Emission Characteristics Of Four Stroke Diesel Engine Operating with The Blended Diesel

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Abstract

Depletion of fossil fuels due to their enormous consumption, strict emission norms regarding pollution, lead to creating an alternative sustainable energy, instead of diesel fuel for automotive engines. Alongside, the global plastic production increases over year due to the vast application of plastics in different sectors, that brought about a huge increase in production of all kind of plastic commodities, which directly or indirectly generate wastes. These waste plastics in terms of its non-biodegradability is threatening the human sustainability.

Both these issues can be solved by converting the waste plastics into useful energy converting the waste plastics into useful energy. This present research describes the production of plastic oils obtained by pyrolysis method and addition of cerium oxide nano particle as additive blends with the diesel fuel. One of the effective methods for the control of harmful emissions from diesel engines is the use of fuel-borne catalyst. Ceria is commonly used as a redox catalyst, and the catalytic activity of ceria decreases due to particle sintering, especially at high temperatures. The assessment of engine performance, surface characterization and emission of diesel engine, without modifications. Also to study the effect of blending percentage of pyrolysis oil in the performance and combustion characteristics of diesel engine. The blending pyrolysis oils at small percentage with diesel could not improve thermal efficiency but there is a significant change in the brake thermal efficiency but there is a significant change in the brake specific fuel consumption. While adding cerium oxide as additive into the blend, the HC, CO emissions and smoke noticeably decreases. The results also showed a significant enhancement in brake thermal efficiency and heat release rate due to the influence of the cerium oxide nanoparticles addition in diesel.

Keywords: *Plastics, Oil, Cerium, nanofuel, diesel, engine, performance, engine, emission*



Oral Presentation | OP-17

Productivity and Soil Health of Rice Based Cropping Systems Under Organic Management

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Abstract

Two years investigation was carried out during May, 2015 to May, 2017 at Department of Agronomy, College of Horticulture, Thrissur to study the productivity and soil health of rice based cropping systems under organic management. The experiment was laid out in randomized block design and replicated thrice. Rice was grown under four different cropping systems with and without foliar spray of liquid organic manures (LOMs) along with traditional cropping system (rice-rice-fallow) keeping as control. The rotations followed were rice-rice-njavara rice, rice-rice-salad cucumber, rice-rice-vegetable cowpea, rice-rice-amaranthus and rice-rice-fallow. The management practices were followed as per the Package of Practices Recommendations: (*Ad hoc*) for organic farming: Crops of the Kerala Agricultural University. *Jeevamrurtham*, *Panchagavyam*, green leaf extract and *fish amino acid* were the liquid organic manures sprayed at 15 days intervals after planting/transplanting. The research findings revealed that rice-rice-salad cucumber with and without LOMs enhanced the system productivity by registering highest rice equivalent yield, system productivity, sustainability yield index, gross return and net return while rice-rice-vegetable cowpea with and without LOMs showed highest B:C ratio. The results further showed that introduction of leguminous crop in the existing rice-rice-rice/ fallow not only increased the system yield but also improved the physical, chemical and biological properties of the soil. It improved the physical characters like bulk density, porosity and water holding capacity, decreased pH, increased organic carbon, available NPK and total microbial biomass.

Keywords: Cropping systems, crop diversification, liquid organic manures, rice equivalent yield, system productivity, sustainability yield index, B:C ratio, soil fertility, and organic carbon.



Oral Presentation | OP-18

Biogenic Synthesis of AuNPs by Endophytic *Cladosporium* sp. for Anticancer Efficacy

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Abstract

This research work is aimed at developing simple eco-friendly method for the synthesis of gold nanoparticles (AuNPs) using aqueous extract of endophytic fungi, *Cladosporium* species isolated from medicinal plant and studying the anticancer activity of these AuNPs using MCF-7 cell model. The formation of AuNPs was confirmed by UV-vis spectra in endophytic extract. The FTIR spectrum of biosynthesized nanoparticles confirmed the involvement of bio molecules in reduction reaction. The endophytic nanoparticles (mycoAuNPs) exhibited spherical to irregular shape with size range of 5-10 nm. For screening the anticancer efficacies of these AuNPs, assays such as cytotoxicity, Dual staining, DNA fragmentation and Flow cytometry were conducted using breast cancer cell lines. The mycoAuNPs inhibited cell proliferation with high efficiency. In apoptotic assays mycoAuNPs at higher concentration showed increase in late apoptotic cells and necrotic cells. Together these results clearly demonstrate for the first time that the AuNPs biosynthesized in extracts of endophytic fungi appear to be more useful as potent anticancer agent.

Keywords: Endophytic fungi, Gold nanoparticles, MCF-7, anticancer activity, apoptosis



Oral Presentation | OP-19

Synthesis of Fe Nanoparticles by *Terminalia Arjuna* Bark Extract and Degradation of Rose Bengal (RB)

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Abstract

In this study Fe nanoparticles (NPs) were synthesized by green route under microwave irradiation. *Terminalia arjuna* bark extract was used for synthesis which acts as reducing and capping agent. The synthesised Fe NPs were characterised by UV-Visible absorption spectroscopy, UV-DRS (Diffuse reflectance spectrophotometer), X-Ray diffraction (XRD), Scanning electron microscopy (SEM) with EDS, BET surface area, Fourier transform infrared spectroscopy (FT-IR). The absorption spectra of Fe NPs showed a surface plasmon resonance (SPR) peak at 280 nm. The average size of synthesized Fe NPs was in between 20-80 nm. The photocatalytic activity of rose bengal dye by Fe NPs was studied under sunlight and UV light (250 W) of photocatalytic reactor. The % degradation of RB was 83 % and 95 % within 240 min and 200 min in sunlight and UV light respectively and its degradation was confirmed by LC-MS.

Keywords – *Terminalia. arjuna* bark extract, Fe NPs, rose bengal (RB), photocatalytic degradation



Oral Presentation | OP-20

Computational Analysis of Novel Antigenic Epitopes Within the Outer Membrane Protein Sequences of *Aeromonas Hydrophila*

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Abstract

Gram-negative bacteria are one of the prime elements for zoonotic disease occurrence to humans and zebrafish. Outer membrane proteins (Omps) candidates of *Aeromonas hydrophila* act as critical component for the subcellular integration to eukaryotic cell and existence within macrophages. Hence, Omps recognized like a superlative factor lead to the promising vaccine development and immunomarkers antagonist to *A. hydrophila*. Pertaining superior *In silico* technique, estimated 3-D model of aimed Omps were identified and categorized through the Swiss model web-server, affirmed with Procheck and ProSA server respectively. Protein sequences carrying B-cell binding sites were favoured from sequence alignment. Accordingly, B cell epitopes prediction was carried out using both modules of BCPred server; BCPred and Amino Acid Pairs (AAP). Therefore, confident sequences containing antigenic amino acids sequences recognizing B-cells were scanned to look for T-cell epitopic determination purposes (both MHC I & II allelic binding sequences) considering ProPred 1 and ProPred server. The epitopic regions (9 mer: LAGKTTNES and GFDGSQYGK) of the Omps bound together with MHC molecules (MHC I and II) with maximum possible number of MHC alleles these are recognized and categorized. Omps of *A. hydrophila* are conserved across the serotypes and immunogenic to their epitopes on cell surface. It classified due to the strong elemental focus on development and improvement of vaccines and immunotherapeutics used against the disease problems of human and zebrafish. The depicted epitopes which can prudently be advantageous while preparing vaccines on peptide-based system against *A. hydrophila* pathogenic infections by stimulating the significant immune responses.

Keywords: outer membrane proteins, epitopic region, disease, allele, *In silico*.



Green Synthesis of Biodegradable Super Absorbent Polymeric Hydrogel/Silver Composite as Water Reservoir for Agriculture

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Abstract

In recent years, desertification and lack of water are serious problem in many parts of the world due to various factors including climatic variations are human activities. The presence of water in soil is essential for growth of plants. One of the way to preserve water potential in soil is by reducing the loss of water. Biodegradable super absorbent polymeric materials contain hydrophilic networks that can absorb and retain large amount of water and release water in response to specific environment stimuli can be used as best green alternative to address this problem. Such stimuli responsive behaviour of hydrogels prompted to synthesis biodegradable super absorbent polymeric hydrogel based on poly(acrylamide) prepared through an optimized rapid redox solution polymerisation with N,N'-methylenebisacrylamide(MBA) in presence of carboxymethylcellulose(CMC). Silver nanoparticles have been prepared within hydrogel networks as nanoreactor via insitu reduction of silver nitrate using neem plant extract under atmosphere conditions. The prepared polymeric hydrogel composite was characterization by UV-Visible spectroscopy, IR spectroscopy, XRD, SEM and Thermo Gravimetric Analysis (TGA). The parameters such as free absorbancy capacity, absorbancy under load, wicking capacity, swelling ratio and swelling gel strength of the prepared hydrogel composite were measured and interpreted. The results established that the prepared hydrogel nanocomposite can be used as effective material for sustainable agricultural farming.

Key words: Super absorbent hydrogel, solution polymerization, nanocomposite, silver nanoparticles ,free absorbancy capacity.



Oral Presentation | OP-22

Synthesis of Novel CuO/ZnO Nanocomposite: Characterization, Photocatalytic and Antibacterial studies

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Abstract

The current work involves the synthesis of pure CuO, ZnO and CuO/ZnO (1:1) nanocomposite by solution combustion method using Oxalyl dihydrazide (ODH) as fuel. Powder X-ray diffraction (PXRD), Scanning electron microscope (SEM), UV- visible diffuse reflectance spectroscopy (UV- DRS), energy-dispersive X-ray analysis (EDX) and Photoluminescence Spectroscopy (PL) techniques were used to characterize the resulted compounds. The enhanced photocatalytic degradation of Methylene Blue and industrial waste water is observed for the CuO/ZnO (1:1) nanocomposite under Sunlight irradiation. The findings reveal that the introduction of a certain proportion of ZnO can promote Sunlight harvesting efficiency and charge carrier separation. We explored the effects of process parameters such as catalyst dosage, initial dye concentration and also proposed degradation pathway mechanism and trapping and enhancer experiments

Keywords: Solution Combustion Process; CuO/ZnO (1:1) nanocomposite; Photocatalytic Performance; Industrial waste water



Oral Presentation | OP-23

Influence of Betel Nut Concentration in The Matrix of Polycarbonate and Abs on The Mechanical Characteristics

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Abstract

The polymer composite materials are attracted by the engineering and scientific community because of their inherent characteristics such as environmental friendly, low density, good load bearing capacity, superior mechanical properties etc. In this regard, lot of work have been done and reported the use of different fillers, reinforcing agents in various polymer matrices and have yielded very good properties. Hence, good scope exists to extend research and development on these green materials for applications in liners, impellers etc.

The effect of filler content and compatibilizer in the peanut based Low Density Polyethylene (LDPE) on the mechanical characteristics (Tensile, Compressive and Flexural properties), especially the Young's modulus, strength and hardness have been reported and have improved greatly over pure LDPE. The work on betel nut fibre separated from the nut with glass fibre as reinforcement in LDPE matrix have yielded very good properties, such as Young's modulus, strength, elongation at break and hardness taking in to account the fibre ratio and volume fraction compared to glass fibre based LDPE. Higher hardness is reported for the betel nut with glass fibre reinforced LDPE composites over the neat LDPE.

Keeping these literature points in view, betel nut powder of average size 180 μm is added at four levels with Molybdenum disulphide (MoS_2) as fillers in Polycarbonate (PC) and Acrylonitrile Butadiene Styrene (ABS) matrices. The blends was compressed to thin sheets in the hot press compression mould followed by mechanical characteristics evaluation. It is observed that, with increase in betel nut concentration, the tensile, compressive and flexural properties have improved for the 10% betel nut powder addition. Further addition of betel nut powder (18% and 25%) to the matrix, have yielded lower mechanical strengths as well as their corresponding modulus compared to 10% betel nut addition. These trends in the mechanical characteristics are explained and interpreted based on the fractured features examined through scanning electron microscope.

Keywords: Betel Nut Powder, PC, ABS, Mechanical Characteristics, SEM.



Oral Presentation | OP-24

***In vivo* Copper Oxide Nanoparticles Conjugated Antitumor Activity of *Celastrus Paniculatus* on Breast Cancer**

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Abstract

Recent report of WHO on death epidemiology describes Cancer as the second foremost cause through-out the world. Nanoparticles with therapeutical utilization have been investigated to treat Cancer. In the present study, we have demonstrated the usage of Copper nanoparticles (CuO NPs) synthesized by *Celastrus paniculatus* which have well known ethano-pharmaceutical properties. The prepared CuONPs were characterized to study their size, structure, functional groups and morphology by XRD, FTIR, SEM-EDX and TEM analysis. The phytonutrients present in *C.paniculatus* aided as capping and stabilizing agents for CuONPs and reduced the particle to 45 nm size. Cancer cell growth arrest by CuO NPs against MCF-7 cell lines was found with half maximal inhibitory concentration of 107.5 $\mu\text{g ml}^{-1}$ due to cell death and apoptosis. The *in vivo* antitumor activity was detected employing Ehrlich Ascites Carcinoma model with normal C-57 male mice. Orally administered CuONPs controlled free radicals and were measured by low amount of MPO and LPO levels and high value of GSH *i.e.* 2.133 \pm 0.09 mg/ml when compared to standard Hesperetin. Further, elevated WBC count, reduced RBC and Hemoglobin content could suppress the activity of Cancer. Restoring of tubular degeneration in kidney, distortion of hepatocytes and mild loss of lymphocytes in spleen were revealed by Histopathological studies. These findings will contribute to the novel drug development for cancer therapy.

Keywords: Cupric oxide nanoparticles, anticancer studies, Hematological, biochemical and Histopathological parameters.



Synthesis and Characterization of Anacardic Acid Encapsulated TiO_2 And ZnO Nanoparticles And Their Biomedical Properties

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Abstract

Metal nanoparticles functionalized with biomolecules have received special attention due to their various biomedical applications such as drug delivery and cancer therapy. In this study, we present the synthesis and characterization of new nanoparticles coated with Anacardic Acid derived from Cashew nut shell liquid.

Anacardic acid encapsulated TiO_2 and ZnO nanoparticles were synthesized by solvothermal method using Ethanol as a solvent. The synthesized Anacardic acid encapsulated TiO_2 and ZnO nanoparticles were further characterized and confirmed using Ultraviolet (UV) spectroscopy, Fourier transform infrared spectroscopy (FTIR), which showed appreciable shift in the wavelength, Energy-dispersive X-ray spectroscopy (EDAX), resulted in respective element expected, Scanning electron microscopy (SEM) showed appreciable size and Morphology and X-ray diffraction (XRD) methods which confirms their encapsulation.

Anacardic acid encapsulated metal particles cytotoxic effect on Breast cancer cell line, HT-29, Hela cell lines were studied and found appreciable results.

Keywords: TiO_2 and ZnO nanoparticles, Anacardic acid, Solvothermal method. MTT assay, Acredine Orange. Apoptosis, Cell culture



Oral Presentation | OP-26

Green Synthesis of Chitosan Silver Nanocomposites and Their Antifungal and Toxicity Studies

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Abstract

Plant pathogens cause up to 20% yield losses worldwide. Application of nanotechnology in plant protection is significantly increasing because of its reliability, stability and high efficacy. Green synthesis of nanomaterials has become an important area of research due to the utilization of less toxic and cost-effective materials for the eco-friendly synthesis of nanomaterials. India is the world's largest producer of Chilli (*Capsicum annum* L.) but its productivity is less compared to other countries. Anthracnose caused by *Colletotrichum truncatum* is the major economic constraint for chilli production. The present study is focused on the development of chitosan silver nanocomposite (CS-Ag Np's) as an antifungal agent to control anthracnose disease caused by *C. truncatum*.

In the current study, silver- nanoparticles (AgNPs) were synthesized at 95°C at an alkaline pH using biopolymer chitosan as the reducing agent and stabilizer. The nanoparticles were characterized by UV-visible spectroscopy, dynamic light scattering (DLS) analysis, zeta potential measurements, transmission electron microscopy (TEM), field emission scanning electron microscopy (FESEM) coupled with energy dispersion X-ray spectroscopy (EDS). The size of silver nanoparticles was found to be in a range between 10 nm to 15 nm.

In vitro conidial germination assay showed that CS-Ag Np composite suppressed germination and exhibited significantly higher antifungal activity against *C. truncatum* and found to be more effective than its counterparts at their respective concentrations. Toxicological evaluation of synthesized nanocomposites was carried out *in vivo* using the insect model of *Drosophila*. The results indicated the least toxicity and no behavioural deficits at low concentrations of CS-Ag-NPs. We opine that the synthesized nanoformulation may find applications in preventing *C. truncatum* infections in chilli because of its effective antifungal activity and non-toxicity to useful insects.

Keywords: Chitosan, Silver nanoparticle, Antifungal activity, Chilli, *Colletotrichum truncatum*, Toxicity.



Oral Presentation | OP-27

Synthesis and Characterization of visible light active TiO_{2-x} photocatalyst for Enhanced Photocatalytic Hydrogen Generation

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Abstract

Ti^{3+} /Oxygen vacancies are considered as one of the unique characteristic defects of TiO_{2-x} nanomaterials. Ti^{3+} Oxygen vacancy defects play significant role on the activity and kinetics of the reactions taking place on the metal oxide surface. In this paper we report on synthesis of oxygen-deficient TiO_{2-x} multi-shaped nanocrystals with high rate photocatalytic performance through tailoring bandgap by using L-Ascorbic acid via hydrothermal method. As synthesized powder was characterized for the study of their structural, optical, elemental properties by using XRD, DRS, SEM, TEM, Raman, EPR, and XPS. It was found that the rate of hydrogen evolution of defect- TiO_{2-x} without loading catalyst was $8170 \mu\text{mol h}^{-1} \text{g}^{-1}$ under visible light irradiation for 4h, which was much higher than that of other TiO_2 and defective TiO_2 based photocatalysts reported in the literature for photocatalytic Hydrogen generation.

Keywords- TiO_{2-x} , Black TiO_2 , Defect TiO_{2-x} , Photo catalyst, Photo anode, Solar Hydrogen Generation.



Oral Presentation | OP-28

Hydrothermal Synthesis of Single Crystalline Nano Ceria Using Different Neutralizing Agent

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Abstract

The synthesis of ceria was carried out on precipitation hydrothermal treatment and calcinations route. Urea or citric acid solutions were used as the neutralizing agents and the mixed solutions were directly charged to the autoclave and hydrothermally treatment (HT) at 120°C for 3 hrs for precipitation. sodium hydroxide or ammonia, pH was adjusted to 9 for precipitating ceria precursor. In this paper, effects of experimental parameters such as citric acid, urea, NaOH and ammonia are neutralizing agents at calcinations temperature (100, 600 and 800°C) and washing of the precursor were studied for synthesis of nano ceria powder. X-ray diffraction patterns were used as a characterization tool to identify the crystalline phases and to evaluate the crystallite size and lattice parameters. The XRD patterns showed the samples are amorphous due to presence of citric acid and urea as the precipitants. XRD peaks of the samples obtained by using ammonia showed better crystallinity when compared to synthesized with NaOH. Calcination at 600°C and 800°C resulted in the formation of crystalline ceria. Sample prepared hydrothermally with washing the precursor showed better crystallinity when compared to the unwashed one. TEM image showed the formation of single crystalline nano ceria of size 5-9 nm when washed the precursor before hydrothermal treatment. In future, lots of study can be done by using novel process. Nano ceria has been widely used in fuel cells, optical devices, gas sensors, hydrogen storage materials, polishing materials and biomedical fields.

Key words: ceria, nano-particles, XRD, crystallinity, neutralizing agent



Oral Presentation | OP-29

Synthesis of Silver Nanoparticles Mediated by *Simarouba* Saponins and their Catalytic and Biological Applications

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Abstract

Green synthesis of nanoparticles using herbal extracts is an emerging topic for research in these days due to its eco-friendly nature and cost-effectiveness. The plant extracts play an important role in reduction and stabilization/capping of nanoparticles during the process of synthesis of nanoparticles. The degradation of organic dyes and pollutants by noble metal catalysts is one of the major applications of metal nanoparticles which receive greater attention because of their high efficiency and industrial importance. The present study deals with the synthesis of silver nano particles using saponin extracted from *Simarouba glauca* oil seed meal. The synthesized nanoparticles were characterized using various characterization techniques viz, UV-vis spectroscopy, Fourier transform infrared (FTIR) spectroscopy, scanning electron microscopy (FESEM) and X-ray diffraction (XRD). The nanoparticle was tested for their application as catalyst for the reduction of various dyes using Methylene blue, Methyl Orange and Congo red. The reaction was carried out in presence of NaBH_4 in water at room temperature and the reaction was monitored by taking Uv-vis spectra. The results showed that the catalyst is effective in reducing the dyes and follows pseudo-first order condition. The synthesized nanoparticle was also tested for their application in the colorimetric determination of hydrogen peroxide. The study is based on the oxidation silver nanoparticles leading to discoloration of the solution which is monitored spectrophotometrically. It was observed that the silver nanoparticle synthesized has the ability to reduce hydrogen peroxide and showed good sensitivity and selectivity.



Oral Presentation | OP-30

Shankpushpi Nanoparticles Inhibit Alzheimer's Effect

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Abstract

Shankpushpi is a glory plant formulation, wide used for its actions on the central system, particularly to boost intellect and boost memory. Four botanicals viz. *Canscora decussate* Schult.(CD), *Clitorea ternatea* Linn. (CT), *vine Pluricaulis Choisy*. (CP) and *Evolvulus alsinoides* Linn. (EA) are thought of as sources of Shankpushpi by Indian practitioners on the premise of their morphological descriptions given in ancient texts. The current study was undertaken to judge the neuropharmacological result of 4 herbs normally known as supply of Shankpushpi. The alcohol extracts of all four varieties were used to synthesise the nanoparticles, characterized and, tested and evaluated in vitro and in vivo for their neuropharmacological effects. Experiments like protection against b-amyloid iatrogenic neurotoxicity on neuron line (Neuro 2A), inhibitor potential, AchE (Acetylcholinesterase enzyme) inhibition, and 5-LOX (lipoxygenase) protein inhibition were conducted for in vitro analysis. For in vivo analysis, *Drosophila melanogaster* Tau E14 mutants were used to judge memory retrieval of locomotory activity and T- maze were absolutely found that protecting effects of nanoparticles from nanoparticles of EA and CD against b-amyloid iatrogenic neurotoxicity in Neuro 2A cells were considerably more than CT and EA proved to be superior than alternative varieties on the premise of inhibitor activity, AchE restrictive and LOX inhibitory activities. The preventive activity of EA on Tau E14 memory retrieval in locomotory activity and T- maze task in *Drosophila melanogaster* was found to be more than that of CD, CT and EA has exceptional neuropharmacological result as compared to alternative 3 styles of Shankpushpi. This result could also be attributed because of the presence of steroids (stigmasterol and betulinic acid), coumarins (scopoletin) and flavonoids (b-carotene and chlorogenic thus it are often used as a promising lead within the development and management of vegetative cell disorders as well as Alzheimer's illness.

Keywords: Alzheimer Disease Bionanoparticles, *Drosophila*, Nanoparticles, Tau mutant



Oral Presentation | OP-31

NiS-RGO Nano hybrid material for Energy storage Application

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Abstract

Metal chalcogenides are highly active, inexpensive, and earth-abundant materials for energy generation application. NiS is attracting attention of researchers due to its unique electronic and optical properties. In this work, Nanostructured NiS-RGO were synthesized by supercritical fluid process with different intervals of time such as 5min, 10min, 15min, 20min, 30min, 45min, and 60min. The changes in crystal structure and morphology were characterised by X-ray diffractometer and Scanning electron microscopy respectively. We have observed that the morphology of the samples varied with synthesis time while synthesis temperature was kept constant at 400°C. Nanostructured NiS and NiS-RGO were used as anodes for Li-Ion Battery, at 0.1 C the specific capacity was found to be 500 mAh/g for NiS sample but NiS-RGO sample we got 590mAh/g with great stability. It is clearly evident from the result that RGO had influenced on the specific capacity of NiS Anodes in Li-ion battery.

Keywords: NiS, RGO, Supercritical fluid, Li-ion Battery.



Importance of Sustainable Solutions in Smart Cities

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Abstract

Sustainability is very important in today's world. There are many important reasons why sustainability is important and how to make our city, state, country, world sustainable in all respects. If we see the present scenario of our world every human being is moving with fast growing technology, trends, rapid growth of urbanization, infrastructure development etc. Sustainability is important for many reasons like environmental quality, to maintain our ecosystem, to preserve the natural resources, to balance all natural cycles. In sustainability efficient water, air, land, waste management are important factors in reducing environmental impacts and promoting sustainability. So now it's time for researchers, engineers and general citizens to think how we can make our ecosystem more sustainable. So there are some keywords we must adopt in our routine life style such as reduce, reuse, recycle which can significantly help to reduce global impact and conserve the natural resources, reduce pollution and reduce global environmental impacts. Socioeconomic values, traditional practices play a very important role to make our society sustainable. For the present study, Belagavi, Karnataka has been selected to understand the socioeconomic issues, its impacts on the environment like land, water, air and waste management related issues and consequences, community related issues and its problems. One pilot study has been analyzed, which is fulfilling the necessity and needs of a sustainable society.

Keywords: Solid waste management (SWM), sustainable, urbanization



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PP-002	Mohd Ali	Orthopteran Fauna In The Cold Arid Region Ladakh: Species Distribution And Habitat	Section of Entomology, Department of Zoology, Aligarh Muslim University, Aligarh-202002
PP-003	Leo Edward M	A study on Phase Transition, Structure and ionic conductivity of $\text{Li}_7\text{La}_3\text{Ce}_x\text{Zr}_{2-x}\text{O}_{12}$ Ceramic Oxide for Lithium ion battery applications	PG and Research Department of Chemistry, Presidency College (Autonomous), Chennai-600005, Tamil Nadu, India
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PP-079	Manikanta P. N.	Coating Of CNT on Polyimide Sheet Using Spray Pyrolysis For Space Application	Department of Nanotechnology, Center for postgraduate studies, Bangalore Region, Visvesvaraya Technological University, Muddenhalli, Chikkaballapur-562101, India
PP-080	Jasmine Sethi	Solid Waste Management at Dr. B. Lal Institute of Biotechnology	Dr. B. Lal Institute of Biotechnology, Jaipur
PP-081	Asheera banu sangli	Influence of total hardness on the lethal toxicity of phenol, para chlorophenol and pentachlorophenol to the fish <i>lepidoccephalichthys guntea</i>	M.E.S College of Arts, Commerce and Science, Malleswaram, Bangalore



PP-082	Gowtham Sanjai S	Synthesis of nano YSZ powders for TBC Applications in Gas Turbine Components	Department of Mechanical & Automobile Engineering CHRIST (Deemed to be University), Kengeri Campus, Bangalore 560 074
PP-083	Anushka Dwivedi	Exogenous effect of salicylic acid on euphorbia hirta under water stress	Dr. B. Lal Institute of Biotechnology, Jaipur
PP-084	Rohith G A	Nsm technique – sustainable method of strengthening rc structures	Research Scholar, Department of Civil Engineering, Presidency University, Bangalore
PP-085	Vinay G.	MnFe ₂ O ₄ Synthesis and characterization for Mg ion battery application	Department of Nanotechnology, Center for postgraduate studies, Bangalore Region, Visvesvaraya Technological University, Muddenhalli, Chikkaballapur-562101, India
PP-086	Kiran R. S.	The development of eco- blocks by using solid waste materials	School of Civil Engineering, REVA University Bengaluru
PP-087	Navya N	Opto-electrical and di-electric properties of nano-doped liquid crystals	Department of Physics, B.M.S.College of Engineering, Bengaluru-560019, India
PP-088	Thejashwini B. R.	Growth and Characterization of KDP, potassium thiourea bromide and L-tartaric acid doped ammonium dihydrogen phosphate Anisotropic Single crystal	Centre for Nanotechnology, Department of Mechanical Engineering, National Institute of Engineering, Mysuru
PP-089	Ashwani Wanganeo	Planktonic Diversity of Barna Reservoir, Raisen, Madhya Pradesh	Department of Environmental Sciences and Limnology, Barkatullah University, Bhopal,
PP-090	Krudanth H. L.	The bacteriological analysis of the groundwater sources at doddaballapura, karnataka state	School of Civil Engineering, REVA University Bengaluru
PP-091	Sumantha H. S.	Structural, morphological & photocatalytic activity of nickel oxide nano particles synthesized by thermal decomposition method	Department of Physics B.M.S. College of Engineering, Bull temple road, Bengaluru-560019
PP-092	Ambika. A. V	Synthesis and characterization of Multiwalled carbon nanotubes by chemical vapor deposition over Calcium carbonate catalyst	Department of Physics B.M.S. College of Engineering, Bull temple road, Bengaluru-560020
PP-093	H N Deepakumari	LC-MS coupled with tandem mass spectrometry method for determination of an antihypertensive drug terazosin hydrochloride in human plasma	Department of Chemistry, Bharathi College, Bharathinagara, Mandya-571422, India
PP-094	Malini. S	Interaction of clopidogrel bisulphate and rizatriptan benzoate with calf thymus dna: an electrochemical and spectroscopic approach	Department of chemistry, Dayananda Sagar College of Engineering, Bangalore-560 078



PP-095	K. Raghavendra Kumara	Long-term (2001-2018) variability of aerosol optical thickness and radiative effects over Southeast Asia	Department of Physics, School of Sciences and Humanities, Koneru Lakshmaiah Education Foundation, K.L.University, Green Fields Campus, Vaddeswaram 522502, Guntur, Andhra Pradesh, India.
PP-096	Mr. Sridhar S.	Comparative Study of Physicochemical Parameters of Water in Urban and Rural Lakes of Chikkaballapura	PG Department of Zoology BGS Science Academy and Research Centre, Agalagurki, Chikkaballapura-562101
PP-097	B. Shyla	Estimation of fluoride concentrations in groundwater sources in some areas of bellary, kerala and tumkur districts by spectrophotometric method	Department of Chemistry, St. Philomena's College, Bannimantap, Mysore-570 015, India
PP-098	Guddappa Halligudra	Synthesis, Characterization and Catalytic performance of Green mediated ZnONPs synthesised using <i>Anethumgraveolens</i> seed extracts for Reduction of Nitroarenes.	Department of Nanotechnology, Visvesvaraya Technological University, Center for Postgraduate Studies, Bengaluru Region, Muddenahalli, Chikkaballapur -562 101, INDIA.
PP-099	K. N. Harish	Development of Cost Effective, Solar Light Active Cu _{1-x} CaxFe ₂ O ₄ Nanocomposite Catalysts for Environmental Protection	Department of Chemistry, Nagarjuna College of Engineering and Technology, Devanahalli, Bengaluru
PP-100	B. Suguna Rao	Micro-structural Prediction of Recycled aggregate Concrete with the inclusion of Additives	Civil Engineering Department, M.S.Ramaiah Institute of Technology, Visvesvaraya Technological University, Bangalore, Karnataka
PP-101	Omkar	Study on current practices of E-waste processing and its Environmental impact	Vtu Belagavi department of civil engineering (Water and land management)
PP-102	Smita Kavadikeri	Phycoremediation And Biodiesel Production Using Diatom	Dept. of Biotechnology, RV College of Engineering®, Bangalore-560059, Karnataka India
PP-103	Ekambaram Balaraman	Sustainable Chemical Synthesis via ADC: Fundamentals and Industrial Applications	Indian Institute of Science Education and Research (IISER) Tirupati, Tirupati – 517507, India
PP-104	Venkatadri B V	Experimental Investigation on the Effect Of Rolling on Hardness of Aluminium Metal Matrix Composites	Department of Mechanical Engg, Sir MVIT, Bangalore, INDIA
PP-105	Mahesh Shastri	Fabrication of Hierarchical Graphene Sulfur and Its Characteristics Application for Energy Storage System	Department of Nanotechnology, Center for postgraduate studies, Bangalore Region, Visvesvaraya Technological University, Muddenhalli, Chikkaballapur-562101, India
PP-106	Kshama V G	Estimation of the groundwater contamination due to the disposal of solid wastes at mandur landfill site, bengaluru	School of Civil Engineering, REVA University Bengaluru



PP-107	Surendra D M	Synthesis of metal nanoparticle using chemical synthesis and their conjugation with folic acid for delivery of methionine drug	Department of Chemistry, Vidya Vikas Institute of Engineering and Technology, Mysore, Karnataka, India
PP-108	Ram Dayal	How to achieve good fraction of morphologically selected motile sperms for IUI and IVF/ICSI procedure depending on semen parameters (Original Paper)	Singhania University & Director Sr. Embryologist (IRCC Hospital).
PP-109	A. Swaroopa rani	Penicillin production from free and immobilized cells of penicillium chrysogenum and study of transfer rate in str.	Department of Biotechnology, JNTU A college of Engineering, Pulivendula, Kadapa Dist. 516390, A.P- India.
PP-110	Smriti Tripathi/ Suruchi	Relative estimation of air pollution tolerance of plants from Polluted and non polluted forest area of Jhansi city in Bundelkhand region: implication for forest ecosystem restoration	Institute of Environment and Development Studies, Bundelkhand University, Jhansi
PP-111	P. V. Shende	Short slender grain type rice variety: PDKV TILAK	College of Agriculture, Nagpur, Maharashtra state, India
PP-112	Arijit Basu	In-situ Ni-doped Co ₃ O ₄ nanostructure: An efficient electrocatalyst for the overall water splitting	Department of Renewable Energy, Energy Institute, Bangalore
PP-113	J.P. Savina	Experimental Investigation of Surfactant Coated MWCNT Hybrid Composite Reinforced with Silicon-Aluminium 6065 to Improve the Mechanical Properties.	Department of Mechanical Engineering, JSS Academy of Technical Education, Bangalore-560060, India
PP-114	Krushitha Shetty	Comparison Study of Green and Chemical Methods for Synthesis of Nano Spinel MgFe ₂ O ₄ and its application as chemical sensor	Department of Nanotechnology, PG Center, Bangalore Region, VIAT, VTU, Muddenahalli, Chikkaballapur - 56210, India
PP-115	Navya Rani M	The RGO-Ag Nanomaterials Based Nanozyme	Department of Nanotechnology, PG Center, Bangalore Region, VIAT, VTU, Muddenahalli, Chikkaballapur - 56210, India
PP-116	Mahesh G	Phytochemical Activity of RGO-Ag-Tulsi Hybrid Nanomaterials	Department of Nanotechnology, PG Center, Bangalore Region, VIAT, VTU, Muddenahalli, Chikkaballapur - 56210, India



Poster Presentation | PP-001

Investigation of Microbial Community Diversity in the Earthworm *Eisenia Fetida* during Vermifiltration

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Abstract

Looking at the current scenario, improving water infrastructure must be a priority, as water conservation and efficiency are key components of sustainable water management. For the same, Vermifiltration is the technology that fulfills all the requirements for the use of treated water in society. It is a bio-treatment technology of earthworms and microbes for treating wastewater. The technique is decentralized, produces zero waste, is economically sustainable and is environment-friendly.

The present study includes isolation, identification, and characterization of the microbial community diversity present in the body of earthworm and its coelomic fluid to find out the combined role of earthworms and microbes in wastewater treatment. Further microscopic and biochemical identification is done according to Bergey's Manual. The identified microflora includes gram-positive as well as gram-negative bacteria such as *Pseudomonas* spp., *Bacillus* spp., *Protease* spp. actinomycetes such as *Corynebacterium* spp. and fungi such as *Penicillium* spp., *Cladosporium*, *Aspergillus niger*, *Aspergillus fumigates*.

The significance of the research is to understand the symbiotic and synergistic relationship between earthworms and microorganisms. The study helps to investigate the microbial community diversity of the microorganisms present in the earthworm to find out the role of these microorganisms in wastewater treatment. These studies can be further combined with other aspects such as investigating the functions of the microorganisms like antimicrobial activities or analyse the protein concentration or enzymes that may play role in the treatment.

Keywords: Vermifilter, Earthworm, Coelomic fluid, Bacteria, Fungi, Actinomycetes.



Poster Presentation | PP-002

Orthopteran Fauna in the Cold Arid Region Ladakh: Species Distribution and Habitat

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Abstract

Orthoptera is one of the largest insect orders having two suborders i.e. Ensifera (long-horned grasshoppers) and Caelifera (short-horned grasshoppers). The superfamily Acridoidea and Pyrgomorphoidea come under the suborder Caelifera and members of these subfamilies are commonly called Locusts and grasshoppers. Grasshopper causes massive damage to agriculture crops and tree seedlings covering more than 20,000 species in this order.

The faunistic survey of Orthoptera in Ladakh from different agriculture, forest, and desert mountain areas were undertaken to know the species abundance, richness, diversity, and distribution of grasshopper in 2018-2019. During the survey the total numbers of 436 specimens were collected; out of this one family of Tettigonioidae and two-families of Acridoidea and one family of Eumastacoidea were reported. On the basis of the total number of species Acrididae were the dominant family with 13 species followed by Tettigoniidae with 2 species and Eumastacidae with 1 species. Similarly, on the basis of the total number of species of grasshopper population recorded *Stenohippus mundus* (Walker, 1871) was the most abundant species of grasshopper recorded from the study area followed by *Acorypha glaucopsis* (Walker, 1870), *Leva indica* (Bolívar, 1902), *Oedipoda miniata miniata* (Pallas, 1771) and *Locusta migratoria migratoria* (Linnaeus, 1758), respectively. *Oedipoda caerulescens* (Linnaeus, 1758), *Sphingonotus (Sphingonotus) savignyi* Saussure, *Gyabus fusiformis* (Bey-Bienko, 1949) and *Phenopteragracilis* Burmeister, 1838 included less abundant species of Grasshoppers recorded during the study period



Oral Presentation | PP-003

A Study on Phase Transition, Structure and Ionic Conductivity of $\text{Li}_7\text{La}_3\text{Ce}_x\text{Zr}_2\text{O}_{12}$ Ceramic Oxide for Lithium Ion Battery Applications

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Abstract

Solid-state electrolytes have emerged as a promising alternative materials for next generation Li ion batteries due their safety and reliability. In this investigation, we report on the synthesis of Nominal $\text{Li}_7\text{La}_3\text{Zr}_2\text{O}_{12}$ (LLZO) garnet doped with Cerium of various weight percentage on the 24c site typically occupied by $\text{La}(3^+)$ in the garnet structure, by sol gel method using oxalic acid as complexing agent and propan-2-ol as surface active agent. The synthesised garnet are screened for Surface morphology, chemical composition and phase transition by various analytical techniques. The surface morphology is recorded by HRSEM with EDS and the cubic face was confirmed by XRD results. Thermal analysis indicates the completely removal of the complexing agent and surface active agent is recorded on TGA. The ionic conductivity of the different weight percentage based garnet ceramic oxide is analysed using AC impedance spectroscopy and compared. The results showed that these materials can be used as potential alternative in the fabrication of Lithium ion batteries.

Key words: Garnet, Cubic face, sol-gel method, ionic conductivity, oxalic acid.

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Poster Presentation | PP-004

Metal-Oxide/Carbon Composite for Electrochemical Energy Devices

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Abstract

With the importance of sustainable energy, resources, and environmental issues, interest in metal oxides increased significantly during the past several years owing to their high theoretical capacity and promising use as electrode materials for electrochemical energy devices. Surface of metal oxides is a key factor for effective interaction with target molecules. Tailoring of the surface properties of metal oxide allows improving sensitive properties. The recent advances in nanotechnology open new possibilities for applications of metal oxides. Reducing the grain size to nano-scale increases the active surface area and induces new effect due to the quantum confinement such as band-gap widening, room temperature photoluminescence, etc. However, the low electrical conductivity of metal oxides and their structural instability during cycling can degrade the battery performance. To solve this problem, studies on carbon/metal-oxide composites were carried out. In present study, we comprehensively discuss the characteristics (chemical, physical, electrical, and structural properties) of such composites by categorizing the structure of carbon in different dimensions and discuss their application toward electrochemical energy devices. In particular, one-, two-, and three-dimensional (1D, 2D, and 3D) carbon bring about numerous advantages to a carbon/metal-oxide composite owing to the unique characteristics of each dimension.



Poster Presentation | PP-005

Visual Detection of Copper (II) By Novel Piperazine Based Ligand and Its Antimicrobial and Toxicity Studies.

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Abstract

Novel piperazine base ligands (1) was synthesized and characterized by FT-IR, NMR and HRMS. The selectivity and sensitivity of piperazine ligand toward copper ions was investigated by colorimetric, UV-Viz, electrochemical experiments. It exhibits highly selective and sensitive recognition toward copper ions over other metal ions in a wide pH range. The complex formed between piperazine ligand and copper ion was found to be 1:1 stoichiometry with an association constant of $1.0 \times 10^6 \text{ M}^{-1}$. The ever increasing incidence of antibiotic resistant infections combined with a weak pipeline of new antibiotics has created a global public health crisis. Accordingly, novel strategies for enhancing our antibiotic arsenal are needed. We developed potent and less toxic piperazine based ligand and metal complexes against MRSA. Validated by *insilico* molecular docking studies and blood biocompatibility studies.

Key words: Piperazine, copper ion, MRSA, Antibiotic resistance,



Poster Presentation | PP-006

Molecular Characterization of Microbes Relevant in Context of Dairy Effluent to Bioremediation Using 16s Pcr

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Abstract

Amongst the food industry sector dairies are among those leading to most polluting waste in regard to its large water consumption. One of the major cause of water pollution is reported to be poorly treated wastewater. Various operations in a dairy industry may include pasteurization and productions of cream, cheese, milk powder, etc. Also, dairies handle large volumes of milk. Thus the major waste material from processing is organic and mineral compounds dumped through the wastewater. In addition, cleaning of plant, invariably ends up in caustic wastewater.

Recent studies show that certain microbes isolated from such contaminated water bodies have the ability to degrade the dairy effluent and accomplish bioremediation within the habitat. Identify such inherent microflora which can bio-remediate the wastewater under natural conditions is very important. If the identity of such microbes is known, it will greatly help in the understanding the microbial niches and overall process of bioremediation and will be greatly significant in development of sustainable environment. We are trying to identify such microbes by using PCR based molecular characterization technique of 16s DNA sequencing to understand the nature and evolutionary significance of these microbes.

Keywords: -Dairy effluent, Pollution, Bioremediation.



Poster Presentation | PP-007

Study on Mechanical Behaviour of Hot Rolled Al-Cu Alloy Reinforced Fly Ash/SiC Hybrid Composite

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Abstract

In comparison with conventional materials, different aluminium alloys are gaining their attention in many areas of interest like aerospace, automobile, and manufacturing due to their enhanced mechanical properties. The aluminium-copper alloy is being used to a large degree due to their augmented properties like a great response to aging, excellent formability, and high strength. Production of hybrid composites by addition of combination of reinforcement such as TiC, SiC, Al₂O₃, TiO₂, TiN, etc. to aluminium matrix for enhancing the mechanical properties has been a well reputable fact. The addition of reinforcement of the aluminium matrix with ceramic phase like silicon carbide (SiC) is well preferred over the stir casting method. Fly ash is one of the low density reinforcement available in abundant and going as waste from thermal power plants. In the present investigation, Al-Cu alloy was used as matrix and reinforced with two reinforcements, fly ash and SiC using stir casting technique. The 2wt.% fly ash with 2, 4, 6wt.% SiC and 4wt.% fly ash with 2, 4, 6wt.% SiC were reinforced in Al-4.5wt.% Cu matrix. The composites were hot rolled to 30% reduction without edge cracking. The result shows that addition of reinforcements exhibited higher hardness and ultimate tensile strength as compared to base alloy. The rolled composites reveal higher hardness and tensile properties compared to all stir casting composites. Fractured surface of the tensile specimen of the hot rolled composite material indicated presence of dimpled surface, indicating thereby a ductile type of fracture.

Key words: Stir casting, fly ash, SiC, rolling, mechanical properties.



Poster Presentation | PP-008

Characterization of Phyto-Compounds Produced from *Gymnemasylvestre* R.Br Through Adventitious Root Culture.

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Abstract

Gymnemasylvestre (Asclepiadaceae) is branded to be a major anti diabetic plant located in many regions of Asia, Africa and Australia due to the phytochemical compounds exhibited by this plant. It is also popularly known as “Gurmur” for its distinct property as sugar destroyer, which is a herb in the Ayurvedic system of medicine. The phytoconstituents responsible for sweet suppression activity includes triterpene, saponins known as Gymnemic acids, Gymnemasaponins and a polypeptide Gurmarin. The dried roots of *Gymnemasylvestre* contain carbohydrates, alkaloids, glycosides, proteins and saponin. The herb exhibits a broad range of therapeutic properties, which is an effective natural remedy for diabetes, besides being used for arthritis, diuretic, anemia, osteoporosis, hypercholesterolemia, cardiopathy, asthma, constipation, microbial infections, indigestion and anti-inflammatory. The natural availability of this high valued herb is not fulfilling the ever increasing demand. Alternative options viz., in-vitro adventitious root culture provides a preferred platform to produce commercially important secondary metabolites as this method is natural, genetically and biosynthetically stable, compared to cell suspension culture should be adopted to balance the supply demand ratio. The present study aims at scaling-up of adventitious root culture for the production of biomass and secondary metabolites involves; induction of adventitious roots from the selected explants, optimization of process parameters, growth kinetics and exploring the suitable techniques for higher accumulation of metabolites without affecting root growth. Followed by the downstream processing for the recovery of desired metabolites.

Key words: Secondary metabolites, *Gymnemasylvestre*, Diabetes, Biosynthesis, Adventitious roots.



Interconnected Network-Like CNS/ ZnCo_2O_4 Composite for Pseudocapacitor Applications

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Abstract

Interconnected network-like carbon nanospheres (CNS) decorated on surface of the ZnCo_2O_4 (ZCO) nano-sheets prepared via a hydrothermal method. Two different composites were obtained (CNS@ZCO-I and CNS@ZCO-II) by altering the concentration of CNS with respect to ZCO nano-sheets (constant metal precursors of ZCO). The X-ray photoelectron spectroscopy and Rietveld refinement methods were used to quantitatively estimate the metal (Zn/Co)/oxygen (O) deficiencies of pristine and composites. The prepared composites provide a short ion/electron transport path distances, high electronic conductivity, additional electrochemical active sites and stable structural integrity. This viable strategy offers good interaction between the CNS and the ZCO, which translates into better supercapacitor activity. The CNS@ZCO-II composite have excellent electrochemical performance including (1) about 983.6 Fg^{-1} of the highest specific capacitance at 0.35 Ag^{-1} (compare to pristine ZCO and CNS@ZCO-I composite). (2) After 2000 charge-discharge cycles, approximately 86.4% of the maximum specific capacitance retained at constant current density of 15 A g^{-1} . This study provides a new path for producing CNS decorated on ZCO nanosheets as electrode materials in supercapacitors.



Fate of Sewage Microorganisms During the Treatment of Domestic Wastewater Through Vermifiltration

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Abstract

Vermifiltration is a sustainable, cost-effective, eco-friendly, decentralized wastewater treatment technology that uses epigeic earthworms for the treatment of the organic matter present in wastewater.

The present study focuses on the microflora present in the untreated and treated wastewater to find out the role of earthworms in the reduction of the microbial load during the treatment of wastewater, therefore, analyzing the fate of microbial diversity after vermifiltration. The samples are collected from the inlet and outlet of the domestic vermifilter plant. Isolation, identification, and characterization of microorganisms are done where the microscopic and biochemical characterization of the isolated microbes is done according to *Bergey's Manual*.

After final identification it is found that the microbial community majorly includes gram-positive as well as gram-negative bacteria along with Actinomycetes and Fungi. A total of 7 bacterial, 1 Actinomycetes and 4 fungal isolates are found in the influent (untreated wastewater). After further analysis of the effluent (treated wastewater), a significant decrease in microbial load is observed.

The significance of this research is to check the fate of microorganisms present in the influent and effluent of the vermifilter plant and to study the synergistic and symbiotic relationship of earthworms (*Eisenia fetida*) and microorganisms in the treatment of wastewater during vermifiltration.

Keywords: Vermifiltration, *Eisenia fetida*, Bacteria, Actinomycetes.



Physico-chemical profile and fish diversity of kangsabati reservoir triggers livelihood generation and nutritional security of villagers of Mukutmanipur, West Bengal, India.

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Abstract

In the present study, a significant attempt has been made to assess the fish diversity which reflects on livelihood and nutritional security of human population adjacent to Mukutmanipur, Bankura, West Bengal, India. Considering about the fish species availability concerned with physico-chemical properties of the water body and planktonic community of Kangsabati Reservoir strongly influences the dietary sources, livelihood generations of local inhabitants and formation of 11 fishermen co-operatives. Analytical research design recognized a total of 39 fish species having economical importance, belonging to 7 Orders, 15 Families and 26 Genera. The Cypriniformes were dominant with 17 species, followed by Siluriformes and Perciformes, with 7 species each, Channiformes with 3 species, Osteoglossiformes and Synbranchiformes with 2 species each, and anguilliformes with 1 species. Subsequently, about the IUCN based conservation status, 27 species has been under Least Concern, 1 species in Vulnerable, 6 species are Near Threatened, 1 species having Data Deficient, and 4 species is not evaluated category (IUCN – version 2015-4). But recently, undesirable anthropogenic activities induced pollution and slight eutrophication lead to the changes in physical and chemical properties of the reservoir's water conditions have forced the fishes within the reservoir to face severe threatening. Therefore, suitable conservation and management plans are urgently needed to protect the chances of biodiversity loss concerned with livelihood as well as nutritional security. Goal-oriented objectives must be framed for beneficial purposes concerned with the people of 40 villages focusing on earning money and availing animal protein rich food.

Keywords: Kangsabati reservoir, Fish diversity, Physico-chemical properties, Nutritional security.



Socio-economic study of composite fresh water fish farming in moyna and tamluk community development block, Purbamedinipur, West Bengal, India

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Abstract

Fish culture also helps in employment, to reveal socio-economic status and earning foreign currencies and economic growth of any county. The socio-economic characteristics affecting to the demography means of production and investment, income and expenditure of peoples living in a specific location. Moyna Block of WB state, total 7000 hector area as fresh water area and fish production 10.76 tone / hector and Tamluk Block total 5250 hector area, annual production 10.3 tone /hector in the year 2019. Therefore, recent survey based socio-economic studies are established on the area of Moyna and Tamluk block, which are most popular for fish farming and huge amount fish production in last few years. In 2019 Government of West Bengal announced 'Moyna Model' which is a Fishery Hub of W.B. During survey & interaction with them a new thought come forward that, unscientific utilization of fish food, chemicals, pesticides and other medicines leads to the water and soil pollution, these factors indirectly effects on their profit also. If those fields are reutilized for paddy cultivation, the crop quality and amount become significantly reduced due to the high pollution rate in soil and water during fish culture specifically in Moyna Block.

From the result of cost profit analysis it shows, in average bigger area occupied by the owners got less profit, but from the regression model it shows that there are positive relation between profit and area, that mean full phase utilization of area is not done due to the lake of scientific knowledge. . Regular monitoring of soil and water quality also not is done in both two Blocks. Government should be taken some steps to those points.

Keywords: Socio-economic, cost profit analysis, Moyna Model, regression model, fresh water fish farming.



Poster Presentation | PP-013

Determination of Enzymatic Activity of Microorganism from the Vermifilter During Wastewater Treatment

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Abstract

Some 1.1 billion people worldwide lack access to water, and a total of 2.7 billion find water scarcity for at least one month of the year. Water scarcity has promoted recycling of wastewater so that it can be reused for non-potable purposes. Recent wastewater recycling eco-friendly technologies include treatment projects like filtration, constructed wetlands etc. but with some obstruction. Therefore, it is necessary to seek an alternative on-site wastewater treatment process which is economically and environmentally sustainable. Vermifiltration is novel technology which involves the joint action of earthworms and microorganisms (symbiotically and synergistically), where earthworm homogenize organic pollutants present in wastewater, thereby increasing the surface area which is more favorable for microbial activity and further degradation.

The present study focuses on the qualitative and quantitative estimation of enzymatic properties (catalase, lipase, protease, amylase) of microflora in a pilot scale domestic Vermifiltration system. The result of study indicates that the microorganisms present in vermifilter are capable of releasing certain enzymes such as lipase, protease, amylase etc. which are responsible for degrading lipids, proteins, starch respectively.

The study will elucidate the enzymatic activity of microorganisms that helps in degradation of organic matter. The potent microflora can be further isolated and used as biozymes.

Keywords: Earthworm, Enzymes, Vermifilter, Wastewater



Poster Presentation | PP-014

Chemical Characterization of Atmospheric Aerosols Analysed by Sem-Edx at Ballari Over North Karnataka Region

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Abstract

Atmospheric aerosols play a pivotal role in bringing changes in the air quality, health of human beings and above all change in the climatic conditions. The aerosol samples were collected during summer and winter in semi urban region, Ballari from December, 2017 to May, 2018. The surface mass concentration ranged from 173 $\mu\text{g}/\text{m}^3$ to 367 $\mu\text{g}/\text{m}^3$ with an average value of $\sim 261 \pm 55 \mu\text{g m}^{-3}$ during the study period. The maximum average mass concentration of atmospheric aerosols was observed in summer and the minimum in winter. The morphology and chemical composition of aerosol particles were analysed using scanning electron microscope (SEM) coupled with an energy disperse x-ray system (EDX). From the EDX results the elements analysed were C, O, Na, Mg, Al, Si, S, Cl, K, Ca, Ti, Fe, Mo, Ba, Co, Br, Hf. The most dominant elements during the sampling period were aluminosilicates (Al, Si, K, Fe, Na, Mg, Ti and Ca), which mainly due to mineral particulate aerosol emanating from crustal origin through dust storm. The carbon species were observed at all days except on 23.02.2018 indicating the day was clear. The major sources of atmospheric aerosols identified were soil particles, vehicular emissions, and construction and mining activities surrounding the vicinity of the sampling site.

Key words: Atmospheric aerosols, SEM, EDX, Morphology, Ballari.



Poster Presentation | PP-015

Laccase Enzyme Production and its Efficiency of Dye Decolourization

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Abstract

In the present investigation, indigenous bacterial strains were isolated capable of laccase production. Total 12 different bacterial isolates were isolated from effluent and soil sediment samples collected from chemically contaminated sites. These isolates were screened for laccase production under submerged condition in Luria Bertani broth supplemented with 1% fructose and 0.01% CuSO₄ and laccase activity was measured using ABTS assay. Out of these, two bacterial isolate was selected on the basis of maximum laccase activity. The effect of carbon sources on laccase production by both isolates was studied. Dye decolorization potential of laccases produced by both isolates were studied on congo red in the presence of mediator ABTS.



Poster Presentation | PP-016

Design, Synthesis and Identification of Novel Benzimidazole Based Small Molecule Methyl 1-Benzyl-2-(4-Fluoro-3-Nitrophenyl)-1h-Benzo[D]Imidazole-5-Carboxylate (Tj8) as Potent Anticancer Agent.

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Abstract

In order to find structurally novel potential anticancer agent, we have designed and synthesized a series of benzimidazole derivatives (TJ01-TJ15) by multistep organic synthesis. The structures of all the final compounds and their intermediates were analyzed by NMR and LCMS analysis. The anticancer effects of these compounds were tested against different cancer cell lines and the compound 'methyl 1-benzyl-2-(4-fluoro-3-nitrophenyl)-1H-benzo[d]imidazole-5-carboxylate (TJ08)' identified as structurally novel anticancer agent with IC₅₀ values of $1.88 \pm 0.5 \mu\text{M}$, $1.89 \pm 0.5 \mu\text{M}$, $3.04 \pm 0.8 \mu\text{M}$ and $6.11 \pm 0.5 \mu\text{M}$ against Jurkat, K562, HCT116 and HeLa cancer cell lines respectively, which were unveiled by MTT Assay and Trypan blue dye exclusion assay. Treatment with TJ08 induces apoptosis of HeLa by altering the membrane potential of mitochondria, which was confirmed by mitochondrial membrane potential assay using Immunofluorescence microscopic study, which was further confirmed Annexin V- PI staining. FACS analysis confirmed induction of apoptosis in dose dependent manner that can be seen by accumulation of cells in sub G1 phase. Development of TJ08, In-Vitro and In-Vivo studies of TJ08 are under investigation to unravel the detailed mechanism of anti-proliferative effect.

Keywords: Benzimidazole, Organic synthesis, TJ08, anticancer agent, apoptosis.



Poster Presentation | PP-017

Rietveld Refinement of $ZrO_2:Tb^{3+}$ Nanophosphor

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Abstract

Tb^{3+} doped zirconium dioxide (ZrO_2) nanophosphors were prepared by using hydrothermal technique method. The powder X-ray diffraction profiles showed pure cubic phase. We analyzed a cubic powder sample by X-ray diffraction and refined its pattern by means of the Rietveld Method.

Keywords: nanophosphors, Rietveld Method.



Poster Presentation | PP-018

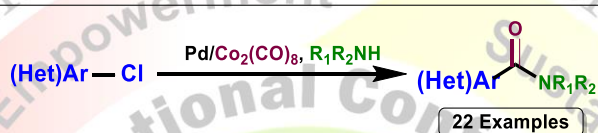
Amidocarbonylation Of (Hetero) Aryl Chlorides Using Cobalt Carbonyl As Co Source

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Abstract



Metal-catalyzed carbonylation chemistry has evolved as an indispensable synthetic tool both in academic and industrial processes. Successful carbonylation employing aryl/heteroaryl bromides, iodides and triflates under moderate conditions is well-documented in the literature. Notable advances have been made in achieving carbonylation of challenging (hetero) arylchlorides, though high temperature or CO pressure with demanding catalytic systems are required.

Though carbon monoxide, CO, still remains as effective carbonyl source for many industrial processes, several attempts to use other CO surrogates which generate CO gas *in situ* or *ex situ* have been explored in various laboratories. Such CO releasing molecules (CORMs) include formates, formamides, formic acid, silacarboxylic acids, acid chlorides, metal carbonyls, and others. Herein we report an efficient method for the amidocarbonylation of (hetero) aryl chlorides under exceptionally milder conditions using Pd/Co₂(CO)₈ catalyst system. Besides acting as CO source, Co₂(CO)₈ enhances the reaction rate by accelerating the CO insertion through an *in situ* generated bimetallic Pd-Co(CO)₄ complex. Under the optimized reaction condition, carboxamide synthesis of a wide range of activated and deactivated, as well as sterically hindered and heteroaromatic chlorides proceeded efficiently. The improved synthesis of biologically relevant molecules highlights its scope as a valuable synthetic method.



Poster Presentation | PP-019

Synthesis of Zinc Oxide (Zno) Nanoparticles by *Momordica Charantia* Fruit Extract and their Application in the Photocatalytic Degradation of Methylene Blue Dye.

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Abstract

In the present study Zinc Oxide (ZnO) nanoparticles were synthesized by Green synthesis approach. Zinc Oxide nanoparticles synthesized by using *Momordica charantia* fruit. The metal oxide nanoparticles obtained were characterized by UV-Vis Spectroscopy, Fourier Transform Infra-red Spectroscopy (FTIR), Scanning Electron Microscopy (SEM) and X-ray Diffraction (XRD) studies. The nanoparticles prepared were evaluated for their application as Photocatalyst for the degradation of Methylene Blue at room temperature. It was observed that the Photocatalyst is effective in degrading the Methylene Blue dye.

Keywords: *Momordica charantia*, ZnO nanoparticles, Photocatalyst, Methylene Blue, Dye degradation.



Poster Presentation | PP-020

Sorption and Entrapment of Heavy Metals in A Contaminated Soil Using Nano Calcium Silicate – A Nano Amendment

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Abstract

Soils worldwide are getting continuously contaminated due to anthropogenic sources and thus increasing the number of brown fields which need remediation. Geoenvironmental engineers are faced with challenges of finding a permanent solution to this cleanup operation and the relapse of sorbed heavy metals back into the soil matrix as an active ingredient ready to undergo reactions and further enhance the pollution potential is the greatest threat being faced. A number of soil amendments which are conventional, low cost and modern such as lime, cement, fly ash and low cost such as rice husk ash and chemicals in the form of chelates which are used as soil washing agents such as EDTA, DTPA, nitric acid, acetic acid etc. have been generally used. But their efficacy has found to be site and metal specific. Hence an attempt has been made to use Nano Calcium silicate (NCS)(CaSiO₃) as a Nano amendment to sorb and entrap heavy metals.

Nano Calcium silicate (NCS) was synthesized by solution combustion method. PXRD pattern of CaSiO₃ confirms the wallstonite structure. The white crystalline powder was embedded with soil in four percentages including without addition of NCS by loaded of soil notated as X₀%, X₁%, X₂% and X₃% with a range of 0.0 to 2.0 % respectively embedded with soil. As a results that X₂% NCS amended soil was good sorption coefficient capacity with mordent weight of NCS absorbed for Lead metal ion on both BCS(Black cotton Soil) and RES(Red earth soil) compare to Nickel metal ion(Ni²⁺). As dilution ratios increases the amount of sorption coefficient increases. The sorption coefficient capacity increases up to pH 5.5 for BCS and sorption co efficient increases up to pH-7.0 for RES. We examined that adsorption of Ni and Pb on both BCS and RES by theoretical and experimental respectively. For both metal ions Lead and Nickel sorption on RES by both theoretically and experimentally well found to be smaller deviation and Ni and Pb sorption behavior is much variation is observed in BCS. Further it was concluded that the ranking of sorption capacity of both the treated and virgin soils were of the order BCS>RES.

Key words: Nickel, Lead, NCS.



Poster Presentation | PP-021

Biological assessment and Dna Interactions of Metal (II) Complexes Containing Indole Based Amino Acid Derived Imines: Design, Development and Validation

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Abstract

A new indole based Schiff base amino acid ligand, L (C₁₅H₁₄N₄O₂) and its divalent metal complexes (where M = Cu(II), Co(II), Ni(II), Fe(II); L = (Z)-2-(((1H-indol-3-yl)methylene)amino)-3-(1H-imidazol-5-yl)propanoic acid) were synthesized and characterized by advanced spectroscopic and analytical techniques. The Schiff base examined reveals tridentate coordination with the general formula [M(LH)₂]nH₂O. The configuration of the prepared complexes is implied to be octahedral and these metal structures were screened against targeted species of pathogenic fungi and bacteria for their *in vitro* antimicrobial activity. The complex interactions with CT-DNA were studied using spectroscopic techniques, viscosity analysis and thermal denaturation method. Absorption spectral ($K_b = 5.27 \times 10^4 \text{ M}^{-1}$ (1), $4.05 \times 10^4 \text{ M}^{-1}$ (2), $3.67 \times 10^4 \text{ M}^{-1}$ (3), $2.43 \times 10^4 \text{ M}^{-1}$ (4)), measurements of thermal denaturation and viscosity reveal that the metal complexes interact with DNA by intercalation mode. In UV-visible irradiation with pUC19 DNA the photo-induced cleavage studies showed the photonuclease characteristics of the metal complexes.

Keywords: Schiff base; Metal complexes; Antimicrobial Activity; DNA Reactivity



Poster Presentation | PP-022

Maturity Level of Animal Waste Compost and Municipal Solid Waste Compost Using Physico-Chemical and Analytical Spectroscopy

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Abstract

Composting can be regarded as the most typical method, for recycling the organic fractions, as it provides an agricultural amendment, capable of mitigating the serious deficiency of organic matter suffered by many agricultural soils, due to less use of organic materials in fertilization programs of crops.

The characterization of compost quality is not possible through a single analytical technique and many physico-chemical parameters and elemental analysis are required for this purpose. The most widely used technique like Inductively Coupled Plasma- Mass Spectroscopy (ICP-MS) method is complex, have higher possibility of sampling errors and are less economic. In the present study, the quality of composts was evaluated through X-Ray Diffraction (XRD) and Scanning Electron Microscopy-Energy Dispersive X-Ray spectroscopy (SEM-EDS) techniques and compared with the results obtained from ICP-MS.

The results show non-destructive, economic and able to estimate the concentrations of several metals present in samples simultaneously, time saving and found to be much significant in the evaluation of compost quality.

From the observations, composts prepared from MSW and AWC were rich source of essential plant nutrients. The concentrations of trace elements were higher in both the compost samples. The regular analysis of compost quality is necessary for the compost samples obtained from the feedstock containing unsegregated solid wastes, generated from various human activities. Proper guidance should be given to the farmers during its utilization as a fertilizer or for the soil amendment, to avoid the soil pollution.

KeyWords: Municipal Solid waste, Animal Solid Waste, Compost Maturity Characterization, Sustainable development.



Poster Presentation | PP-023

The Study of CNT-Fe-Al₂O₃ Composites

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Abstract

Carbon nanotubes are promising to transform many areas in material science and in nanotechnology. The ability of the carbon nanotubes to assume a wide variety of different structure makes it unique among the other. Depending upon the structural parameters and way in which the carbon atoms are arranged, the CNT can either be metallic or semiconductor. This property opens up the exciting properties of devices. CNT emerges as potentially attractive materials as reinforcing elements in ceramic matrix composites. The another major advantages of the CNT remain undamaged neither by the high temperature nor by the extreme shear stresses. Moreover superplastic forming is made easier by the CNT inhibit the matrix grain growth and also acts as a lubricant agent. In this paper recent research on CNT are studied and CNT-Fe-Al₂O₃ composites have been prepared by hot pressing where the quantity of CNT has greatly been increased in comparison with the previous results.



Poster Presentation | PP-024

Biosynthesis and Characterization of Silver Nanoparticles (AgNps) from the Phyto-Extracts of *Lamiaceae* species for their Biological Activity Study

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Abstract

Majority of the world's population depends on herbal medicine for primary health care and treatments due to their adaptability with the human body and stance lesser side effects. The synthesis of nanoparticles using medicinal plant extracts have become one of the principal alternative source that inhibit the microbe, which are highly resistant to different classes of antibiotics due to their of physio-chemical properties. Lamiaceae is one the important plant family, which possess medicinal values due to rich in essential phyto-compounds. Extracts from *Hyptissuaveolen*, *Leucasephalotes*, *Leucadiffusa*, *Anisomelesmalabarica*, were used in biosynthesis of nanoparticles. Characterization of thus developed AgNPs were studied which explained the detailed result of their behaviour, efficacy, safety and biodistribution. Characterization is performed using a variety of analytical techniques, mainly including X-ray diffractometry (XRD), Fourier transform infrared spectroscopy (FTIR), dynamic light scattering (DLS), scanning electron microscopy (SEM), X-ray photoelectron spectroscopy (XPS), transmission electron microscopy (TEM), and atomic force microscopy (AFM), UV-vis spectroscopy. In the current study, the biological activity like Antimicrobial and Anticancer activity of the phyto-extracts and nanoparticles will be conducted on *Escherichia coli*, *Klebsiella pneumoniae*, *Streptococcus pneumoniae* and *Bacillus subtilis* and comparative analysis of biological activities of phytoextracts and silver nanoparticles.

Key words: Nano particles, Biosynthesis Silver nanoparticles (AgNPs) *Lamiaceae* sp.



Influences of Seed Priming with Leaf Extract of *Sidaacutaon* Seed Germination of *Triticum Aestivum* under Salt Stress in Lab Conditions

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Abstract

Wheat is a cereal grain most often in the form of bread. Seed priming stimulates the pre-germination metabolic processes and makes the seed ready for radicle protrusion. It increases the antioxidant system activity and the repair of membranes. These changes promote the seed vigor during germination and emergence under salinity stress (Ibrahim et.al., 2016). The salinity delays or prevents the seed germination through various factors. Salt stress causes adverse physiological and biochemical changes in seed germination. The aim of current study is to determine the role of seed priming during germination under salt stress in lab conditions.

Aqueous leaf extract of *Sidaacuta* was prepared at four different concentrations: 1% PE, 3% PE, 5% PE, and 10% PE (Plant Extract) along with control. By using seed priming method, wheat seeds were soaked in four different concentrations along with distilled water (Hydropriming). After the seed germination, physical parameters like root length, shoot length, wet weight, dry weight were measured. Physical parameters are found to have stimulatory effect on wheat seedlings. It was observed that 3% PE show maximum growth at 0mMNaCl concentration and 5% PE show maximum growth at 50mMNaCl concentration in lab conditions. So, it can be concluded that by using seed priming method with plant extract, salt stress can be overcome and it can be used for the growth enhancement for the wheat crop plants.

Keywords:- Physical Parameters, Salt Stress, Seed Priming, *Sidaacuta*, Wheat Seedling



Poster Presentation | PP-026

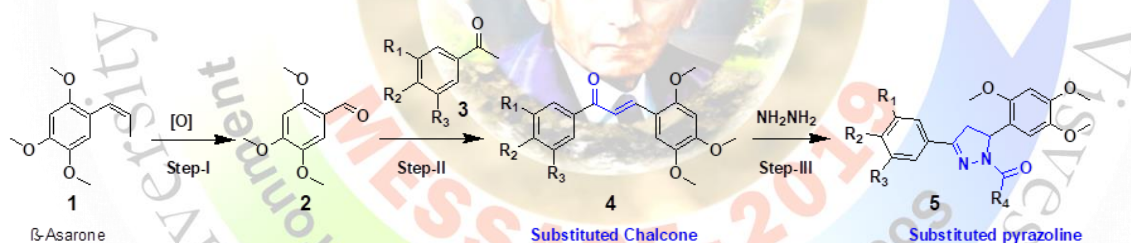
Synthesis of 3, 5-Diaryl-2-Pyrazolines from Natural Precursor: Anti-Cancer Study

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Abstract

A heterocyclic class 3, 5-diaryl-2-pyrazolines analogues were synthesized from trimethoxy substituted chalcone intermediates and evaluated their anti-cancer activity. Naturally occurring β -Asarone a major active principle compound (70-80%) found in *Acorus calamus* (sweet flag rhizome) used as precursor to get corresponding aldehyde via oxidation. The trimethoxy aldehyde was treated with substituted acetophenones under Claisen-Schmidt conditions to get desired trimethoxy chalcones. These chalcones are further cyclized using hydrazine to get desired substituted pyrazolines.



Synthesized substituted chalcone intermediate and pyrazolines compounds were tested *in-vitro* for their inhibitory activity against various human cancer cell lines. Results revealed that the chalcones that are having electron donor groups in para position to carbonyl moiety of phenyl ring showed better inhibitory activity and similar results were observed in case substituted pyrazolines compounds.



Poster Presentation | PP-027

Design, Synthesis, Structural Properties and Biological Evaluation of Metal Complexes of Thiosemicarbazones Antiplaetlet Evaluation of New Thiosemicarbazide: An Over View

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Abstract

There have been tremendous development in the chemotherapy of cancer and researches are still developing new and more effective drugs to combat this disease. Thiosemicarbazones and their metal complexes possess a wide range of biological applications. Thiosemicarbazones is a unique class of organic compounds which is not known only for its various biological activities but also as metal-chelating and anticorrosion agents. This review discusses current advances of an emerging 'new wave' of thiosemicarbazone and their metal complexes as potent anticancer agents, mode of action and toxicity caused by them.

Keywords: Anticancer, Antitumor, Thiosemicarbazones, anticorrosion



Poster Presentation | PP-028

Physical and Elastic Properties of Holmium Doped Borate Glasses

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Abstract

$60\text{B}_2\text{O}_3\text{-}30\text{PbO}\text{-}(10\text{-}x)\text{Li}_2\text{O}\text{-}x\text{Ho}_2\text{O}_3$ (where $x=0.1, 0.2, 0.3, 0.4$ & 0.5) glass system were synthesised by melt quenching process. Physical parameters, i.e., density, molar volume, oxygen packing density, and packing density, were studied using appropriate formulas. From dissociation energy and packing density parameters, the elastic moduli were calculated and analyzed by Makishima – Mackenzie model. The Young's Bulk and Shear decreases with the increases of holmium concentration; the Poisson's ratio remains all most the same range for all the concentration. The Poisson's ratio is affected by the changes in the cross-link density of the glass network, a high cross-link density has Poisson's ratio in the order of 0.1-0.2, while a low cross-link density has Poisson's ratio between 0.3 and 0.5, in our glass samples, it is 0.2359 -0.2379. It shows that it is having low cross-link density, which means that it is creating more number of bridging oxygen to non-bridging oxygen.



Poster Presentation | PP-029

Soil Quality Analysis for Conservation of Agriculture: An Over View

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Abstract

Rice is staple crop for most of the people in Karnataka, in due days its productivity and production is reducing due to improper application of fertilizers, specially the zinc. This study was undertaken to know the status of micronutrients and zinc fractions in soils under paddy land cover in times in southern bayaluseeme region of Karnataka. To determine the sustainability of soil and land management practices prevalent in this region, a study on soil quality assessment was done through minimum data set. Few soil samples at 1-2 feet depth were collected from different locations of southern bayaluseeme region of Karnataka. Soil quality index (SQI) was assessed through identifying minimum data set (MDS) by employing principal component analysis.

Keywords: micronutrients, productivity, bayaluseeme



Poster Presentation | PP-030

A Review on Characterization and Extraction of Cellulose from Sugarcane Bagasse with its Applications.

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Abstract

Recently waste recycling has been the main topic of various scientific researchers due environmental concern. Renewable agricultural sources such as sisal, jute, pineapple leaf, coir, piassava, and sugarcane bagasse are among agro waste, normally known as biomass. The aim of this review paper is to carryout comparative evaluation of studies on characterization, extraction of cellulose from sugarcane bagasse by different methods, the study also focuses on the cross linking of cellulose with polymers. It also involves testing of cellulose composites by different methods and its applications. Various journal papers are referred for this purpose. The paper gives an overall view of the recent development of cellulose composites and its applications.

Keywords: Cellulose. Sugarcane Bagasse, PVC, EVA, Composites.



Poster Presentation | PP-031

Molecular Characterization of Microbes Relevant for Azo-Dye Degradation

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Abstract

Azo dyes are extensively used in textile and other industrial processing. These are complex chemical compounds that imparts colour to substances. On the urge of urbanization, the use synthetic dyes are increasing largely. The untreated effluent released from the textile industries causes serious environmental pollution affecting the water bodies in which it is dumped. These compounds are highly toxic and disturbs the aquatic ecosystem, soil, plants, livestock ultimately affecting humans. Besides its toxic nature, its removal from the wastewater is a challenging task for the researchers.

Recent studies show that certain microbes isolated from such contaminated water bodies have the ability to degrade the dyes and accomplish bioremediation within the habitat. In order to promote the process of bioremediation understanding of the inherent microflora interaction is a must and for that identification of the active members of such bioremediating microflora is critical. Total 16 bacterial isolates were isolated from four different effluents and cultivated soil samples. These isolates have also been biochemically characterized previously. We are trying to validate and identify the isolates active in dye degradation remediation. The isolates were validated for Azo dye degradation and it was observed that within 24 hours of incubation, dye concentration decreased as much as up to 88% of the initial concentration by some of the isolates. Molecular characterization is performed by isolating DNA from two of such isolates and using PCR based characterization techniques such as 16s DNA sequencing and RAPD analysis.

Keywords: -Azo dye degradation, Textile industry, Bioremediation.



Poster Presentation | PP-032

Biomass Derived Activated Carbon and its Application in Water Pollution Control: Experimental and Theoretical Approach

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Abstract

Activated carbon has been a strong and reliable adsorbent for the removal of various organic, inorganic and biological pollutants from water. Its widespread use is limited due to the high production cost involved, which has prompted researchers to search for viable cost-effective production process. The utilization of biomass for activated carbon preparation has been a feasible alternative to expensive commercial activated carbon precursor such as coal. The present work describes the conversion of biomass materials such as *Tithonia diversifolia*, pine cone, *Schima wallichii*, ravena grass, coconut shell etc into sustainable activated carbon, and its subsequent application in removal of various pollutants from water. The process parameters involved in the activated carbon production was optimized, and activated carbon with excellent adsorbent characteristics such as high surface area, large pore volume and abundant functional group has been synthesized. The prepared carbon was efficiently use for removal of phenolic compounds, coliform bacteria, *E.coli*, fluoride and toxic dyes from water. Maximum removal efficiency of 96%-99% has been achieved for all the pollutants under optimum operating conditions. Additionally, an in-depth understanding of the interaction of activated carbon with specific pollutants has also been done using Density Functional Theory calculations. The outcome of the study revealed that biomass materials could be effectively used for the preparation of activated carbon with promising characteristics, which could further be used for solving various environmental problems.



The magnetic properties of $\text{Nd}_2\text{Fe}_{17}\text{MB}_{0.05}$ (M= Al/Ga/Si)

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Abstract

$\text{Nd}_2\text{Fe}_{14}\text{B}$ is a famous permanent magnet material due to its large coercivity but has a drawback of low Curie temperature and thus in order to investigate its magnetic properties in the off-stoichiometric 2:17 systems, $\text{Nd}_2\text{Fe}_{17}\text{MB}_{0.05}$ compounds are selected. $\text{Nd}_2\text{Fe}_{17}\text{MB}_{0.05}$ compounds are prepared by arc melting the high pure starting elements. Powder X-ray diffraction patterns indicate that all the compounds are formed in rhombohedral ($\text{Th}_2\text{Zn}_{17}$) structure with the traces of α – Fe. The magnetization values show a tendency to saturate at a field of 12 kOe. The saturation magnetization (M_s) values were obtained from Honda plots and observed that M_s values increased with the addition of M which could be attributed to the hybridization of 3p(4p) band of Al, Si (Ga) with the 3d band of Fe. The maximum M_s was obtained with the addition of Si. The Curie –temperatures for these compounds were determined and found an increase with the addition of M and a maximum increase was observed with the addition of Ga. This could be attributed to the dependence of T_C on the Density of States at E_F . The room temperature XRD patterns of oriented samples show the presence of (0 0 6) plane for the $\text{Nd}_2\text{Fe}_{17}\text{MB}_{0.05}$ compounds indicating the change of Easy Magnetization Direction (EMD) from planar to uni-axial anisotropy which indicates the increased anisotropy. The magnetization curves of the magnetically aligned samples also confirm the increase of anisotropy with the addition of M.

Keywords: Permanent Magnet Materials, Magnetization, Curie- Temperature, Easy Magnetization Direction, Anisotropy



Seasonal Incidence and Management of Cocoa Mealybug, *Planococcus Lilacinus* (Cockerell)

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Abstract

An investigation was conducted at Zonal Agricultural and Horticultural Research Station (ZAHRS), Navile, Shivamogga, Karnataka, India during 2018-19 to study the seasonal incidence and to evaluate the efficacy of ten insecticides against mealybug, *Planococcus lilacinus* (Cockerell) viz., Azadirachtin 50,000ppm @ 1 ml/l, Cypermethrin 25 EC @ 0.5ml/ l , Acephate 70 SP @ 1g/ l , Flonicamid 50 WG @ 0.4g/ l , Imidacloprid 17.8 SL @ 0.5 ml/ l , Thiamethoxam 23WG @0.2g/ l , Malathion 50 EC @ 2ml/l , Dimethoate 30 EC @ 1.75 ml/ l , *Lecanicillium lecanii* 2 X 10⁸ cfu @ 2 ml/l , *Beauveria bassiana* 1 X 10⁸ cfu @ 2 g/ l along with the control in cocoa. Seasonal incidence studies revealed that the highest population of mealybugs was reported during January second fortnight (30.34 Mealybugs/ 5cm twig length) whereas, least population was noticed during second fortnight of August (5.32 Mealybugs/ 5cm twig length). To study the efficacy of insecticides, pre treatment counts (mean number of Mealybugs/ 5cm twig length) were taken a day before spraying, and post treatment observations were recorded at 3, 7, 15 and 30 days after spraying. Data was subjected to square root transformation and analyzed using Analysis of Variance technique (ANOVA) of Randomized Complete Block Design (RCBD). Among ten treatments evaluated against mealybug, *Planococcus lilacinus* (Cockerell), Imidacloprid 17.8 SL @ 0.5 ml/ l was found superior (82.57 %), followed by Flonicamid 50 WG @ 0.4g/l (81.86 %) and Dimethoate 30 EC @ 1.7ml/l (79.53 %) whereas, least percent reduction was recorded in *Beauveria bassiana* @ 1 X 10⁸ cfu @ 2g/ l (60.48 %). Cost Benefit ratio was highest with imidacloprid 17.8 SL (1: 2.01), followed by Flonicamid 50 WG (1:1.94), dimethoate 30 EC (1:1.74), Malathion 50 EC (1:1.64), acephate 75 SP (1:1.59), Thiamethoxam 23WG (1:1.50), Cypermethrin 25 EC (1:1.42), azadirachtin 50,000 ppm (1:1.34), *Lecanicillium lecanii* 2 X 10⁸ cfu (1:1.08) and *Beauveria bassiana* 1 X 10⁸ cfu (1:1.02).



Poster Presentation | PP-035

Study of Mechanical Properties of Aluminium / Nano-Zirconia Metal Matrix Composites.

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Abstract

In the present work, Aluminium/ZrO₂ nanocomposites have been fabricated through stir casting process. Mechanical properties, morphology and effect of ZrO₂ nanoparticles on Aluminium/ZrO₂ nanocomposites have been studied. ZrO₂ nanoparticles were added in terms of 2.5 and 5% by weight. Hardness, tensile and compressive test results were enhanced with the addition of nanoparticles whereas the elongation decreased with the incorporation of ZrO₂ nanoparticles. Hardness increased from 71.33 HBN to 87.63 HBN at AL356 / 0% ZrO₂ to AL356 / 5% ZrO₂ nanocomposites. The improvement of 24.52% and 28.9% in Yield strength (YS) and 24.52 and 28.9% for 2.5 and 5% samples in ultimate tensile strength (UTS) is observed. Similar observations were made with compression samples also. Fractured surfaces of the fabricated nanocomposites were examined using SEM. SEM micrographs disclosed the nature of the fractured mechanism.

Keywords: Nanocomposites, Stir Casting, Mechanical Properties, SEM, Zirconia



Poster Presentation | PP-036

Synthesis and Characterization Of Barium-Strontium ($Ba_xSr_{1-x}Fe_{12}O_{19}$) Hexaferrites

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Abstract

With increasing degree of interest in the hexagonal ferrites, also known as hexaferrites, is still growing exponentially today. Hexaferrites became massively important materials commercially and technologically, as well as their use as permanent magnets; common applications are as magnetic recording and data storage materials, and as components in electrical devices, particularly those operating at microwave/GHz frequencies. The magnetic mineral magnetoplumbite was first described in 1925, and in 1938 the crystal structure was deduced as being hexagonal. The synthetic form of magnetoplumbite was found to be $PbFe_{12}O_{19}$ or pure PbM , and a number of isomorphous compounds were suggested including $BaFe_{12}O_{19}$, although this material was not structurally investigated as being isomorphous with the hexagonal magnetoplumbite until it was first studied and characterized magnetically in the early 1950s by Philips.

$BaFe_{12}O_{19}$ is known by many names, including barium ferrite, barium hexaferrite, M ferrite and BaM but it was initially named ferroxdure, to distinguish it from the spinel ferrite which was named ferroxcube. $SrFe_{12}O_{19}$ (SrM) in which barium has been replaced by the smaller strontium atom resembles BaM is most other physical properties but has a density of 5.101 g cm^{-3} and molecular mass of 1062g.

Barium-Strontium hexaferrite ($Ba_xSr_{1-x}Fe_{12}O_{19}$; $x=0, 0.25, 0.5, 0.75$ and 1) powders were prepared by sol-gel auto combustion method and annealed to the temperature ($T_a=1000^\circ\text{C}$) for 2 hours, with increasing T_a , growth of hexagonal-shaped sharp-edged particles was observed for Barium-rich samples. The microstructure of the powders was investigated using X-ray diffraction and scanning electron microscopy to understand the particle size and morphology of the powders. The XRD patterns of the samples confirms the formation of crystalline M-type hexagonal ferrite phases for powders annealed at 1000°C , whereas the presence of hematite ($\alpha\text{-Fe}_2\text{O}_3$) as secondary phase was also observed for the sample.

Keywords: Barium hexaferrite (BaM), Strontium hexaferrite (SrM), magnetoplumbite, ferroxdure, hematite.



Poster Presentation | PP-037

MgFe₂O₄ Synthesis and Characterization for Mg-Ion Battery Application

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Abstract

Magnesium metal complex oxides are potential electrode materials for magnesium ion batteries with high specific capacities. However, the strong electrostatic interaction between Mg²⁺ and the host lattice due to its divalency induces slow intercalation kinetics of Mg ions within the crystal lattices. Thus, nanocrystalline particles with shortened Mg ion diffusion distance enable the insertion/extraction of Mg ions and improve the specific capacities of the batteries. Herein, we report the Hydrothermal synthesis of crystalline MgFe₂O₄ nanocrystals. The material was characterized with XRD, SEM, TEM and Electrochemical studies. The Crystalline MgFe₂O₄ were controllably synthesized for the first time, which are active materials for magnesium-ion batteries.



Poster Presentation | PP-038

An Empirical Study of Technical and Economical Characteristics for Wind Farm Installation in Karnataka

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Abstract

One kind of renewable energy used extensively in India is wind wherein energy from the wind is extracted by using a turbine. Establishing wind power plants involves processes like site selection, turbine selection, wind economics, and wind analysis, etc. The process of site selection can be done by using data collected from these places and build mathematical models using wind data available for these places. Many models which have been reported in the last few years have been discussed here, these mathematical models and works of literature have been used for identifying wind potential sites and opportunities for a large-scale organization sector to install wind turbines in the state of Karnataka to achieve carbon footprints by wind turbine installation within the state. Karnataka is a southwest state of India; the wind data have been collected for different locations and sites in Karnataka and among these four sites have been considered for this purpose.

Any establishment or organizations in Karnataka can look into these details, to find what amount of carbon footprints can be achieved if a wind turbine is established in one of these locations. The economics and payback period can also be found out more accurately with the facts provided here. The mathematical models provided here can be used to check the accuracy of given value and compare to theoretical values of any wind data.

Keywords—Wind potential, mathematical model, carbon foot print, payback period, turbine characteristics.



Poster Presentation | PP-039

Electrical and Humidity sensing properties of Polyaniline/SnO₂ composites

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Abstract

Conducting Polyaniline/Stannic oxide (PANI/SnO₂) composites have been synthesized by insitu deposition technique by placing fine graded SnO₂ in polymerization mixture of aniline. The results were also well supported by X-ray diffractometry (XRD), Infrared (IR) spectral analysis, scanning electron microscope (SEM) and conductivity measurements. It is observed from the XRD studies that SnO₂ has retained its structure even though it is dispersed in PANI during polymerization reaction. By observation of IR spectra, it is seen that some of the characteristic stretching frequencies are considerably shifted towards higher frequency side. The surface morphology of these composites was studied by SEM and it was found that, composites possess grains and porous structure. High conductivity measurements show thermal activated behavior. The change in resistance with respect to percentage relative humidity (% RH) is observed. The composites in the pellet form exhibit almost linear behavior within a chosen range of humidity (ranging between 10 and 95% RH).

Keywords: Polyaniline composites; SnO₂; conductivity; Humidity sensors



Poster Presentation | PP-040

Deciphering the Role of Symbiotic and Synergistic Interactions of Earthworms and Micro-Organisms During Vermifiltration

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Abstract

Cities across the world are grappling with the challenges posed by scarcity of clean and usable water. Reclaiming of treated wastewaters should be considered as a new source of unconventional resources taking in account of the social and the environmental issues. Wastewater is gaining momentum as a “reliable alternative source of water, shifting the paradigm of wastewater management from ‘treatment and disposal’ to ‘reuse, recycle and resource recovery’”. Clinical wastewater carries various pathogenic microbes and other contaminants which are essential to be treated.

Vermifiltration Technology is a decentralized treatment system which shows a symbiotic and synergistic interaction between the microbes and the earthworm (*Eisenia fetida*) resulting in the treatment of the clinical wastewater with high value end products, zero energy consumption and ecologically sustainable. The current work is focused on investigating the role of microflora present in the earthworms and active layer of vermifilter. The study intends to find out the beneficial microflora which showed antimicrobial activity against known pathogens and to screen out microbes which showed antimicrobial resistance against known Antibiotics. The concept behind the study is to decipher the role of earthworms in the treatment process and to find out the population of beneficial microbes up for treatment.

The Significance of the work is to figure out the symbiotic and synergistic relationship between antimicrobial activity and antibiotic resistance activity resulting in an efficient treatment of wastewater. These studies will pave a way for mechanistic insights on Vermifiltration technology and advancement process.

Keywords:-Antibiotics, Antimicrobial Activity, Antimicrobial Resistance, Earthworms, Wastewater



Poster Presentation | PP-041

Synthesis and Characterization of Cupric Oxide Nanoparticles and Controlled Properties

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Abstract

Nanoscale particles of metallic Copper oxide powder has been prepared by chemical route of precipitation method in an aqueous medium, due to interesting properties, low cost of preparation and many potential applications in catalysis, cupric oxide nanoparticles play an important role in current study.

In the present work, the nanoparticles were synthesized through the chemical reaction of copper sulphate with sodium hydroxide in de-ionized water. Copper oxide nanoparticles were characterized by spectroscopy to investigate the coordination between Copper oxide nanoparticles. Transmission electron microscopy (TEM) and UV-Visible spectrometry contributed to the analysis of size and optical properties of the nanoparticles, respectively. The synthesized Copper oxide nanoparticles exhibited a distinct absorption peaks in the region of 320 and 366 nm. Particle size and morphology were checked by Scanning Electron Microscopy (SEM). Elemental composition was studied out by Energy Dispersive Analysis (EDX). Crystal phase identification of the Cupric oxide nanoparticles were characterized by X-Ray Diffraction (XRD) analysis, confirmed the size of nanoparticles at room temperature, less than 10nm. It was observed that, the surface phenomenon can be controlled during synthesis by varying the reaction time, pH and relative ratio of Copper sulphate to the surfactant, while the apparent colour changes from red to black, which was partly related to the change in particle size.



Poster Presentation | PP-042

Graphene-based materials and their composites possess promising applications

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Abstract

Recent years have perceived many innovations in research and advancement of graphene, the thinnest two-dimensional atomic material. Graphene-based materials and their composites possess promising applications in wide range of fields such as, electronics, biomedical aids, membranes, flexible wearable sensors and actuators. The latest studies and progression in this subject area often produce inconsistent or inconclusive results. In this article assesses Firstly, the distinct structural nature of the graphene materials available is elucidated, as well as different synthesis techniques available thus far for. Then this article discusses the various composites focusing different sub-functional regimes such as mechanical and collective functional applications such as energy, electronics biomedical, membranes and sensors. Finally, a conclusion and perspective are given to discussing the remaining challenges for grapheme nanocomposites in material science and engineering.



Poster Presentation | PP-043

Efficacy of Newer Insecticides against Tobacco Leaf Caterpillar *Spodoptera litura* (Fab.) in Soybean (*Glycine max* L.)

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Abstract

A study on efficacy of new molecules was undertaken during *Kharif* season 2014-15 in the Agricultural Entomology Section, College of Agriculture Nagpur. Fenvalerate 20 EC @ 0.50 ml/l was found most effective in terms of recording maximum number of larvae reduction of tobacco leaf caterpillar *Spodoptera litura* (Fab.). As regards to soybean grain yield, the treatment fenvalerate 20 EC @ 0.50 ml/l, Indoxacarb 15.8 EC @ 0.60 ml/l, Spinosad 45 SC @ 0.25 ml/l were found to be most effective treatments recording yield of 21.05 q/ ha, 20.10 q/ha and 19.02 q/ha respectively. From the seed production point of view Fenvalerate 20 EC @ 0.50 ml/l, Indoxacarb 15.8 EC @ 0.60 ml/l, Spinosad 45 SC @ 0.25 ml/l were most effective in recording highest yield.

Key words *Spodoptera litura*, Spinosad, Emamectin benzoate, Indoxacarb 15.8 EC, *Beauveria bassiana*, grain yield, ICBR, soybean.

Field: Agricultural Sciences



Poster Presentation | PP-044

Chemical Characterization of Atmospheric Aerosol at Industrial Area Gajraula, U.P.

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Abstract

Atmospheric aerosols are important from a perspective of ambient air pollution and health of humans beings and others. The industrial aerosol is categorized into two parts i.e. coarse particles (PM_{10}) and fine particles ($PM_{2.5}$). Samples of PM_{10} and $PM_{2.5}$ were collected from three different sites, SI, SII, SIII twice a week on Whatman and Teflon membrane filter paper through RDS (460 NL) and FPS (APM 550). Monitoring and chemical analysis of PM_{10} and $PM_{2.5}$ was done in the month of December 2018 to January 2019 and July 2019 to August 2019 for trace metal and ionic content analysis. Trace metals such as Pb, Cd, Ni, Cu, and Al were determined by ICP-MS and ion contents of SO_4^{2-} , NO_3^- , and NH_4^+ through ion exchange method. The result indicates that an increasing order of atmospheric aerosols is found in the order $SIII < SI < SII$. SII shows highest pollution level at all parameter including trace metals and ionic contents. It may be attributed to many industries located around this site and high density of automobiles plying throughout the day and night, Hospital admissions reports of current year i.e. 2019 shows the critical condition of health problems specially cancers.

Keywords:- Aerosols (PM_{10} , $PM_{2.5}$), Trace metals, Ionic contents, Health effects.



Poster Presentation | PP-045

Emission of Heavy Metals from E-Waste Burning, and Its Effect on Soil and Human Scalp Hair

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Abstract

Electronic waste (e-waste) in developing countries is causing an increasing concern due to its effects on the environment and associated human health risks. To understand the contamination status, we measured trace elements in soil and human hair collected from e-waste recycling sites. Heavy metals were analyzed in soils and male scalp hair samples collected from two age group subjects; adults (18 - 45 years) males from polluted and relatively less polluted areas in Moradabad. The samples used were collected from same sites as the individuals who had stayed in the sampled regions for more than four years. The samples were digested using acids and analyzed using Atomic Absorption Spectrometry (AAS). The results revealed that the contaminated soils have significantly increased the concentrations of selected metals in the human hair. Pb and Cd concentrations in soils showed elevated levels above the WHO recommended limits. Pb, Cd, Cr, Cu, and Zn concentrations were significantly higher ($p < 0.05$) in male scalp hair samples collected from polluted area as compared to control area. In conclusion, the study areas are exposed to high health risks associated with bioaccumulation of heavy metals through ingestion of heavy metals resulting from contamination in the study area and should be sensitized on the dangers of heavy metals on their health.

Keywords: Heavy Metals, Soil, Male Scalp Hair and Human Health.



Poster Presentation | PP-046

Zein-Alginate Biopolymer Enhances Delivery and Bio-Functionality of Lycopene in Colon Cancer Cells.

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Abstract

Dietary consumption of carotenoids has been correlated with reduced risk of cancer, atherosclerosis, and age-related degenerative diseases. Though carotenoids showed important biological activities, however its applications are limited due to non-polarity, and liable to oxidative degradation. Zein, a protein from maize, and alginate a polysaccharide from algae has been explored to encapsulate carotenoid lycopene. The current study was aimed to understand the anti-cancer potency of encapsulated lycopene over dietary mode of supplement. Lycopene zein-alginate nanoparticles (LYCZA) prepared by anti-solvent precipitation using tween 80, and then stabilized with alginate by electrostatic deposition. These LYCZA were synthesised, characterized and assessed anti-cancerous effects on HCT-116 colon cancer cells. Lycopene solubilised mixed micelles treated as control. The particle size of LYCZA was found to be 237 nm, and zeta potential was -3.51 mV. The spherical shape and size of LYCZA was established by SEM and AFM. The amorphous nature of LYCZA is confirmed the suitability of drug delivery. *In vitro* bioaccessibility of LYCZA was micellized by 87%. Cell viability results suggested that LYCZA found to have enhanced cytotoxicity than carotenoids delivered with mixed micelles in colon cancer cells. It is evident that biopolymers based nanoencapsulation of lycopene would be suitable for enteral nutrition to gain maximum health benefits.



Origin of the Kolleru Lake, A Ramsar Wetland, Andhra Pradesh, East Coast of India.

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Abstract

Kolleru Lake, the largest freshwater body along the east coast of India, is situated between the Krishna and Godavari delta plains in the central part of the State of Andhra Pradesh (AP). Previous studies identified beach ridges in the entire 30 km wide coastal belt between the lake and the sea, and inferred that the Kolleru Lake was a coastal lagoon around 6000 years ago during the Holocene marine transgression.

The areal spread of the Lake is variable with monsoon rains swell it to more than 300 km², while during the dry summer months it appears in shallow discrete pools. The Lake performs several ecological services as an important flood balancing reservoir, haven for migratory and resident birds, and sustains a large population of about 2.6 lakh persons engaged in economic activities like fish-catching, duck and cattle rearing, and subsistence agriculture (mainly paddy cultivation during rabi season). The AP government has designated the 493 km² area enclosed by 5-foot contour as Wildlife Sanctuary, and in 2002, an area of 901 km² around Kolleru Lake has been declared as Ramsar wetland.

However, during the past several decades, the Lake environment has been degraded due to large-scale encroachments for commercial aquaculture. As a result, most of the lake area was highly compartmentalized by 3–4 m high embankments of hundreds of fish tanks that had sprung up in the lake bed, which are time and again obstructing of the floodwaters from entering into the lake area, destroying the biodiversity, and degrading the aquatic environment by chemical pollution with the residues of fish-feed, pesticides and other liquid wastes. A study based on an analysis of the satellite images from 2001 showed the existence of more than one thousand fish tanks occupying about 42% of the lake area while the rest of it was either covered by dense weed or paddy cultivation. Subsequently during 2005–06, the AP Government under the Supreme Court's directive undertook the task of what was termed as 'Operation Kolleru', and removed all encroachments within the designated wildlife sanctuary of the lake. Even dynamites were used to blast off the imposing earthen embankments of the fish tanks. The Operation was conducted over several months from September 2005 to June 2006 amidst stiff resistance from the locals. The success of this operation and return of migratory birds to the lake have been widely acclaimed. But the ground reality does not seem to be as delightful as what one would expect after governmentation.

I have made an attempt to investigate the extant conditions in the lake through analysis of recent satellite images and field observations. The analysis of five sets of satellite imagery (from 1977, 1990, 2004, 2006, 2008, and 2015), revealed significant spatial and temporal variation in the Kolleru Wildlife Sanctuary area before and after Operation Kolleru. There was no trace of aquaculture encroachments in the sanctuary in the 1977 image. By 1990, fishponds appeared over 12 % of the area, which increased to as much as 64 % by 2004. The satellite image from 2006 showed drained fishponds and breached embankments to a large extent (as a result of Operation Kolleru), with fishponds occurring only in about 9.27 km² of the sanctuary area. However, analysis of satellite images from 2008 and 2015 that represent the post-Operation Kolleru period shows the reappearance of fishponds within the sanctuary area. By 2008 fishponds reoccupied 138 km² (about 28 % of the 493 km² area of the sanctuary), while another 91 km² (18 % of the sanctuary area) was being used for paddy cultivation. By 2015, the area used for fishponds further increased to 211 km², covering about 43 % of the lake sanctuary, while another 47 km² (9 % of the total area) was covered with paddy crop. By 2018,

A comparison between growth of aquaculture and population in the region indicates to an interesting trend. While the aquaculture has grown to occupy 35.7% of the Lake area, the population in the region has declined by -1.18% (during 2001–2011). This declining trend of population in the Lake region is contrary to the general population growth the district level (5.8% increase), at the State level (11.1% increase), and at the national level (17.64% increase) during the corresponding period.

The situation calls for immediate corrective measures. The encroachments have to be removed strictly by flattening the embankments of the fishponds, untreated industrial and urban pollutants should be prevented from entering the lake, and the weed should be removed from the lake area to ensure free-flow of water in and out of the lake, in order to restore the pristine environment of the Kolleru Lake.



Poster Presentation | PP-048

Physical and Optical Properties of Samarium Doped Sodium Lithium Phosphate Glasses

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Abstract

Sm³⁺ doped Sodium Lithium Phosphate glasses are prepared by conventional melt quenching method. The obtained X-ray diffraction patterns confirm the amorphous nature of prepared glass samples. The densities of the samples are measured by Archimedes method, and the physical properties like molar volume, oxygen packing density, interionic distance, field strength, rare earth ion concentration and polaron radius have been calculated using appropriate formulae. At room temperature, the absorption spectra of the prepared glasses in the UV-Visible region (wavelength 200-1100nm) are taken to study the optical properties of the glasses. The optical energy bandgap values are determined from Tauc plots. The refractive index of all the prepared glass samples is calculated, and these values are used to determine the corresponding molar refraction, the molecular polarizability of oxide ions, dielectric constant, reflection loss and metallization criterion of all the glass samples using appropriate formulae.

Keywords: Phosphate glass, Sm³⁺, Absorption, Refractive index



Poster Presentation | PP-049

Biosynthesis of Cerium Oxide Nanoparticles by Fungus *Trichoderma viridae*

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Abstract

Fungi have emerged as an innovative method synthesis of nanoparticles. In the present study, we have reported the synthesis of Cerium oxide nanoparticles (CeO₂ NPs) using *Trichoderma viridae* culture filtrate. The nanoparticles were characterized by UV–Visible spectrometry, Xray diffraction (XRD), Scanning electron microscopy (SEM), Fourier transform infrared

Spectrometry (FT-IR) and dynamic light scattering (DLS) analyses. UV–Vis spectral analysis and reveals the formation of CeO₂ NPs and the functional groups present in the fungal filtrate responsible for the synthesis of NPs were analysed by FT -IR. The XRD, SEM and DLS analysis confirmed the cubic structure of CeO₂ NPs, and spherical shape, with the particle size of around 68nm. The high negative zeta potential value and its free radical scavenging activity indicate the stability and potent antioxidant property of the synthesized nanoparticles. The synthesis of CeO₂ NPs utilizing fungi is a simple, cost-effective and green approach and further studies have to carry out to understand its efficacy in preventing oxidative stress-related diseases.



Poster Presentation | PP-050

Antimicrobial, Antimycotoxigenic and Antioxidant Activities of Endophytic *Alternaria Alternata* Isolated from *Catharanthus Roseus* (L.) G. Don.

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Abstract

The present investigation evaluates the antimicrobial, antimycotoxigenic and antioxidant activities of ethyl acetate extract (EA) and bioactive compound of *Alternaria alternata* an endophytic fungus isolated from *Catharanthus roseus* leaves. The isolated fungus *A. alternata* was identified using PCR based 18S rDNA sequence analysis. The bioactive compound was identified by using LC-MS, FT-IR and NMR analysis. Disc diffusion, micro-broth dilution and poisoned food techniques were employed for evaluation of antimicrobial activities. Anti-aflatoxin and anti-fumonisin activities were evaluated using spectrophotometric and spectrophotodensitometric analysis. Antioxidant activity was determined using DPPH radical scavenging assay. The bioactive compound p-Coumaric acid (PC) was identified from the activity guided ethyl acetate extract. Both ethyl acetate extract and bioactive compound showed concentration-dependent broad spectrum antimicrobial activity against Gram-positive and Gram-negative bacteria, yeasts and fungi including aflatoxin B₁ producing *Aspergillus flavus* and fumonisin B₁ producing *Fusarium verticillioides* with MIC values ranged between 8.0-500 µg/ mL. A negative correlation was observed between extracts and production of AFB₁, FB₁ and ergosterol. The AFB₁ and FB₁ production was completely inhibited in vitro by PC at 200 µg/mL. The EA also showed significant antioxidant activity with IC₅₀ 100 µg/mL. The present study confirms that EA and PC showed significant antimicrobial, antimycotoxigenic and antioxidant activities, hence they could be explored for preventing microbial deterioration and mycotoxin contaminations after toxicological study.

Keywords *Alternaria alternata*, endophytic fungi, p-Coumaric acid, antimicrobial activity, antimycotoxigenic activity, antioxidant activity, bioactive compounds.



Poster Presentation | PP-051

Development of Paper Based Sensors for Detection of Arsenic in Underground Water Samples

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Abstract

The development of a cost-effective, user friendly methodology for onsite real-time monitoring of metal ions is the aim of this proposed work. So we preferred to go for antibodies for the detection of arsenic as they are highly specific and get easily conjugated with the gold nanoparticles. This conjugate can be used for construction of a dipstick strip sensor, based on technique of competitive ELISA for the real-time analysis of arsenic contaminated water samples. Production of antibodies against ground water contaminant, Arsenic.

Keywords: Arsenic, gold nanoparticles, groundwater, competitive ELISA, biosensor



Poster Presentation | PP-052

Processing of TiB_2/B_4C Particulate Reinforced Aluminium-Copper Metal Matrix Composite by Stir Casting

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Abstract

The control of a homogeneous distribution of the reinforcing phase in aluminum matrix composites is the main issue during the synthesis of this kind of material. In this work, Al-4.5wt%Cu composites reinforced with Boron Carbide (B_4C) were produced by stir casting. The B_4C is the third hardest ceramic materials next to diamond and cubic boron nitride having a melting point of around $2450^\circ C$ with rombohedral crystal structure and high resistance to chemical attack. In the present investigation, Al-4.5wt%Cu alloy is used as matrix by stir casting process to produce composite. Stir casting technique is gaining importance due to its easy setup, low cost, uniform dispersion of reinforcement compare to other techniques. Metal Matrix Composite (MMC) is stir casted by incorporation of B_4C reinforcements to investigate mechanical properties. The B_4C is coated with TiB_2 via sol-gel process and reinforced in Al-4.5wt%Cu alloy matrix to produce composites. It was observed that the hardness and tensile strength of alloy and composites increases with increases in percentage of reinforcement. The amount of porosity increased with increasing the percentage of B_4C reinforcements. Microstructural characterization studies performed on the different compositions of composite prepared shows a uniform distribution of B_4C particles at microscopic scale with good bonding between matrix and reinforcement.

Keywords: MMC, Boron carbide, hardness, microstructural analysis.



Poster Presentation | PP-053

A Review on the Effect of Hardness, Strength, and Microstructure of Al-Alloy(T6-6061) Reinforced with Nano/Micro Ceramic Particulates Based Metal Matrix Composites (NMMC'S)

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Abstract

This paper involves the Mechanical property Evaluation of Al- Alloy (T6-6061) reinforced with Nano Ceramic Particulates (ZrO_2) subjected to forging process. The standard Aluminum alloy ingots/blocks is melted and superheated in the electrical resistance furnace for about 8 hours at 750^0 C. The superheated melt was reinforced with zirconium dioxide particulates by varying weight percentages in 3, 6 and 9 percent. The molten metal mixture was poured in a metal die of cylindrical shape having dimensions 300mm length and 20mm diameter and allowed to solidify at ambient temperature, the sample were subjected to hand forging process. The microstructural characterization of forged composite specimen exhibits more or less uniform distribution of ZrO_2 particulates. The grain structure with spherical morphology of secondary magnesium and silicon phase in the Aluminum matrix whereas the unforged composite sample indicates coarse with dendrite type morphology. The strength results in terms of forged composite specimen reveals significant improvement in the tensile strength over the unforged composite specimen due to refined grain structure. The hardness result also reveals significant improvement in the forged and reinforced samples over the matrix alloy.



Poster Presentation | PP-054

Comparative Analysis of Phytoconstituents in *Moringa Oleifera* leaves and Bark

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Abstract

Methicillin Resistant *Staphylococcus aureus* (MRSA) (“Superbug”) is classified under the category “Serious Threats” by CDC. The prevalence of MRSA ranges from 23.3% to 73% throughout the world. The incidence of MRSA varies from 25% in Western India to 50% in South India. The scarcity of new antimicrobials active against these drug resistant bacteria propels the urgent need to search for novel antibiotics. *Moringa oleifera* plant is well known for its various medicinal properties and is rich in minerals and phytochemicals.

This study was focused to screen the phytoconstituents present in *Moringa oleifera* leaves and bark.

The results from our experiments showed the presence of Flavonoids in Methanolic extracts of both *M. oleifera* leaves and bark. Presence of Phenols was observed only in Ethanolic extracts of *M. oleifera* bark. Alkaloids were present in Ethanolic extracts of both *M. oleifera* leaves and bark but only in the Methanolic extracts of *M. oleifera* bark. As per the quantitative estimation, the total flavonoid content in Methanolic extracts of *M. oleifera* leaves (306.75 mg/ml) was more than in *M. oleifera* bark (127.25 mg/ml). The total phenol content in Ethanolic extracts of *M. oleifera* bark was 91.6 mg/ml.

The results of this study can be further analysed to isolate the phytoconstituents from the plant extracts and screen the anti-MRSA potentials of the isolated phytoconstituents. These results can thus lead to the development of novel therapeutic agents which might be able to control or cure the infections caused by MRSA.

Keywords: MRSA, *Moringa oleifera*, Flavonoids, Alkaloids, Pheno



Poster Presentation | PP-055

Review Paper on Materials Used in Microbial Fuel Cell for Sustainable Development

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Abstract

Sustainable development leads to sustainable society & renewable energy is the part of sustainable development, one amongst renewable resource is the microbial fuel cell. Microbial fuel cell is a promising technology in conversion of waste to energy, providing green environment. It uses bacteria as the catalyst to oxidize organic and inorganic matter present in the waste water to generate electricity, novel technology for waste water treatment along with energy recovery. Cost of the Microbial fuel cell is dependent on the materials used. Selection of material for energy generation which provides improved stability, immobilization of catalysts, materials that increase the conductivity, surface area of the electrodes and materials that aid facile mass transport is important. This paper highlights various types of materials, progress of the material improved the performance of Microbial fuel cell is discussed. It is understood that the carbon based materials give great performance like carbon, graphite, graphene etc.

Keywords- Microbial fuel cell, Electrode materials, Carbon, Graphite, Graphene;



Poster Presentation | PP-056

Synthesis of Perovskite Structure of Bismuth Ferrite Nanoparticles and its Photocatalytic and Sensing Applications.

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In the current work, Gadolinium (Gd^{3+}) substituted bismuth ferrite ($BiFeO_3$) nanoparticles were synthesized via sol-gel method. To investigate the effect of Gd^{3+} substituent on structural, optical and surface properties of Gd^{3+} substituted $BiFeO_3$ nanoparticles were characterized by various physico-chemical techniques. Compared to bare $BiFeO_3$, the Gd^{3+} substituted $BiFeO_3$ nanoparticles showed better long-range ordering, smaller pore diameter, higher porosity and red shift of the band gap. These characteristics led to an amended photocatalytic activity, when Gd^{3+} substituted and pure $BiFeO_3$ nanoparticles were subjected for photodegradation of organic dyes. And also enhanced bio-sensing property of $BiFeO_3$ materials during the detection of uric acid by cyclic voltammogram technique was noted.

Keywords: Perovskite, Bismuth ferrite, Optical band gap, Sol-gel method.



Integrated Waste Management through Symbiotic Macro Culture

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Abstract

Unsegregated heterogeneous mass of solid waste is a potential threat towards the safe processing and disposal of municipal solid waste (MSW), which is cumbersome and ancillary, elevates the expenditure. The absence of any pertinent technique to handle these bulky mass in an eco-friendly way makes it even more hectic for the MSW processing plants. But, this substantial mass constitutes a huge potential, which can be valorized through the larval digestion of a symbiotic macro culture, to create new economic niches for small-scale entrepreneurship in developing and under-developed nations. The present study incorporates a symbiotic waste reduction system with the efficient functionalism of micro and macro conversion agents which is attributed to the synthesis of waste derived co-products from the same platform. This study is solely a novel approach, which is capable of addressing a wide fraction of solid waste, domestic sewage, and bio-leachate and converts them into value-added co-products within the magnificent period of time. Multiple experiments have been conducted under the controlled feeding environment with an established symbiosis between the BSF larvae, Wax Moth larvae (*Galleria melonella*), Laboratory Fly (*Megaselia scalaris*) and Effective Microorganism (EM) culture. An initiation period of 5 days was allocated for the macro conversion agents and during the tenure, the larvae were supplied with synthetic diet to accelerate the body growth index. The entire experiments have been conducted in a newly formulated novel bioreactor namely, Integral Larval Grub Composting Reactor (ILGCR) which is capable of performing automated pupal segregation and addresses solid and liquid waste under a single platform. The system enforces the zero liquid discharge concept and also helps in an indirect suppression of house fly growth. The novel approach only required 14-16 days in order to convert the solid waste into nutrient-rich manure, having significantly high-quality component. The operation has been executed in a number of batch processes and each process valorized a quantity of approx 30 kg of heterogeneous mass. The targeted larval period has been prolonged by means of maintaining higher moisture content with the help of sewage supply and once the maturation period arrives the further addition of moisture has been restricted for 3 days. The barely degradable fraction of MSW was valorized utilizing the potential of the *Megaselia scalaris* as a readily available scavenger an underrated creature in all possible scenarios. The capability of the laboratory flies in terms of discarding the hardly degradable matter yet to be explored and nurtured. Thus, the present study tried to emphasize the capability of the laboratory flies to minimize the scientific disposal issues associated with the barely degradable matter, often ranging approximately 7% in Indian MSW. Initially, experiments were conducted in prototype bins using the thermopile variety of this mutant fly, which is predominant in the Indian subcontinent. The feeding process yielded an optimal weight reduction of 35% over the period of 11 days subjected to the environmental conditions. Moreover, the greater consumption rates, compatibility of the coffin fly larvae with the MSW ambiance and ability to develop symbiotism with other larval varieties established it as one of the most pertinent species for heavy fraction stabilization of



MSW. Overall it's an ultimate and wholesome biological waste management technique, which is capable of standing solely to strengthen the sustainable waste management strategy. Besides waste management the larvae of *Hermetia illucens*, colloquially known as Black Soldier Fly (BSF) pose an enormous potential for small-scale entrepreneurship, especially for economically backward nations. Engaging these avid eaters in frugal application towards the societal benefit can open a new dimension to explore feasible business opportunities and mitigate unemployment issues. The present study also tried to emphasize the various possible end applications of the BSF larvae in a holistic and wholesome way. The prime advantage of dealing with these larvae incorporates the minimization of the threat associated with the mortality rates, due to the ancillary applications of the dead larvae towards the nutri-culture industry and production of alternative fuel. Furthermore, the nutrient-rich compost formation due to the larval digestion activity on the municipal organic waste (MOW) fraction creates a new entrepreneurial niche for lower and middle-income nations. Ultimately, the research yields synthesis of primarily four major end products in terms of compost, bio-diesel, fish meal cake, and refuse derived fuel (RDF). Initially, the larvae were employed for the degradation and stabilization of MOW and the product of stabilization was further analyzed and identified as compost as per the Fertilizer Control Order (FCO) 1985. The departed counts have further compressed by means of compaction machine with capacity 3000 kN and body fluid was segregated. The crude liquid was purified using centrifugation and successively followed by Soxhlet extraction. Subsequently, the separated bottom sludge has been blended with the crushed body skeleton of the larvae and turned into protein-rich fish meal cake. Thus, it's evident to state that besides substantial societal benefits BSF poses magnificent potential to be explored by the entrepreneurial venture.

Keywords: Compost, Fish meal cake, *Galleria melonella*, *Hermetia illucens*, *Megaselia scalaris*, Leachate, Poultry meal, Plastic waste, Solid waste, Wastewater





Poster Presentation | PP-058

Rapid and Cost-effective Stabilisation of Hexavalent Chromium in Industrial Waste

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Abstract

A wide range of industrial operations yield numerous undesired by-products, majorly hazardous in nature. Industrial processes such as metallurgical extraction, tannery operations, textile preparation, dyeing, pigmentation, thermal power production, steel processing etc. primarily generate persistent pollutants such as Chromium, which are potential threats to the environment and human health. Chromium is one of the common heavy metals, which is present in many industrial wastes. Presently, safe, scientific, rapid, and cost-effective management of Chromium is a major challenge in developing countries including India, due to the rampant boom in the waste management sector. Hence this research work focuses on the investigation and identification of a novel agent to stabilize Chromium. The contaminated dry alkaline soil (pH: 10.36) from Sukinda Mines, Orissa was utilized as the source of Chromium. Unlike traditional stabilization, lowering of sample pH was not necessary. The initial concentration of hexavalent chromium (Cr^{6+}) was 101.11 mg/L, which was almost 200 times higher than the concentration set in the regulatory guidelines (<0.5 mg/L) for safe landfill disposal. In this study, we investigated the feasibility of employing sodium thiosulfate as an alternative, reliable, and cost-effective stabilizer for Chromium. Chromium-contaminated soil samples of 25 gm each were comprehensively dosed with 1.25, 2.50, 3.75, and 5.0 gm of sodium thiosulfate ($\text{Na}_2\text{S}_2\text{O}_3$) and 5 ml of water. The wet cake was left undisturbed for an hour and then mixed with 0.25 gm (1% of sample weight) of lime and 7.5 gm (30% of sample weight) of fly ash to extrapolate binding characteristics. The novel binder was assessed in terms of irreversibility and longevity from the landfill perspective. Water leachability test (WLT) was performed on a regular basis over a period of one month to ensure the aforementioned characteristics of the binder. The ultimate concentration of Chromium was analyzed using UV-Vis spectrophotometer (UV 3000) at 456 nm and 540 nm. All the test samples portrayed positive outcomes. The Chromium concentration values were ranging between 0.35 and 0.02 mg/L for 1.25 and 5.0 gm dosage respectively. Considering the regulatory requirement and associated expenditure, 5% was concluded as the most pertinent dosage of $\text{Na}_2\text{S}_2\text{O}_3$.

Keywords: Hazardous Waste, Hexavalent Chromium, Industrial waste, Sodium Thiosulfate, Stabilization, Water Leachability



Poster Presentation | PP-059

Challenges and Prospects in Using Renewable Energy Systems for Minimizing Environmental Impact: A Case of Masdar City, Abu Dhabi

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Abstract

Rapid urbanisation has triggered global warming to an alarming extent. This can be attributed to the hasty measures adopted by countries around the world, to counter disproportionate migration to cities. Statistics show that cities alone contribute 70% of world's greenhouse gas output. Thus, the need to build the model "green city of the future" is high on every country's agenda.

The Paris Agreement and the UN Sustainable Development Goals for 2030 aim to limit the increase in global temperature to 1.5°C. To achieve this, every country has to revisit its city's growth model. Further, the depleting reserves of fossil fuels stresses the need to look for renewable resources. A Smart City strategically aims at using the technologies to identify and mobilise renewable energy sources and achieve resource self-sufficiency. With mounting concerns over global warming and exploding urban populations, the race to design and build the model "green city of the future" is on full throttle.

Masdar city project, underway since 2007, is one such proposal. Located in the desert near Abu Dhabi, it is planned as one of world's first completely sustainable, environment friendly, communities. It combines renewable energy sources, efficient resource usage of traditional Arabian design and spectacular architectural elements. Although Masdar had idealistic environmental goals, it is facing many challenges. The paper aims to assess the challenges in adopting renewable energy sources in making of a brand new "zero carbon city", like Masdar, to learn lessons and emulate the ideas and innovations of such cities by other countries.



Poster Presentation | PP-060

Optimization of Cutting Parameters in Drilling of Aluminium Hybrid Composite by Using TAGUCHI AND GRA

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Abstract

In aluminum matrix composites presence of hard particles inside the matrix which causes tool wear, poor surface finish and high cutting forces while machining. This paper discusses the influence of Silicon carbide and boron carbide particles and cutting parameters on drilling characteristics of aluminum hybrid composites (AHCs)-Al6063/Al₂O₃ and Al6063/3% SiC / 3% B₄C. The composites were fabricated using stir casting method. The number of drilling experiments were designed by Taguchi L16 orthogonal array. Experiments were conducted with TiN coated carbide tools and commercial carbide tools at various cutting speeds, feeds and work pieces. MRR and surface roughness of the drilled hole was investigated with special attention paid to the effects of boron carbide and silicon carbide particles. From GRA the most influencing parameters are cutting speed, work piece, feed, tool respectively. The contributions of input parameters on individual response are identified by ANOVA.

From ANOVA surface roughness and material removal rate, are mostly affected by cutting speeds, depth of cut.

It is also find the optimal process parameters to achieve economical manufacturing of Aluminium Hybrid Composite by using GRA and ANOVA.

Key words: CNC drilling, Al6063, TAGUCHI, GRA.



Poster Presentation | PP-061

Ecological Assessment of Basundhra River before commencement of Siarmal Open Cast Coal Mining Project, Odisha

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Abstract

Present study was aimed to assess the present ecological status of Basundhra River and its adjoining canals in the buffer area of proposed Siarmal OCP (MCL), Odisha. During the present study, information pertaining to the diversity and distribution of plankton, benthos, amphibians, fishes and macrophytes were collected between August, 2018 to October, 2018 from 11 selected sites of Basundhra River and other water bodies situated in the buffer zone of Siarmal OCP. Among plankton, a total of 99 species of Phytoplankton and 77 species of Zooplankton were recorded from the different sampling sites.

Phytoplankton population were composed of Chlorophyceae (36 species and 37%), Bascillariophyceae (30 species and 30%), Cyanophyceae (24 species and 24%), and Euglenophyceae (9 species and 9%). Protozoa (12 species and 16%), Rotifera (32 species and 42%), Cladocera (18 species and 23%), Copepoda (11 species and 14%), and Ostrachoda (4 species and 5%) were the different contributor groups of Zooplankton.

Among benthic fauna (macro-invertebrate), the class Insecta and Mollusca contributed 30 and 18 species respectively. 37 species of aquatic vegetation (macrophytes) and 25 fish fauna were documented from the study area of present investigation.

Physico-chemical properties of water of Basundhra River and other water bodies reveal the alkaline nature of surface waters and the quality of water was found to be good as per BIS standards. Also, the water of Basundhra River and other water bodies is good and healthy for fishes and other aquatic flora-fauna. Higher anthropogenic activities observed at some sites which were located near the human settlement.

The slop of the proposed Siarmal coal mining project area is towards the Basundhra River. The runoff from the project area can be a major cause for the water quality deterioration of Basundhra River after fully commencement of Siarmal project and its associated activities. Before starting the project, an extensive catchment treatment/ catchment management plan needs to be prepared to protect the all fresh water bodies situated in the buffer area of the project along with its biotic components.

Key Words: Plankton, Benthos, Fishes, Water Quality, Basundhra River, Coal Mining,



Poster Presentation | PP-062

Use of Climber based Vertical Greenery System to Control the Fugitive Dust in Indian Coal Mines

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Abstract

Coal mining activities result in generation of fugitive dust which adversely affect the environment. Dust control is a major challenge for coal mining industry. Most of the dust generating sources in coal mines is open to the air and engineering control system may not be very effective. The concept of vertical greenery system has been designed to reduce the dust generated from various mining and associated activities.

Vertical Greenery System (VGS) is old concept to grow the useful and beneficial climbers species but the concept have been modified with a scientific reason with an intention to use it in the open areas for dust control. Present concept of VGS is to grow suitable and sustainable climber species on an artificial vertical frame. The development of VGS is also useful nearby the human settlement, Colonies, Schools, and Hospitals etc.

For the successful establishment of VGS, selection of native, perennial and woody climber species can play a vital role in the different areas of coal mines etc. Fruits/seeds bearing climber has more significant for VGS as they help in the regeneration of saplings at the place in natural condition.

Drilling, blasting, loading, unloading, haulage of materials are the major source of fugitive dust generation in coal mining areas. Loose materials lying on the road surface become air borne due to action of wind or mechanical turbulence created by the vehicular movements. Coal and overburden dumps also contribute to fugitive dust due to wind erosion.

Due to limitation of various control measures at source level, it is proposed to introduce Vertical Greenery System (VGS) to reduce the generation of dust at source level and to arrest them after becoming air borne. VGS system can acts a dust filter to remove the air borne dust from moving in the down wind direction. VGS is quite effective for ground based sources during stable atmospheric conditions.

Present VGS model has been accepted by MoEF&CC to fugitive dust control in Indian Coal Mines. MoEF&CC recommended through a special condition in Environmental Clearance (EC) to the several coal production companies of CIL to apply the same in the mining areas. Present design is being developed by Mahanadi Coalfield Limited, Orissa and South Eastern Coalfield Limited, Bilaspur (Chhattisgarh).

Keywords: Vertical Greenery System (VGS), Dust control, Climbing Plants, Air pollution



Poster Presentation | PP-063

Macroinvertebrate Diversity of Tawa River, Hoshangabad, M.P. with special reference to Sand Mining

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Abstract

Present study has been conducted to check the macro-invertebrates fauna present in a 40 KM long stretch of Tawa River from Tawa Dam to its confluence at Narmada River near Bandrabanof Hoshangabad District, Madhya Pradesh. Tawa River is one of the major tributary of the holy River Narmada.

During the present investigation, total 63 species of macro-invertebrates were recorded from the different selected sites of Tawa River. Out of 63 macro-invertebrates, 31 species were from class mollusca while remaining 32 were individuals of different groups of class Insecta.

Irregular sand mining of river bed of Tawa river is a major cause of habitat destruction of small animals especially habitat of small fishes and their breeding grounds. Among all the 8 selected sites at the different location, maximum diversity of macro-invertebrates was recorded at site-5 (Anchalkheda Bridge) due to the existence of natural and perennial habitat. The site has large number of aquatic vegetation which provides food and shelter to the all kind of macro-invertebrate fauna to complete their life cycle. Very less number of macro-invertebrate population were recorded from the site-7 (Near Ghanabad of Bandraban) due to the continuous sand mining activities which disturbed and damage the natural habitat of small aquatic life. High accumulation of sand at the site restricts to the small faunal species of to grow in the riverine ecosystem. Unavailability of water due to huge accumulation of sand at site-7 was observed as a significant reason to restrict the diversity and density of macro-invertebrates.

Key Words: Insects, Mollusca, Tawa River, Sand mining



Poster Presentation | PP-064

Prevalance and Spread of Antimicrobial Resistance Through Wastewater Treatment Process

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Abstract

Antimicrobial Resistance has been described as one of the major threats to individual and population health. Statistics suggests that we may have to restrict the use of antibiotics as far as possible to ensure their continued effectiveness. Antimicrobial resistance (AMR) is the ability of a microorganism (like Bacteria, viruses etc.) to stop an antimicrobial (such as antibiotics) from working against it. Wastewater treatment plants have been recognized as hotspots for antibiotic resistant genes and antibiotic resistant bacteria which enter the environment. However, the persistence of these genes and bacteria in the ecosystem remains poorly understood. Therefore, the current study aims to provide a comprehensive analysis of AMR bacteria present in the influent and effluent during a vermifiltration process. Vermifiltration is a traditional biochemical method for treating organic waste through the joint action of earthworms and microorganism. The study includes isolation, identification and characterization of different antibiotic resistance bacteria present in the influent and effluent after Vermifiltration situated in Dr. B. Lal Institute of Biotechnology, Jaipur. Further AMR pattern was studied through Disc Diffusion Method. The results revealed that some of the isolates showed a zone of inhibition against known antibiotics such as Cephalosporin, Penicillin, Quinolone, Aminoglycoside, Macrolide, Tetracycline, etc., which is alarming and need to be removed. The present study demonstrates that fewer species show significant increase in resistance to several commonly used antimicrobial agents. The results suggest reconsideration of the empiric use of these antimicrobial drugs for the treatment of various diseases. A high level of antibiotic resistance bacteria is present in the effluents which can be a big health hazard to the human being. Further study is required to treat the effluent by disinfection based system.

Keywords: Antibiotics, Antimicrobial Resistance, Disc Diffusion Method, Vermifiltration.



Molluscan diversity of some Freshwater Ecosystem of Bhopal District, India

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Abstract

Mollusc population has the great importance in the freshwater ecosystem among all the invertebrates. The freshwater molluscs play an important role in aquatic ecosystems and some of them are edible providing food for many fish species and other vertebrates. Species like *Bellamyia bengalensis*, *Pila globosa* and *Lamellidens marginalis* are proven food for man also. While, some molluscan species such as *Lamellidens marginalis* and *Lamellidens corrianus* have also been used to produce pearls in some parts of India.

Numerous works on the aquatic ecology has been conducted to study the biota and their ecology of water bodies situated in the Bhopal district. But, only few works has been conducted pertaining to study the mollusc and their ecology in only few selected water bodies of Bhopal district.

An extensive investigation was framed and conducted to assess the diversity of mollusc present in various freshwater bodies situated in different locations of Bhopal district. Present study has been conducted on a total of 7 water bodies namely Kerwa Dam, Upper Lake, Kaliyasot Dam, Lower Lake, Shahpura Lake, Hathaikheda Dam, Sarangpani Pond and one pond (BU pond) situated in the Barkatullah University campus.

During the present study, total 51 molluscan species were recorded from the all selected freshwater habitat. The maximum diversity of mollusc (33 species) was recorded from Upper Lake while minimum of 11 species were documented from the pond situated in the Barkatullah University campus (BU pond). Random method was adopted for the collection of individuals of mollusc from littoral zone of selected water bodies. Maximum individual of molluscs were collected from the location where emergent or submerged aquatic vegetation were abandonment in all water bodies. The identification of molluscs collected from all the water bodies was carried out up to the species level for their taxonomic and various morphometric characters with the help of available standard taxonomic references.

On the basis of presence of some indicator species, water bodies such as Lower Lake, Shahpura Lake, and Hathaikheda Dam categorized as eutrophic water bodies of Bhopal district. Few locations of Upper Lake and Kerwa Dam also showed higher trophic status due to the higher accumulation of organic wastes and direct mixing of domestic wastes & sewage etc.

Key Words: Mollusca, Littoral zone, Trophic status, Aquatic vegetation.



Poster Presentation | PP-066

Avian Faunal Diversity in Urban Ecosystem of Ranchi, Jharkhand

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Abstract

Present study has been conducted in the Ranchi city of Jharkhand. The avifaunal diversity of CMPDI campus and Kanke dam has been studied to prepare a primary report on available avian fauna in this area of Ranchi city.

CMPDI campus and the Kanke dam are adjacent to each other. CMPDI Campus has got well-protected by greenery whereas Kanke dam is a potential source food for bird's species in this area which also provides shelter to the birds as well. Kanke dam is a eutrophic water body. The dam waters have several major and minor fishes along with the divers group of insect fauna on which mostly bird's species prefer to feed on them.

CMPDI campus provides a mosaic of habitat for more than 23 bird species whereas, Kane dam also provides shelter to the 25 birds species along with the water and food. CMPDI campus is preferred for nesting by the local resident avifauna, whereas Kanke dam area is preferred by local as well as large number of migrant species for nesting, feeding, roosting and wintering habitats.

During the present study period, a total of 34 species of birds belonging to 21 families have been recorded and identified from the study area. Out of 34 avian faunal species, 4 species (12%) belongs to Columbidae, 3 species (9%) to Motacillidae; 2 species (6%) each to Sturnidae, Accipitridae, Ardeidae, Cuculidae, Muscicapidae, Corvidae, Phasianidae and Nectariniidae; and 1 specie (3%) each to Acrocephalidae, Anatidae, Dicruridae, Passeridae, Phalacrocoracidae, Psittaculidae, Pycnonotidae, Paridae, Ploceidae, Tytonidae and Zosteropidae.

As per the IUCN Status, all birds are least concern on account of their ecological importance and sensitivity based upon the global status. Whereas, as per the Wildlife Protection Act, 1972, *Aquila chrysaetos* (Golden eagle) and *Milvus migrans* (Black kite) were the only species which comes under the Schedule-I category. The schedule status of these two birds showed high risk of their ecological status and they need to be conserve. Special attention is required to assess the effects of rapid urbanization on avian abundance, distribution and breeding success in urban environments. The ecological threats on avian fauna in urban areas must be identify and an extensive conservation plan to be prepared accordingly.

Key Words: Avian fauna, CMPDI campus, Kanke dam, Urbanization.



Characterisation of Biodiesel from Simarouba Oil and Optimization of Reaction Parameters for Maximising the Yield

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Abstract

Petroleum products are the main forms of the energy consumed worldwide other than nuclear and hydroelectricity sources. It is well known that these sources are limited and will exhaust in near future. India imports about 80% of its petroleum products from the Gulf countries that are most of the time under political turmoil. By 2015, this percentage is likely to increase to 85%. Thus for India, like many other nations in the world, national security for energy supply and concern for the environment are the main driving forces for the search of renewable and clean source of energy for the transportation. The ever growing environmental and health hazards associated with diesel fuel necessitates to look for alternative fuel to address all the problems [2]. Bio-fuels are one of the answers to this search. It is quite welcome change that today bio-fuels are being seriously viewed from the multidimensional perspective of depleting fossil fuel resources, environmental, health, and energy security.

In the current work oil is extracted from Simarouba seeds and the feasibility of using Simarouba seed oil as raw material to produce ASTM standard biodiesel is evaluated. Two-step reaction, acid-catalysed esterification followed by alkali-catalysed transesterification, was performed for production of biodiesel. Properties of biodiesel such as kinematic viscosity, flash point, Specific gravity, calorific value etc., are found out. Key reaction parameters in the process of transesterification such as catalyst concentration, alcohol to oil molar ratio, reaction temperature and reaction time are optimized using Taguchi technique so that the yield of the biodiesel is maximised.

Results show that the free fatty acid (FFA) content of Simarouba oil is around 5, in the presence of high FFA content, transesterification could not take place properly and it also results in the soap formation during the water wash, which decreases the final yield of the biodiesel. The oil is neutralised in the presence of concentrated sulphuric acid as a catalyst and methanol as a reactant. The neutralised oil is made to react with suitable quantity of methanol and catalyst NaOH. The reacted product of this second stage is made to settle down under gravity. The lower layer containing the glycerol and other impurities, are separated from the methyl esters. Excess methanol from the methyl esters is removed by distillation and the esters are washed and dried to get pure biodiesel. To maximize the yield of biodiesel Taguchi technique is used to optimize the reaction parameters like methanol to oil ratio, Catalyst concentration, Reaction Temperature, Reaction Time. On the basis of orthogonal array this process is carried out and it gives much reduced variance for the experiments with optimum setting of controlled parameters.

Keywords: Biodiesel, Transesterification, Simarouba Oil, FFA.



Poster Presentation | PP-068

Supercritical water Synthesized of Bi_2MoO_6 Nanoplates/Reduced Graphene Oxide Composite as Anodes for Lithium-Ion Batteries

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Abstract

Metal molybdates have been attracting the attention of researchers due to its potential applications as electrodes in high performance energy storage systems. In this paper we are reporting the synthesis of single phase Bi_2MoO_6 nanosheets/Reduced Graphene Oxide (BMONS/RGO) nano composite by one pot Super critical water (SCW) method. The synthesised BMONS/RGO composite shows single phase orthorhombic crystal structure. Transmission electron microscopy (TEM) analysis revealed good sheet like morphology of as-prepared samples. The results show RGO content had the influence on the electrochemical performance of the electrodes. One-pot synthesis has shown to be a promising method for synthesis of BMONS/RGO nanocomposite.

Keywords: Keywords: Bi_2MoO_6 ; nanoplates; RGO composite; anodes; Lithium-ion batteries



Poster Presentation | PP-069

Synthesis of Silver Nanoparticles Using Neem Gum Extract Under Microwave Irradiation

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Abstract

Silver nanoparticles (AgNPs) were prepared using neem gum extract as a fuel via microwave irradiation method. The AgNPs were characterized with XRD and EDAX studies, the morphologies of the prepared NPs were studied by SEM and TEM analysis. The TEM data revealed that bearing bore quasi-spherical like structure were obtained. Furthermore, *in vitro* studies revealed dose-dependent cytotoxic effects of AgNPs treated MCF-7 cell line. This is the first report on the green synthesis of AgNPs using Neem gum extract under microwave irradiation. Results of the present study indicated that AgNPs exhibited promising cytotoxicity assay.

Keywords: Silver nanoparticles, Neem gum, TEM, Human breast cancer cell lines.



Poster Presentation | PP-070

Discovery and Antiproliferation Activity of Quinoline-Thiadiazol-Amines as Growth Suppressors of Cancer Cell Lines

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Abstract

Synthesis of 5-[2-(1-furan-2-yl)quinolin-4-yl]-1,3,4-thiadiazol-2-amines **4(a-f)** and 5-[2-(1-benzofuran-2-yl)quinolin-4-yl]-1,3,4-thiadiazol-2-amines **7(a-c)** by reacting furan-4-carboxylic acids with thiosemicarbazide. The characterization of synthesized compounds **4(a-f)** and **7(a-c)** done by IR, ¹HNMR, ¹³CNMR and mass spectral study. The predicted molecular docking on human estrogen (breast cancer) (PDBID:3ERT) receptor Schrödinger. GLIDE XP (extra precision) method. And ADMET parameters and cheminformatics properties are also studied. The electrophoretic DNA cleavage studied by using agarose gel method. Further the title compounds were also explored for *in vitro* antiproliferative study on K562 (Chronic myelogenous leukemia), MDA-MB-231 (Breast Cancer), A549 (lung cancer) cell lines employing MTT assay. The results revealed that the compounds **4c**, **4f** and **7c** were effective on MDA-MB-231, A549 and K562 cell lines. Whereas the other derivatives were moderate to less active. Pharmacokinetic parameters are in excellent agreement *in silico* for their drug likeliness behavior, obeying the Lipinski rule of five.

Keywords: Thiadiazole, schrödinger, ADMET, agarose gel method, MDA-MB-231, MTT assay.



Poster Presentation | PP-071

Combustion Method Synthesis of β -SnWO₄: Anode Material for Li-Ion Battery Application and Photo-Catalytic Degradation.

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Abstract

The surge in demand for high dense li-ion battery for potable devises, electric vehicles and other vast application has brought accelerated efforts from past years on li-ion battery. High energy capacity materials are required to keep up the demand.

In this report, we have synthesized β -SnWO₄ by a simple combustion method. The β -SnWO₄ has been characterized by XRD, FT-IR, Raman, SEM, HR-TEM, UV-DRS. The β -SnWO₄ and β -SnWO₄-rGO has been examined as electrode material for Li-ion battery, displays an initial discharge capacity of 1351 mAhg⁻¹ and 1662 mAhg⁻¹ respectively and first discharge shows 716 and 981 mAhg⁻¹ which is about 27% increase in capacity for β -SnWO₄-rGO compared to β -SnWO₄. The retention capacity of β -SnWO₄-rGO from 3C to 0.1 C is much higher than β -SnWO₄.

The β -SnWO₄ shows admirable photocatalytic activity against Rose Bengal and Methylene blue, the rGO composite of β -SnWO₄ displays better photocatalytic activity then bare β -SnWO₄.

Keywords: Combustion, Li-ion battery, anode, β -SnWO₄, Photo-catalytic degradation.



Poster Presentation | PP-072

Variations in MBCin a Pulse Crop Against Organic Fertilization in A Semi-Arid Subtropical Region.

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Abstract

Purpose Intensive agriculture activities in small holder farming systems are declining taken as a whole soil nutrient status. The present study is conducted to compare the soil health and plant growth attributes under pulse crop cultivation among different organic amendments. Recycled waste of pulse crops agrosystem is utilized to determine an optimal sustainable solution for hilly areas. One field experiments were carried out during 2018-2019 seasons, in the Experimental Farm, Faculty of Agriculture, Bundelkhand University, Jhansi, Uttar Pradesh in India.

Randomly blocked design experiment was conducted with chickpea plants, each amended with organic inputs including Control (T1) (no amendment), Vermicompost (T2), Farm yard manure (T3), Kitchen waste (T4) and Cow dung (T5). Soil samples were studied at each growth phase while plant growth attributes were measured at the harvesting stage of the crop. Significantly higher magnitude of soil organic carbon, microbial biomass carbon. The principal component analysis revealed components responsible of the variance in the organically treated soil. The experimental results imply that composting of organic matter could be the most reliable practice to improve soil nutritional quality as well as crop growth for sustainable pulse cropping system in the semi-arid subtropical area.

Keywords: Organic matter. Microbial biomass carbon. Soil enzymes. Pulse crop



Poster Presentation | PP-073

A Review Paper - Study on Green Highways Concept and Implementation Practices

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Abstract

Several infrastructure developmental activities lead to change the natural environment and sometimes it leads to excessive environmental degradation. Poor management of natural resources is already constraining development in some areas and the growing scale of economic activity will pose serious challenges for environmental management. Environmental friendly methods and technologies are essential in today's scenario of global issues such as climate change, global warming, energy depletion and other environmental concerns which have led to the emergence of green concept in India. The policy makers and researchers are strongly believed that the increase of green technologies will result in sustainable societies and economic development.

It is understood from the literature review that the implementation of Green concept in Roads and Highway projects is necessary, as the natural resources lost in the process of Highway construction are restored in such a way. Eco-friendly approaches should be followed from the stage of project planning and designing to its execution. Considering for economic development and environmental sustainability in roads and highways sector, it is necessary to adopt the green concept, implementation practices and challenges. The aim of this paper is to present the approaches of green highways concept, the available green practices, technical aspects and challenges faced in implementing such practices in Indian context.

Keywords: Green highways approach, sustainability practices, implementation challenges



Poster Presentation | PP-074

Synthesis of Silver Nanoparticles Byspodias *Mombin* Fruit Extract by Green Route and Their Photocatalytic Degradation Ofcationic Thiazine Dye.

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Abstract

In this study Silver (Ag NPs) nanoparticles were synthesized by Spondias mombin fruit extract as a reducing agent and aqueous silver nitrate as the precursor. The Ag NPs formation was observed as a color change of the mixture from colorless to dark-brownish by simple, low cost, most reliable green route method using Spondias Mombin fruit extract. The Silver NPs formed were characterized by X-ray diffraction (XRD), Diffuse Reflectance Spectrophotometer (DRS), Fourier-Transform Infrared Spectroscopy (FTIR), Scanning Electron Microscopy (SEM).

The X-ray diffraction pattern confirmed the presence of Ag crystallites, and the average size of the Ag NPs to be 62 nm as calculated by Scherrer formula. Fourier Transform Infrared as well as UV-Vis spectroscopy (DRS) identifies the presence Silver Nanoparticles, Scanning Electron Microscopy show the Spherical morphology of the nanoparticles. The enhanced Photocatalytic activity was performed by degrading Methylene Blue (MB) as a pollutant dye under ultraviolet light irradiation. The Silver nanoparticles showed excellent photodegradation efficiency against the cationic thiazine dye- Methylene Blue.

Keywords: Silver Nanoparticles, Spondias *mombin*, Green route, thiazine dye, Methylene Blue.



Poster Presentation | PP-075

Laser Surface Modification of Leaded bronze for Sustainability

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Abstract

Leaded bronze provides excellent anti friction and anti wear properties for bearing alloys. However lead is considered as an environmentally hazardous material. Lead content in bronze depends on various applications but disposal of waste material from fabrication processes, used bearings and contamination of lubricants can cause serious environmental and health concerns. This calls for surface modification of leaded bronze in order to improve the bearing life for better sustainability. This project work focuses on improving the tribological performance for extension of bearing life.

Laser surface texturing with 10, 15 and 20% density elliptical patterns was performed with power 10 W, scanning speed 250 mm/s and hatch spacing of 0.01 mm on pin specimens using Yb-YAG laser. Roughness and depth of textured specimens were analysed using Mitutoyo surface roughness tester. Friction and wear tests were carried out using pin on disc tribometer with 300, 350 and 400 rpm under dry sliding condition. The microstructure of worn out specimens studied using scanning electron microscope (SEM).

Experimental results showed that lowest friction coefficient of 0.17 was obtained for 20% texture density at 400 rpm with constant load 1 kg and lowest specific wear rate of 2.45E-05 mm³/Nm obtained for 20% texture density at 1 kg load condition with constant speed 450 rpm. From optical images, it can be seen that heat affected zone is formed around the dimples due to the laser with high energy density. SEM images showed that wear particles trapped inside the micro dimples which indicates that wear particles eliminated from the contact interface to reduce friction and wear in sliding regime. The laser modified surface had lower and more stable friction coefficient than untextured surface. 20% texture density was found to be more effective for improving tribological performance and hence bearing life.



Poster Presentation | PP-076

Methanol Sensing by TiO₂ Nanowires at Room Temperature

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Abstract

Nanotechnology is a rapidly expanding area of research with huge potential to revolutionize our lives and to provide technological solutions to the existing problems in different domains including agriculture, environment and medicine. Gas sensors are finding applications in almost all the mentioned areas. Mostly, the resistive sensors are synthesized using metal oxides, which exhibit high sensitivity to gases. In this study, TiO₂ nano wires were synthesized through hydrothermal process at a temperature of 200 °C. The synthesis was carried out for three different durations—24 h, 48 h and 72 h. The crystallographic information and morphologies of the samples were studied using the X-ray diffraction (Rigaku Ultima IV) and field emission scanning electron microscopy (Carl Zeiss, Gemini 300). The sensor samples were prepared by dissolving the materials in ethanol with a concentration of 10 mg/ml and then dropcasting these on gold interdigitated electrodes patterned on ceramic substrate. The sensors were then probed into the sensing test setup and was exposed to synthetic air for 1 h. All the TiO₂ nanowires samples were exposed to six different concentrations of methanol (1000 ppm to 10000 ppm) at room temperature. The sensors TiO₂ 24 h, TiO₂ 48 h and TiO₂ 72 h exhibited responses of 4% to 25%, 6% to 23% and 5% to 12%, respectively for above mentioned concentration ranges. The TiO₂ 24 h, TiO₂ 48 h and TiO₂ 72 h showed the response times of 39 s, 17 s and 16 s and recovery times of 170 s, 17 s and 12 s, respectively for 10000 ppm of methanol at room temperature.

Keywords: Nanotechnology, Methanol sensors, Hydrothermal method, TiO₂ sensors.



Poster Presentation | PP-077

***In vitro* Study of Antibacterial Activity of Extract fruits of *Artocarpus gomezianus* against Gram Positive and Negative Bacterial Strains**

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Abstract:

In this study Methanolic and aqueous extract of fruits of *Artocarpus gomezianus*, was studied for its antibacterial activity. Antibacterial activity of leaf and root extracts was assessed against *Staphylococcus aureus*, *Escherichia coli*, *Pseudomonas aeruginosa*, *Bacillus subtilis* and *Klebsiella pneumonia* by disc diffusion method. Methanolic extract was showed the maximum zone of inhibition for all test organisms than the aqueous extract. According to observations of methanolic extract of 50 μ l/ml concentration 14.4mm, 15.2mm, 14.3mm, 9.1mm and 11.0mm zones of inhibition and for concentration of 100 μ l/ml 21.5mm, 23.1mm, 16.1mm, 15.0mm, 13.0mm zones of inhibition were formed against *Staphylococcus aureus*, *Escherichia coli*, *Pseudomonas aeruginosa*, *Bacillus subtilis* and *Klebsiella pneumonia* respectively. 100 μ l/ml concentration showed maximum zone of inhibition against all test organisms for methanolic extracts. All the bacteria were more susceptible to methanolic extracts than the aqueous extract.



Poster Presentation | PP-078

A Case Study On Rain Water Harvesting at Yamuna Block, National Games Village, Kormangala, Bengaluru

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Abstract

At the rate in which Indian population is increasing, it is said that India will surely replace China from its number 1 position of most densely populated country of the world after 20-30 years. These will lead to high rate of consumption of most valuable natural resource i.e Water resulting in augmentation of pressures on the permitted freshwater resources. Ancient method of damming river and transporting water to urban area has its own issues of eternal troubles of social and political. In order to conserve and meet our daily demand of water requirement, we need to think for alternative cost effective and relatively easier technological methods of conserving water. Rain water harvesting is one of the best methods fulfilling those requirements.

In the present study the rain water harvesting project at Yamuna block, National games Village, Kormangala, Bengaluru was conducted in two phases, and the water quality analysis of samples and the results are compared with the Bureau of Indian Standards (BIS). It can be concluded from above findings that rainwater, if conserved and utilized using the rainwater harvesting technology, can be an effective tool of replenishing ground water resources.

Keywords: Rainwater Harvesting, Consumption, Conservation



Poster Presentation | PP-079

Coating of CNT On polyimide sheet Using Spray Pyrolysis for Space Application

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Abstract

The space environment nurtures many challenges for new materials growth to overcome from hazards in space which includes solar radiation, vacuum, energetic particles and space plasma, highly reactive atomic oxygen (AO) in low earth orbits (LEO). To overcome from these problems space durable polyimide based materials and Nanocomposites can be used. Bulk Atomic oxygen durability can be enhanced through incorporation of CVD grown carbon nanotubes (CNT) using spray pyrolysis and CNT agglomeration and degradation which are common in dispersion based processes. In this present work we have successfully synthesized CNT dispersion using SDS surfactant and fabricated films by spray pyrolysis and confirmed by various techniques such as Raman Spectroscopy in order to detect the presence of CNT and Transmittance, Reflectance, absorptance, Emittance and sheet resistance. The adhesion test was carried by adhesive scotch tape (3M-250, USA). Enhancement in conductivity was observed which can be attributed to the coating of CNT onto polyimide surface. Nevertheless, the poor adhesion between CNT and polyimide surface will be addressed in further experiments.

Keywords: Carbon Nanotubes, Supercritical Fluid Process, Spray Pyrolysis.



Poster Presentation | PP-080

Solid Waste Management at Dr. B. Lal Institute of Biotechnology

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Abstract

Municipal solid waste management (MSWM) is one of the major environmental problems of Indian cities. Improper municipal solid waste management causes hazards to inhabitants. Various studies reveal that about 90% of MSW is disposed-off unscientifically in open dumps and landfills; creating problems to public health and the environment (Sharholly et.al., 2008). The aim of this study is to describe the optimization of Waste Minimization/Zero Waste strategies and to present a Zero Waste model in Dr. B. Lal Institute of Biotechnology. Diversion of solid waste material from landfills and converting into some usable products, or processing it into new products, leading to resource recovery was the ultimate aim of the study. During the study, a survey was conducted in the institute to categorize the types of waste generated. This waste includes mostly plastic, paper, food waste, stationary waste and e-waste. To ensure source segregation of waste, color-coded dustbins was proposed. For proper recycling of waste, 18 different recycling industries were contacted out of which 5 were e-waste recyclers, 4 recycled inorganic waste, 4 recycled organic waste, 3 recycled all types of waste, 1 recycled waste furniture. To ensure proper disposal of sanitary napkins, a sanitary napkin incinerator will be installed in the washrooms. For food waste recycling, organic waste composter will be installed. All these measures will reduce environmental footprints favoring Swachh Bharat Abhiyan, hence making the institute a zero waste model. The findings of the study will assist the policy and decision makers to identify priority areas of zero waste strategy in developing the evidence-based zero waste guidelines.

Keywords: Color-coded bins, Solid Waste Management, Swachh Bharat Abhiyan, Zero waste Model.



Poster Presentation | PP-081

Influence of Total Hardness on the Lethal Toxicity of Phenol, Para Chlorophenol and Pentachlorophenol to the Fish *Lepidocephalichthys Guntea*

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Abstract

Phenol and phenolic compounds have several sources including coal, wood distillation, road tars, petroleum refining, chemical and plastics manufacture, domestic sewage discharges, industrial discharges, natural sources such as plant material decay and leaching from coal and oil deposits, they enter the natural water system and affect the fish and other aquatic organisms. Total hardness is one of the physico-chemical factors which alters the toxicity of phenol and phenolic compounds. So the study was done to find the effect of total hardness on the toxicity of phenol, para-chlorophenol and pentachlorophenol to the freshwater fish *Lepidocephalichthys guntea* by static renewal bioassays. The study shows that at total hardness of 30 mg/l as CaCO_3 , the 24, 48, 72 and 96 hours LC_{50} values were 21.0, 19.0, 17.0, and 15.0 mg/l and at total hardness of 100 mg/l as CaCO_3 the LC_{50} values were 29.0, 27.0, 25.0, 23.0 mg/l and at 250 mg/l of total hardness CaCO_3 were 33.0, 31.0, 28.0 and 26.0 mg/l for the fish exposed to phenol. The 24, 48, 72 and 96 hours LC_{50} for the fish exposed to the total hardness of 30 mg/l as CaCO_3 were 9.0, 7.0, 5.0 and 3.0 mg/l and at total hardness of 100 mg/l were 15.0, 12.0, 9.0 and 7.0 mg/l and at 250 mg/l of total hardness were 15.0, 12.0, 9.0 and 7.0 mg/l respectively for the fish exposed to para-chlorophenol. For the fish exposed to pentachlorophenol at total hardness of 30 mg/l as CaCO_3 , the 24, 48, 72 and 96 hours LC_{50} were 0.25, 0.22, 0.20, and 0.17 mg/l and at total hardness of 100 mg/l were 0.37, 0.30, 0.25 and 0.20 mg/l and at 250 mg/l of total hardness the 24, 48, 72 and 96 LC_{50} were 0.50, 0.40, 0.30 and 0.20 mg/l respectively for the said fish.

Keywords: Toxicity, *Lepidocephalichthys guntea*, Phenol, Para-chlorophenol, Pentachlorophenol, Total Hardness.



Synthesis of nano YSZ powders for TBC Applications in Gas Turbine Components

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Abstract

The gas turbine industry is amongst the largest industries in the world today and is expected to see exponential growth during 2019 – 2023. This is due to the ever increasing need for energy and the drop in oil prices. Gas turbines are preferred in the power generation field due to their increasing efficiency and low capital cost. The Asia Pacific region is one of the most profitable markets for gas turbine industry. That being said, research and study into the field to seek further improvement to current technology is imperative to the Indian economy and infrastructure. One of the ways to do this is by inducting nano-materials to the product manufacturing process because they enhance the properties of materials as opposed to their micron grained counterparts. Nano-materials, when used in applications involving bulk products or as coatings provide higher durability, strength and improvement in both thermal and mechanical properties. One such application of nano coatings is thermal barrier coatings (TBCs), widely used in Gas turbine, automobile and aerospace industries.

Yttria Stabilized Zirconia (YSZ) is currently one of the most sought after coating materials used in TBCs. Due to good thermal and mechanical properties it retains the capability to serve up to 1150°C. The state of the art TBCs are synthesized from 20 to 30 microns sized plasma sprayable YSZ grains. This paper highlights the results obtained after synthesis of 6-8 wt.% YSZ nano-powders (30-90 nm) followed by converting them by binder addition into micron – sized plasma sprayable powders via (a) Manual Granulation and (b) Spray Drying process. The synthesis of Nano -YSZ nano powders involving sol-gel method comprised of optimization of many process parameters. The spray drying process to generate agglomerated nano powders resulting in micron sized flowing powders mainly relied on understanding how the slurry and feed composition affected the final product and its flowability for suitability to function as plasma sprayable powders. The nano powders were characterized for grain sizes and chemical composition and flowability of plasma sprayable powders were studied as well. The agglomerated powders were coated on Al-Si alloy substrates by Atmospheric Plasma Spray unit (APS) to obtain 200 microns thick TBCs with well adherent nano grained microstructure. The powders and coatings were characterized for microstructure and chemical composition by Scanning Electron Microscope/Energy Dispersive Spectroscopy (SEM-EDS) and structural phase by X-Ray Diffractometer (XRD). Details of nano-powder synthesis, preparation of plasma sprayable powders and plasma spray coatings from the synthesized powders and the results obtained are discussed in the paper.



Poster Presentation | PP-083

Exogenous Effect of Salicylic Acid on *Euphorbia Hirta* under Water stress

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Abstract

Abiotic stress originates from the surrounding environment of the plant. One of the most important abiotic factors affecting plants is water stress. **Water** is a major abiotic stress limiting the agricultural production of plant *Euphorbia hirta*, to mitigate stress, the effect of salicylic acid on the growth of plant under normal and water deficit conditions were studied to understand the stress tolerance mechanism. **Salicylic acid(SA)**(phenolic phytohormone) has a role in abiotic stress tolerance such as drought tolerance.

Euphorbia hirta, commonly known as Asthamatic plant, was selected to study the exogenous effect of salicylic acid on the plant. selection of seeds was based on physiological characteristics such as root & shoot length. Selected seeds were treated with different combinations of severe and mild drought conditions using salicylic acid. Further, biochemical (ascorbic peroxidase, catalase, superoxide dismutase, guaiacol peroxidase enzyme activities) and physiological parameters (root & shoot length) were observed on theselected five combinations. The results were positive,as the effect of salicylic acid mitigated the water stress and helped the plant to grow in water deficit conditions,when compared to control.

Keywords:- Abiotic stress(water stress), *Euphorbia hirta*, salicylic acid



Poster Presentation | PP-084

NSM Technique – Sustainable Method of Strengthening RC Structures

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Abstract

Deterioration of Concrete structures occurs due to various reasons and hence fail to perform their characteristics. Some of the existing structures need to be upgraded or replaced because they are in poor condition, not only due to deterioration processes, but also due to errors made during design and execution. This sensitivity leads to study on different strengthening methods.

There is a great potential in FRP strengthening to retrofit concrete member owing to its ease construction and high structural capacity compared to other materials. The use of fibre reinforced polymer (FRP) in civil construction applications with near-surface mounted (NSM) method has produced confident strengthening and repairing systems for existing concrete structures.

Hence an effort has been made in reviewing the current research on concrete beams retrofitted by NSM technique. In addition, this review focuses on types of NSM FRP reinforcements used for strengthening, its applications and case studies on strengthening of RC structures is reviewed. Furthermore, the feasibility of NSM technique for strengthening of RC structures is reviewed.



Poster Presentation | PP-085

MnFe₂O₄ Synthesis and Characterization for Mg-Ion Battery Application

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Abstract

Magnesium metal complex oxides are potential electrode materials for magnesium ion batteries with high specific capacities. However, the strong electrostatic interaction between Mg²⁺ and the host lattice due to its divalency induces slow intercalation kinetics of Mg ions within the crystal lattices. Thus, nanocrystalline particles with shortened Mg ion diffusion distance enable the insertion/extraction of Mg ions and improve the specific capacities of the batteries. Herein, we report the Hydrothermal synthesis of crystalline MnFe₂O₄ nanocrystals. The material was characterized with XRD, SEM, TEM and Electrochemical studies. The Crystalline MnFe₂O₄ were controllably synthesized for the first time, which are active materials for magnesium-ion batteries.



Poster Presentation | PP-086

The Development of Eco- Blocks by Using Solid Waste Materials

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Abstract

India is getting buried under mounds of garbage as the country has been generating more than 1.50 lakh metric tonne (MT) of solid waste every day. Worse - approximately 90 per cent (1,35,000 MT per day) of the total amount is collected waste. Nearly 15,000 MT of garbage remain exposed every day, resulting in almost 55 lakh MT of solid waste disposed in open areas each year, which leads to "severe" pollution level. Of the total collected waste, only 20 per cent (27,000 MT per day) is processed and the remaining 80 per cent (1,08,000 MT per day) is dumped in landfill sites. Advances in solid waste management resulted in alternative construction materials as a substitute to traditional materials like bricks, blocks, tiles, aggregates, ceramics, cement, lime, soil, timber and paint.

In present study, the eco-blocks are manufactured by using waste material like fly ash and debris using with cement and coarse aggregate. The materials are optimized by using different combinations, and compressive strength of eco blocks is determined. The compressive strengths of 7, 14 and 28 days are 3.71, 5.8 and 9.10 N/mm² respectively. The strength of eco blocks are equal to or more than standard concrete blocks manufactured by local company. From the study it is found out that solid waste debris can be used in the manufacture of solid blocks. We have taken the initiative to see how debris can be recycled to find an alternative to reduce the cost and the consumption of natural resources and also manage wastes.

Keywords: Eco Blocks, Solid waste, Alternative construction materials.



Poster Presentation | PP-087

Opto-Electrical and Di-Electric Properties of Nano-Doped Liquidcrystals.

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Abstract

In this paper we present the results based on electro-optical and dielectric properties of liquid crystal mixtures, doped with nanoparticles in little concentrations. Nanoparticles have emerged as extremely promising materials to alter and improve the properties of liquid crystals. It is observed that the clearing temperature of doped liquid crystal mixture is increased with increase in concentration of nano particles. The electric field induced by polarized nanoparticles enhances the orientation coupling in a liquid crystal mixture results in increase of clearing temperature. The mixture of liquid crystals influences the molecular orientation of liquid crystal compound consequently affecting their physical properties. We calculate the phase transition temperatures of the samples by Differential Scanning Calorimetry and Thermo Gravimetric Analysis. The di- electric constants and Conductivity will be measured through Precision Impedance Analyser. The Refractive Index of the composite will be measured by Raman spectroscopy/UV-Visible Spectroscopy. The textures of different mesophases of the samples are recorded using Optical Polarizing microscopy. The liquid crystal mixtures show phase transition temperatures and other physical properties which are different from their constituents. Doping of liquid crystal mixture with little concentration has improved the optical, electrical and dielectrical properties of the liquid crystal mixture.

Keywords: Mesophases, Clearing Temperature, Phase Transition Temperature.



Poster Presentation | PP-088

Growth and Characterization of KDP, potassium thiourea bromide and L-tartaric acid doped ammonium dihydrogen phosphate Anisotropic Single crystal

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Abstract

A single crystal or monocrystalline solid material in which the crystal lattice of the entire sample is continuous and unbroken to the edges of the sample, with no grain boundaries. The absence of the defects associated with grain boundaries can give single crystals unique properties particularly mechanical, optical and electrical properties, since these properties in addition in making the single crystal more precious are industrially used in technological applications, especially in optics and electronics. The nonlinear optical properties of single crystals have the potential for combining the high optical nonlinearity and chemical flexibility.

In this project our aim is to obtain an optically transparent single anisotropic crystal and that is used to grown by the method known as solution growth method. The basic condition in growing the crystal is by attaining a state of super saturation and followed by the nucleation process. The solvent used in the solution growth method is DI water due to its high solubility and thermal stability. The advantages of this method is low mechanical and thermal stresses imposed on the growth of crystal. The Supersaturation is a solution that contains more of the dissolved material than could be dissolved by the solvent under normal condition and followed by the Nucleation is the process of generating with a metastable mother-phase. The growth of single crystal characterized by XRD. Thus from the XRD characterization, the obtained optical transparent single crystal is confirmed.

Thus this project describes the growth of single crystal by the solution growth method which is useful in the application of optical communication, laser technology, optical storage technology and electro-optic modulation.



Poster Presentation | PP-089

Planktonic Diversity of Barna Reservoir, Raisen, Madhya Pradesh

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Abstract

Present work was aimed to assess the biodiversity of planktonic biota of Barna wetland which is situated in the central India and has rich planktonic diversity. Barna wetland is one of the clean, healthy and productive water body of tropical India in terms of pollution load. The wetland has only one source of major pollution i.e. agricultural wastes from its adjacent catchment. Barna wetland is most favorite place for several migratory birds due to its shallow depth, availability of aquatic vegetation, abandonment insects and small fishes as source of food etc.

During the present study, a total number of 158 phytoplankton and 96 zooplankton species were recorded and identified. Among phytoplankton, class Bascillariophyceae (51species, 32%) was dominant followed by Chlorophyceae (46 species, 29%), Cyanphyceae (41species, 25%), Euglenophyceae (14 species, 9%), Dinophyceae (6 species,4%) and Xanthophyceae (1 species, 1%) respectively.

Among zooplankton, class Rotifera (47species, 46%) showed its maximum presence followed by Cladocera (21species, 23%), Protozoa (15species, 17%), Copepoda (9 species,10%) and Ostrachoda (4species, 4%) respectively.

Physico-chemical parameters of Barna wetland indicates its alkaline as well as oligotrophic in nature. On the basis of its planktonic flora and fauna this wetland has been categorized as a healthy and productive in nature. Availability of good amount of phytoplankton and zooplankton in the ambient water of Barna wetland is good sign for the activities related to the fisheries.

Key words: Planktonic population, Trophic status, Water chemistry, Barna Wetland.



Poster Presentation | PP-090

The Bacteriological Analysis of the Groundwater Sources at Doddaballapura, Karnataka State

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Abstract

In recent years, an increasing threat to ground water quality due to human activities has become of great importance. In present work bacteriological studies in Doddaballapura, Karnataka state is carried out. Groundwater samples from 5 different bore well locations were collected. Analytical techniques as described in the standard methods for the examination of water and wastewater were adopted for physical-chemical analysis and bacteriological analysis of these samples. The results are compared with the Bureau of Indian Standards (BIS) guideline values for potable water in the light of possible health hazards.

The samples were analyzed for various parameters like: pH, Conductivity, Dissolved Solids, Total Solids, Chloride, Sulphate, Nitrates, Sodium, Total Iron, Calcium, Magnesium, Total Hardness, Fluoride, Bicarbonate, Carbonate, Potassium and Bacteriological test. The analysis of water samples reveals that in the study area, most of the water quality parameters like Total Hardness, Chloride content, exceeds the permissible limits. On the basis of both chemical and bacteriological analysis, the water samples are found to be fit for drinking purpose.



Poster Presentation | PP-091

Structural, Morphological & Photocatalytic Activity of Nickel Oxide Nano Particles Synthesized by Thermal Decomposition Method

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Abstract

Nickel oxide nanoparticles were synthesized by using thermal decomposition method by employing nickel chloride hexahydrate as a precursor. The structural elucidation of synthesized NiO nanoparticle was confirmed by powder X-ray diffraction method and Fourier Transform Infrared spectroscopy. Surface morphology of NiO nanoparticle revealed cubic structure. The optical band gap of NiO nanoparticles were determined by diffuse reflectance spectra and it is found to be 2.36eV. Photocatalytic activity of NiO nanoparticles was carried out against methylene blue dye by variation of different factors such as different catalyst dosage, different dye concentration and different pH.

Keywords: Nickel oxide, Photocatalytic activity, nickel chloride hexahydrate, different catalyst dosage, different dye concentration, different pH.



Poster Presentation | PP-092

Synthesis and characterization of Multiwalled carbon nanotubes by chemical vapor deposition over Calcium carbonate catalyst

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Abstract

Calcium carbonate catalyst was used to synthesize Multiwalled carbon nanotubes. The synthesized multiwall carbon nanotubes structural conformation studies were carried out using powder X-ray diffraction. The plane 002 shows crystallinity of graphite hexagonal carbon structure. The Fourier transform spectroscopy shows the presence of C=C double bond which reveals the presence of MWCNT. The morphological and elemental analyses were done by using Scanning electron microscopy and Energy dispersive X-ray analysis.

Keywords: Multiwall carbon nanotubes, catalyst, spectroscopy, Morphology.



Poster Presentation | PP-093

LC-MS Coupled with Tandem Mass Spectrometry Method for Determination of an Antihypertensive Drug Terazosin Hydrochloride in Human Plasma

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Abstract

Terazosin hydrochloride, an alpha-1-selective adrenoceptor blocking agent, used to treat hypertension. A highly sensitive, selective and validated high-performance liquid chromatography (HPLC) method has been developed for the quantitative determination of terazosin hydrochloride in human CPDA plasma. The analyte and internal standard (IS) candesartan were extracted from human plasma using liquid-liquid extraction technique, then separated on a Thermo Hypersil Keystone Beta basic-9.1 mm, 50 mm, 3 μ m), reverse phase column with a mobile phase comprising of acetonitrile:methanol:0.1% formic (65:20:15 v/v) and column oven temperature was maintained at 40 °C. It was pumped at a flow rate of 0.25 mL/min without splitter with an injection volume of 10 μ L, with a total run time of 2 min. The detection was performed using positive ion mode. Calibration curve for terazosin hydrochloride was linear within the selected range of 0.1 to 20.5 ng/mL in human plasma. LLOQ spiked with IS sample found to be 0.120 ng/mL. The intra- and inter-assay precision and accuracy of the quality control samples, expressed as RSD was less than 2%. This method has been demonstrated to be an improvement over existing methods due to its greater sensitivity, stability and specificity. The data obtained show that the sensitivity and selectivity of this method are adequate for clinical research and pharmacokinetic investigation of terazosin hydrochloride in human plasma.



Interaction of Clopidogrel Bisulphate and Rizatriptan Benzoate with Calf Thymus DNA: An Electrochemical and Spectroscopic Approach

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Abstract

Electrochemical and spectroscopic methods are used as a probe to examine binding properties and binding site of Clopidogrelbisulphate (CLP) an antiplatelet drug and Rizatriptan Benzoate (RTB) an antimigraine drug with calf thymus DNA (CT-DNA), as these drug molecules can modify, inhibit or activate the functionalities of DNA. Cyclic Voltammogram of CLP and RTB in 50mM Tris-HCl/NaCl buffer pH 7.1 showed a stable anodic peak at 1.18 V and 1.31 V respectively. Variation of scan rate over a range 0.05 - 0.3 Vs⁻¹ resulted in increase of peak current proportionally with the root of the scan rate with a minute potential shift indicating a diffusion controlled process. The peak current decreased upon adding increasing concentrations of DNA (1.25×10^{-6} to 5×10^{-6} M), owing to the formation of electroinactive drug-DNA complex. UV absorption titrations with fixed concentration of drug and varying concentrations of CT-DNA demonstrated a stacking Hypochromism. Fluorescence measurements using reverse titrations with increasing quantities of drugs titrated versus EB bound to CT-DNA showed a progressive Hypochromic effect leading to the calculation of Stern Volmer quenching constant. Binding constant (CLP = 2.3×10^2 L/mol and RTB = 0.7×10^{-5} L/mol) and binding site size (CLP = 0.1818 and RTB = 0.23) was evaluated which confirms an interaction between the drug and CT-DNA.

Keywords: Clopidogrelbisulphate; Rizatriptan Benzoate; DNA binding; Cyclic voltammetry; Spectrophotometry



Poster Presentation | PP-095

Long-Term (2001-2018) Variability of Aerosol Optical Thickness and Radiative Effects Over Southeast Asia

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Abstract

The present study utilizes 18 years of long-term (2001-2018) data collected from six active AERONET sites over the Indo-Gangetic Plain (IGP) and the North China Plain (NCP) areas in Southeast Asia. Climatologically, an increasing and decreasing trends were observed over IGP and NCP sites, respectively, with Beijing (Karachi) found exhibiting the highest (lowest) percentage of departures in AOT₄₄₀. The aerosol volume size distribution exhibited bimodal structure, with the dominance of fine- relative to coarse-mode aerosols, except Karachi. We further identified the four major aerosol types that showed the dominance of both biomass burning and urban-industrial followed by mixed types of aerosols. In addition, single scattering albedo (SSA), asymmetry parameter (ASP), and complex aerosol refractive index (RI) showed significant temporal and spectral changes, illustrating the complexity of aerosol types. At last, the annual mean direct aerosol radiative forcing at the top, bottom, and within the atmosphere over all sites were found in the range from -17.36 ± 3.75 to -45.17 ± 4.87 $W m^{-2}$, -64.6 ± 4.86 to -93.7 ± 10.27 $W m^{-2}$, and 40.5 ± 6.43 to 68.25 ± 7.26 $W m^{-2}$, respectively, with an average heating rate of $0.9-2.3$ $K day^{-1}$. Large amount of anthropogenic aerosols showed significant effect of heating (cooling) on the atmosphere (surface) results obviously, increased rates of atmospheric heating.

Keywords: AERONET; Aerosol optical depth; Single scattering albedo; Radiative effect.



Comparative Study of Physicochemical Parameters of Water in Urban and Rural Lakes of Chikkaballapura

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Abstract

Lakes are one of the main water sources for rural and urban lives. Chikkaballapura is one of the dry districts of Karnataka. Present study was conducted during December 2018 - March 2019 to find out the comparison account of the pollution intensity in the urban and rural lakes of Chikkaballapura. To assess the water quality four lakes in Chikkaballapura district viz., Kattamachanahalli, Neelkunta, Gudibande and Kanampalli are selected. The physicochemical parameters are studied- alkalinity, chlorides, calcium, total hardness, magnesium and nitrates are below threshold limits. Dissolved oxygen and Biological oxygen demand have less than the threshold limit which because of the lack of phytoplankton, infusion of the atmospheric air to water because of huge proliferation of the algal blooms, submerged plants and spread of oil on water surface. Kattamachanahalli and Kanampalli rural and urban lake have elevated sulfate level. The amount of CO₂ has less than the threshold limit in all the lakes leads to the diminished growth of the autotrophic organisms.

The current study revealed that instability of the physicochemical parameters in different lakes. In few physicochemical parameters rural lakes are in better condition than urban lakes. Deviations of the physicochemical parameters due to anthropogenic activities, deforestation, usage of chemical fertilizers, pesticides, soil erosion etc. are the main causes of the poor quality of the water. If the status of water is persisted in the same condition will push our mother earth into a great irreversible threat and necessitous status.

Key Words: Physicochemical parameters, Chikkaballapura, Anthropogenic activities.



Poster Presentation | PP-097

Estimation of Fluoride Concentrations in Groundwater Sources in Some Areas of Bellary, Kerala and Tumkur Districts by Spectrophotometric Method

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Abstract

A rapid spectrophotometric method is developed for the determination of fluoride in ground water samples in some areas of Bellary, Kerala and Tumkur districts. The method is based on the decolourising effect of fluoride on phosphomolybdate-thiourea complex in sulphuric acid medium at 790nm. The system obeys Lambert-Beer's law at 790 nm in the concentration range of 0.5-160µg/ml. Molar absorptivity, correlation coefficient. And Sandell's sensitivity values were found to be $1.712 \times 10^3 \text{ mol}^{-1}\text{cm}^{-1}$, 0.9921 and $0.8864 \mu\text{g cm}^{-2}$. The results obtained were reproducible with acceptable RSD 0.0903 - 1.8373.

Keywords: Fluoride, Phosphomolybdate complex, thiourea



Poster Presentation | PP-098

Synthesis, Characterization and Catalytic performance of Green mediated ZnONPs synthesised using *Anethumgraveolens* seed extracts for Reduction of Nitroarenes.

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Abstract

The synthesis of nanoparticles using medicinally important plant extracts has become one of the most important due to its environmentally friendly approach. *Anethumgraveolens* is used in ayurvedic medicines since ancient times and it is a popular herb widely used as a spice and also yields essential oil. These green mediated nanoparticles are well employed in eliminating organic and inorganic effluents present in wastewater. In the present work, we attempted to synthesise Zinc Oxide nanoparticles (ZnO NPs) using *Anethumgraveolens* seed extracts for catalytic reduction of 4-nitrophenol and 2-chloro-4-nitrophenol which are among the major pollutants from industry. The synthesized ZnO NPs are well characterized by using X-ray diffraction (XRD), Scanning electron microscopy (SEM) and Fourier transform infrared spectroscopy (FTIR) techniques. The catalytic reduction efficiency ZnONPs for reduction of 4-nitrophenol and 2-chloro-4-nitrophenol were evaluated by optimizing the reaction parameters. Results suggest that, the synthesized ZnONPs is highly effective in reduction of nitro compounds.

Keywords: *Anethum Graveolens* Seed (Dill), ZnO Nanoparticles, Nitroarenes Reduction.



Poster Presentation | PP-099

Development of Cost Effective, Solar Light Active $\text{Cu}_{1-x}\text{Ca}_x\text{Fe}_2\text{O}_4$ Nanocomposite Catalysts for Environmental Protection

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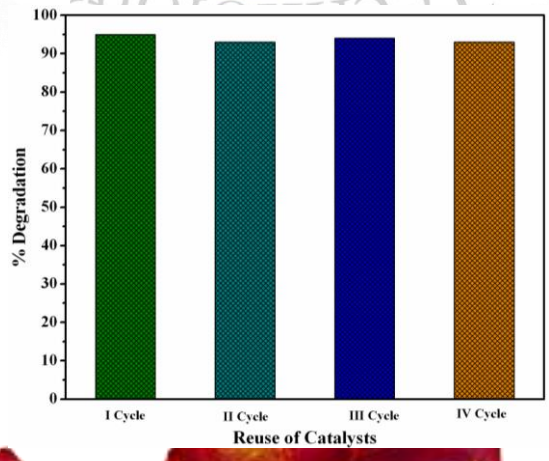
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Abstract

Calcium substituted copper ferrite composites with average size between 17 to 21 nm were synthesized as novel, efficient, and magnetically recyclable photocatalysts via a facile, green approach. The $\text{Cu}_{1-x}\text{Ca}_x\text{Fe}_2\text{O}_4$ composites showed high visible light absorption and good energy band gap property, which favored photocatalytic activity test and also shows good magnetic separation for reuse. The results show that the calcium substituted copper ferrite nanoparticles enhanced electron transfer and charge separation, leading to a significant improvement in photocatalytic efficiency. The composites exhibited superior photocatalytic inactivation toward malachite green (MG) under direct sun-light irradiation. The destruction of model organic pollutant was monitored by UV-Vis spectrophotometer. The model organic pollutant inactivation mechanism was investigated in a scavenger study, and $\cdot\text{O}_2$, H_2O_2 , and h^+ were identified as the major reactive species for organic pollutant inactivation. Multiple cycle runs revealed that these composites had excellent stability and reusability. In addition, the composites showed good photocatalytic performance in model organic pollutant sample. The results of this work indicate that $\text{Cu}_{1-x}\text{Ca}_x\text{Fe}_2\text{O}_4$ composites have great potential in large-scale photocatalytic disinfection operations.

Keywords: Renewable energy, Photocatalyst, Sunlight irradiation.





Poster Presentation | PP-100

Micro-structural Prediction of Recycled Aggregate Concrete with the inclusion of Additives

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Abstract

Urbanization and globalization has increased the magnitude of construction and demolition waste (C & D). The increasing quantity of C & D waste is a problem to be addressed as there exists a scarcity of land fill areas. The increasing construction activity and higher demand for natural resources leads to the acute problem of depletion of natural resource. To overcome this problem there is a need of sustainable construction to be considered with an utmost importance. Hence in this paper an effort is being taken to consider various replacement ratios of recycled aggregate concrete and determine its compressive strength for the same. After arriving at the compressive strength by optimized replacement ratio is arrived. For this optimized value an effort is made to understand the micro-structural behaviour by conducting SEM analysis for the optimized replacement ratio with the reference concrete. Replacement ratios are considered for 0%, 10%, ..up-to 100%. The compressive strength of these replacement ratios are determined and are optimized using Taguchi method. SEM, XRD and EDAX tests are conducted for 0%, 45% and 100%.

Keywords: C&D waste, mix design, compressive strength, optimization, SEM, XRD, EDAX.



Poster Presentation | PP-101

Study on Current Practices of E-waste Processing and its Environmental Impact

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Abstract

The generation of E-waste is increasing as increasing in technology. The quantity analysis of E-waste in Bangalore city is studied and methods of disposing of e-waste is known. Only 57 recycling units are working in Karnataka.

In which estimating e-waste is a questionnaire based survey. The survey could be conducted on a household basis, commercial establishment basis or even on an industrial basis. The questions are framed in such a way to collect information about the options of disposing off the electrical appliances, the average year of using an electrical product after re-using, obsolescence rate of different electrical appliances etc.

Some of raw materials are valuable and they can be recycled or reused by creating asset. Awareness among the people is to be created. Proper disposing, reduce, reuse, refurbish, recycle of e-waste. Improvement in technology for disposing need to be created. Need for stringent health safeguards and environmental protection laws in India. The E-waste should be given to the Authorized recyclers.



Poster Presentation | PP-102

Phycoremediation and Biodiesel Production Using Diatom

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Abstract

Municipal and Agricultural waste produced from Anthropogenic activity and uncontrolled use of fertilizers led to excess nutrient runoff entering natural water bodies resulting into eutrophication. Result of human intervention has led to severe deterioration of fresh water habitats. A solution to this cultural eutrophication is of freshwater microalgal cultivation with urban wastewater treatment is a promising solution for nutrient removal to reduce the formation of hypereutrophic lakes and biofuel production which will reduce the crisis for fossil fuel and greenhouse gas emission. Dominating diatom consortium (Navicula, Nitzschia, synedra and cyclotella) from Kengeri lake (12.9165° N, 77.4878° E) and Uttarhalli lake (12°54'20.83"N 77°32'33.50"E) are collected, grown on the wastewater. Diatom community reduces BOD and COD of waste water. Flocculated biomass is subject to electroporation with different voltages 20, 40 and 60 volts for 10, 15, 20 and 30 minutes. Electroporation improved lipid extraction efficiency in terms of time and solvent. Extracted lipid is quantified by SPV assay. TLC analysis confirms the presence of TAG in oil extracted. Further characterization of oil by Gas chromatography shows the presence of Oleic acid, Caprillic acid, Palmitic acid and Myristic acid as major fatty acids. The extracted oil is Trans-esterified to produce biodiesel. The remaining biomass is used as fertilizer for plants.



Poster Presentation | PP-103

Sustainable Chemical Synthesis via ADC: Fundamentals and Industrial Applications

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Abstract:

Catalytic dehydrogenation is one of the most fundamental processes in synthetic chemistry and chemical biology. Recently, acceptorless dehydrogenative coupling (ADC) and hydrogen-atom (HA) transfer reactions of renewable chemical feedstocks with the liberation of molecular hydrogen/water open a new avenue in contemporary organic synthesis and have manifold practical applications in sustainable energy.^[1] Despite significant advances achieved in noble-metal catalysis, the limited terrestrial abundance, and the high cost and high-degree price fluctuation of precious-metal catalysts and the supporting ligands have prompted chemists and chemical industrialists to search for new sustainable catalysts to facilitate practical applications. Thus, the replacement of noble metals with base metals for similar or better reactivity is one of the promising approaches in homogeneous catalysis. However, the search for an efficient catalytic system based on base-metal catalysts for sustainable chemical transformations is extremely rare.^[2] We have successfully designed and prepared a new cheap-metal based catalysts (Mn, Fe, Co, Ni) and applied in various synthetic transformations.^[3] Herein, some of our recent progress on acceptorless dehydrogenation and related reactions using cobalt, and nickel complexes will be discussed.

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Poster Presentation | PP-104

Experimental Investigation on the Effect of Rolling on Hardness of Aluminium Metal Matrix Composites

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Abstract

The objective of the investigation is to fabricate a composite material, which is to be used as an alloy wheels in automobile vehicles. The Metal Matrix Composite includes two metals which includes aluminum, and chromium. Aluminum is chosen because of its superior strength to weight ratio. Chromium is chosen because of its strength-weight ratio. The fabrication of composite material is done through stir casting method. Deformation of composite is done using manual rolling after the casting of composite. Further analysis of composite includes microstructural study, hardness values and machinability results. The specimens are collected for every work to analysis the composite. Experimental investigation also shows that, homogenization is directly proportional to hardness but it may contradict based on homogenization temperature and time span. Micro hardness suddenly drops from homogenized specimen to 10% deformed specimen because of exposure of specimen to high temperatures before deforming the specimen, which might have affected the specimen properties. Deformation has impact on micro hardness but it is randomly increased achieving the offset trend varied. Material removal rate results are bit far away from expected. These results may be effected by so many factors like small depth of cut, environmental factors, Non- conventional machining study, grain variations, particle distribution etc.

Keywords: Metal Matrix Composite, Rolling Process, Stir Casting, Machinability.



Poster Presentation | PP-105

Fabrication of Hierarchical Graphene Sulfur and Its Characteristics Application for Energy Storage System

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Abstract

Among the types of energy storage batteries, lithium sulfur batteries provide high energy density and high power density. In this paper we present graphene encapsulated sulfur as electrode for Energy storage application. Here, a hierarchical graphene sheets are wrapped on the sulfur nanoparticles and used as a cathode material in the batteries. The composite is characterized using XRD, SEM, FTIR, TG-DTA, Arbin Test. The XRD pattern confirms the formation of the graphene sulfur crystal structure and SEM images shows the graphene sheets wrapped on sheet shaped sulfur nanoparticles. The composite material shows better cyclic performance and good capacity

Keywords: Graphene Sulfur, Electrode, Energy Storage, Nano Composite



Poster Presentation | PP-106

Estimation of the Groundwater Contamination Due to the Disposal of Solid Wastes at Mandur Landfill Site, Bengaluru

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Abstract

In the present study the landfill site at Mandur, Bengaluru North was selected to study the impact on Groundwater. Water sample were collected at nearby bore wells surrounding the landfill site and drinking water parameters were analyzed and compared with Indian standards. The values of water quality parameters like Iron, Total hardness, BOD, Nitrate are exceeding the permissible limits of drinking water at some stations. The ground water was not fit for drinking purposes. The test confirms that the present open dumping has polluted the ground water. This happens because of rainfall and runoff, as result large quantities of leachate is formed, which pass downwards to pollute the surface waters, ground water and soil. Based on the results and field observations, it has been suggested that the MSW produced from the community shall have to be collected, treated and disposed at properly designed engineering landfill and also Phytoremediation and bio-remediation activities can be taken up so that reclaimed area can be used for recreational purposes.

Keywords: Municipal Solid Waste, Landfill site, Pollution, Groundwater contamination



Synthesis of Metal Nanoparticle Using Chemical Synthesis and Their Conjugation with Folic Acid for Delivery of Methionine Drug

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Abstract:

There is an enormous growth in the field nanotechnology during last few years, which facilitated innovative research and industrial production of nanoparticles (NPs) for various applications. Obviously, there are questions about their potential toxicity and safety issues. These metal nanoparticles (MNPs) have potential biomedical and industrial applications, but there are only few reports on their Biosafety assessment. Materials with dimensions scaled down to the nanometer scale show novel physical and chemical properties that, however, are strongly dependent on preparation methods. This behavior is quite general for nanostructures and nanoparticles of metals, compounds and composites. Silver nanoparticles (Ag-NPs) exhibit a great potential in the fields of life sciences such as biomedicine, agriculture, and environment. Various physical, chemical, and biological methods have been adopted to synthesize magnetic NPs with suitable surface chemistry. In the present study, iron nanoparticles were chemically synthesized. Chemically synthesized Ag-NPs are characterized using UV-vis spectra, DLS, FTIR and XRD. X-ray diffraction studies confirmed that the resultant powders are pure Ag-NPs. The bond gap energy of the iron oxide nanoparticle is 2.3ev. XRD pattern indicated that the magnetic nanoparticle were pure AgFe₂O₄. Synthesized nanoparticle bind with synthesized drug to check the activity of final product using XRD,FTIR,UV,TGA,DTA. Significance of the present study creates opportunities for exploring the biological functions and their effect n various cell lines as the Ag-NPs exhibit great potential in the fields of life sciences such as biomedicine, agriculture, and environment.



How to Achieve good fraction of morphologically selected normal motile sperms for IUI and IVF/ICSI procedure depending on semen parameters

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Abstract

Couples should be referred for infertility evaluation if they have been unable to conceive after at least 1 year of attempting to achieve pregnancy. **In female**, infertility is mainly due to irregular periods, fallopian tube blockage, and problems in follicle rupture, abnormal shape of uterus, cervix blockage, abnormal vaginal pH and higher age of female. **In male**, sexual dysfunction, low sperm count, abnormal sperm morphology, azoospermia and pre-ejaculatory problems are the leading factors of male infertility. Adoption of child is one method to meet the desire of child but couples frequently doubt for the genetic identity of adopted child and thus demand their own genetic baby. Intra-uterine insemination (IUI) is the first line of treatment for such infertile couple but success of IUI is less than 25% (Willem Ombele et al.). Semen processing methods for assisted reproduction including IUI, were developed to separate the morphologically normal motile spermatozoa from ejaculated semen sample. In semen sample leukocytes, bacteria, debris and dead spermatozoa produce oxygen radicals or reactive oxygen species (ROS) that negatively influence the ability to fertilize the egg. The yield of higher motile, morphologically normal spermatozoa improves treatment choices and therefore outcomes. In order to treat infertility many Assisted Reproductive Techniques (ART) are in practice. The success rate of these techniques depends upon the preparation of the semen sample. We assessed the quality of 150 semen samples. Those samples with different semen parameters & **we prepare same sample in two groups**: one is double density gradient (DDG) of 150 samples and second is single density gradient (SDG) of 150 samples for IUI/IVF/ICSI/IMSI or any ART procedure. We discussed here four methods for semen preparation depends on semen parameters but we compared only two major semen preparation techniques with DDG and SDG centrifugation; two different RPM & time and analyze the good fraction of morphologically selected normal motile sperms (millions/ml). Over all, SDG centrifugation is the best semen processing technique for any type of semen sample. Due to the cost effectiveness of simple Swim Up or simple wash technique, it can be used when infertility is only with female and semen parameters are very good.

Result: We found single density gradient (SDG) centrifugation is the best suitable techniques for semen processing after analyzing the 150 samples each with both DDG & SDG centrifugation at 1500 RPM for 12 minutes as a first wash & 1500 RPM for 5 minutes as a second wash in siblings semen samples.

Keywords: - Semen Analysis (SA), Semen Processing, Intra Uterine Insemination (IUI), DDG, SDG, Simple wash, Swim up, IVF / ICSI, ART & Infertility.



Poster Presentation | PP-109

Penicillin Production from free and Immobilized Cells of *Penicillium Chrysogenum* and Study of Transfer Rate in Str.

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Abstract

Penicillin production by free and Agar immobilized *Penicillium chrysogenum* cells were investigated in a stirred tank reactor. Penicillin production was increased two times with immobilized cells. In order to verify the oxygen transfer efficiency in STR, oxygen mass transfer

Coefficient was determined by using dynamic method at the end of steady state operation of the reactor often achieving $425.86 \mu\text{gml}^{-1}$ of penicillin production. The oxygen mass transfer coefficient (K_{La}) obtained in STR with 20% (V/V) agar immobilized beads, at 1 VVM (Unit volume of air per unit volume of the reactor per minute) of air flow rate and 250RPM of agitator speed has shown maximum amount of antibiotic production in the reactor. The oxygen mass transfer coefficient (K_{La}) obtained in stirred tank reactor (STR) was 18 hr^{-1} .

Keywords: Immobilization, penicillin, *Penicillium chrysogenum*, Stirred tank reactor, dynamic gassing out method, Volumetric oxygen mass transfer coefficient (K_{La}).



Poster Presentation | PP-110

Relative Estimation of Air Pollution Tolerance of Plants from Polluted and Non Polluted Forest Area of Jhansi City in Bundelkhand Region: Implication for Forest Ecosystem Restoration

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Abstract

In recent era, biodiversity of plants is now become an eco-sustainable tool for monitoring and mitigation of air pollution. The present study aimed to compare the impact of pollutants i.e. particulate matter (PM), SO₂, NO₂ released from different pollution sources (e.g. vehicles, stone crushers, mining etc.) on some biochemical (i.e. heavy metals, chlorophyll a, chlorophyll b total chlorophyll and carotenoids) parameters of common plant species, growing at four different sites emphasizing different pollution sources and a control site of Jhansi City, Bundelkhand region.

Results revealed that the site facing towards stone crushers shows significant ($p < 0.05$) decrease in chlorophyll contents and carotenoids values followed by mining and vehicular pollution. Present study indicates a heavy pollution load on the forest area present in and around the Jhansi city, Bundelkhand region. Some Tolerant plants find their suitability for plantation in ecologically sensitive regions, having implications for forest ecosystem restoration.

Key words: Forest, Pollution, Chlorophyll, carotenoids, atmospheric pollution, tolerance index.



Poster Presentation | PP-111

Short slender grain type rice variety: PDKV TILAK

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Abstract

For achieving and maintaining self sufficiency in rice, in view of ever increasing population, continuous enhancement of rice production is the need of hour. As suited the irrigated ecological condition, the late duration varieties are very popular in Vidarbha region of Maharashtra state (India). Hence the late varieties like, PKV HMT, Shriram etc are widely adapted varieties in this region.

As a part of continuous efforts to involve high yielding, supper fine (Short slender) good quality variety, the cross effected between Daya \times SYE632003 at Agriculture Research station, Sindewahi resulted in the development of new culture SYE-503-78-34-2 (PDKV TILAK), which is late duration (140-145 days), high yielding (40-45 q/ha) with good cooking quality *i.e* intermediate amylase content (22-26%). With high milling (70.96%) and good head recovery (66.47%). It poses a Short Slender grain with test weight of 12.27 g. It has been tested extensively in University, State and All India level breeding trials. This culture found promising over widely adopted PKV HMT, RTN-24 and Shriram variety with 24.07%, 24.77% and 27.91% Increased in yield during 2013 to 2016 respectively, at University level trial and 21.31, 19.70 and 11.93 percent increase over PKV HMT, RTN-24 and Karjat-6 during 2014 and 2015 in short slender group trial at State level respectively



Poster Presentation | PP-112

In-situ Ni-doped Co_3O_4 Nanostructure: An Efficient Electrocatalyst for the Overall Water Splitting

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Abstract

This work represents an environmentally strong one-pot synthesis mechanism for the production of nickel (Ni) doped cobalt oxide (Co_3O_4) at a significant quantity of 1%, 3%, 5%, 7% and 10% that demonstrates efficient electrocatalysis towards oxygen evolution reaction (OER) and hydrogen evolution reaction (HER), in 1M KOH. The Ni/Fe doped Co_3O_4 were synthesized using cobalt nitrate hexahydrate ($\text{Co}(\text{NO}_3)_2 \cdot 6\text{H}_2\text{O}$), nickel nitrate hexahydrate ($\text{Ni}(\text{NO}_3)_2 \cdot 6\text{H}_2\text{O}$) and citric acid ($\text{C}_6\text{H}_8\text{O}_7$), among which 7% Ni doped Co_3O_4 proved to be an optimal OER/HER catalysis as compared to that of iron doped cobalt oxide. Nickel foam electrode drop cast with Ni doped Co_3O_4 3mg displayed remarkable OER/HER catalysis with an over-potential (η) of 451mV (vs RHE) recorded at $100\text{mA}/\text{cm}^2$ for OER and 212mV (vs RHE) recorded at $50\text{mA}/\text{cm}^2$ which is superior to that of RuO_2 (483 mV). The composite also exhibits Tafel slope of 102mV/dec @ OER and 48mV/dec @ HER which is kinetically more efficient. Clearly, 7% Ni doped Co_3O_4 has the potential to replace precious metal-based catalysts as the anodic/cathodic material within electrolyzers, reducing the associated costs of hydrogen/oxygen production from water splitting.

Keywords: Ni-doped Co_3O_4 ; nanostructures; electrocatalysis; catalytic potential; water splitting.



Experimental Investigation of Surfactant Coated MWCNT Hybrid Composite Reinforced with Silicon-Aluminium 6065 to Improve the Mechanical Properties.

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Abstract

The lightweight aluminium based metal matrix components are gearing up in the current manufacturing industries. This favouritism is due to its low density, strength and high stiffness. Various reinforcing materials like Silicon Carbide, Aluminium Oxide, Graphite and CNTs are best compatible for aluminium based metal matrix composites. In the present appraisal, Al6065-Si-CNT composites were fabricated by Stir Casting Method with percentages of CNT varying from 0.5 wt. % to 6 wt. % with surfactant coating. Various validation approaches for finding the mechanical properties of the fabricated composite has been incorporated. They include FEM as a simulation approach and Stir casting method for fabrication. FEM is used to determine the density, Young's Modulus, Shear Modulus and Poisson's Ratio and hence to understand the nature of the structure. Mechanical properties such as hardness, tensile strength and abrasive wear tests have been experimented on Al6065-Si-CNT composites with SDS coated CNT. Under identical conditions, adopted Al6065-Si-CNT coated with SDS was investigated using SEM, which showed good dispersion stability in the fabricated composite with increase in the hardness, tensile strength and reduced wear loss of the CNT reinforced composite material.

Keywords: MWCNT (Multi-Walled Carbon Nanotube), CNTs (Carbon Nanotubes), FEM (Finite Element Method) Mechanical properties.



Comparison Study of Green and Chemical Methods for Synthesis of Nano Spinel $MgFe_2O_4$ and its application as chemical sensor

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Abstract

Spinel $MgFe_2O_4$ nanoparticles (NPs) were prepared by solution combustion synthesis (SCS) and sol-gel methods via green and chemical routes. Green and chemical methods for Sol-gel were followed by using Lemon extract and Citric acid respectively. A green and chemical method for SCS was followed by using Phyllanthus acidus leaf extract and Urea respectively. X-ray diffraction (XRD), Scanning electron microscopy (SEM), Fourier transform infrared spectroscopy (FT-IR), UV visible Spectroscopy were used to study the effect of synthesis methodology on the behavior of synthesized NPs. Differences in crystallinity, particle size, photocatalytic and electrochemical activity of the $MgFe_2O_4$ NPs prepared by different methods were observed. XRD pattern of NPs obtained by green and chemical methods confirmed spinel phase structure of the prepared NPs with average size ranging from 10-22 nm respectively. The flake like morphology was seen for all the prepared NPs. FTIR confirms the absorption value of tetrahedral and octahedral sites. The $MgFe_2O_4$ NPs synthesized by green sol-gel method exposed exceptional electrochemical property with less charge transfer resistance. The correlation for EIS data with the photocatalytic mechanism is observed. The chemical sensor property of $MgFe_2O_4$ NPs was exposed by the detection of H_2O_2 by cyclic voltammetry technique.

Keywords: Green sol-gel synthesis; Green combustion synthesis; Cyclic voltammetry.



The RGO-Ag Nanomaterials Based Nanozyme

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Abstract

The RGO-Ag nanomaterials ability to act as an enzyme were evaluated by its antioxidant activity studies. RGO-Ag based nanozymes reduces the ROS in cell when attached to the thiol group. *In vitro* antioxidant activity was performed by FRAP and Phosphomolybdenum assay. In FRAP assay, the amount of nanoparticles reducing Fe³⁺ to Fe²⁺ in presence of TPTZ is evaluated. RGO-Ag-AV and RGO-Ag-MG showed better reduction of ~90 % at 500 µg/mL than the standard ascorbic acid. Similar results were also observed in Phosphomolybdenum assay, in which the total antioxidant capacity of RGO-Ag nanocomposites were known and the RGO-Ag prepared using *Aloe vera* and marigold extracts converted molybdenum (VI) to molybdenum (V) in more efficient level than ascorbic acid.



Poster Presentation | PP-116

Phytochemical Activity of RGO-Ag-Tulsi Hybrid Nanomaterials

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Abstract

In summary, preparation of RGO, RGO-Ag-Tulsi hybrid nanomaterials was carried out using phytochemicals extract assisted reaction. The effects of Tulsi plant extracts on the reduction of GO, formation of RGO-Ag-Tulsi hybrid nanomaterials were evaluated by techniques such as XRD, UV-visible spectroscopy, SEM and TEM studies. The average crystallite size of RGO-Ag-Tulsi hybrid nanomaterial was found to be of approximately 22 nm and 30 nm, respectively. The nanoparticles coated on RGO shows spherical surface morphology with size ranging from 20-150 nm with agglomeration as observed in TEM. The SEM Images clearly shows the prolonged sheets of lateral extents ranging from a few micrometers in length.



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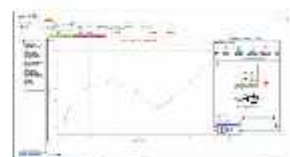
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