सीएसआईआर-उत्तर पूर्व विज्ञान तथा प्रौद्योगिकी संस्थान, जोरहाट
CSIR-North East Institute of Science and Technology

INFOWATCH

An In-house Monthly Communication (December, 2024)

INDIA INTERNATIONAL SCIENCE FESTIVAL 2024 COMMENCES AT IIT GUWAHATI WITH A FOCUS ON NORTH EAST INDIA

The 10th India International Science Festival (IISF-2024) was inaugurated at IIT Guwahati, marking a historic milestone for the North East region. The festival, running from 30th November to 3rd December 2024, features 24 diverse events showcasing India's scientific achievements and addressing specific challenges of the region.

Dr V M Tiwari, Director, CSIR-NEIST, presenting innovative products of the institute to Hon'ble Minister of S & T, Mr Jitendra Singh.

(Left) Mr Madhujya Saikia, Senior Technical Officer, CSIR-NEIST, while presenting, at CSIR-NEIST stall, IISF Guwahati

The inaugural ceremony was graced by Hon'ble Minister of Science & Technology, Mr Jitendra Singh, Assam Chief Minister Dr Himanta Biswa Sarma, Meghalaya Chief Minister Mr Conrad Sangma, and other senior officials representing the Science and Technology (S&T) departments of the eight North Eastern states.

(from right) Dr V M Tiwari, Director, CSIR-NEIST, felicitating Shri Bhubaneswar Kalita, MP, Govt of Assam

(from right) Dr V M Tiwari, Director, CSIR-NEIST, felicitating Shri Keshab Mahanta, Mnister of S&T and IT, Govt of Assam

Group photograph of the esteemed delegates and special guests

One of the festival's highlights, *"*Science Odyssey of North East India: Focused S&T for North East States*"*, was jointly inaugurated by Shri Keshab Mahanta, Minister of S&T and Information Technology, Government of Assam, Shri Bhubaneswar Kalita, Member of Rajya Sabha and Chairperson of the Parliamentary Standing Committee on S&T, Prof Ashutosh Sinha, President of INSA, and Dr V M Tiwari, Director of CSIR-NEIST, Jorhat.

In his inaugural address, Shri Bhubaneswar Kalita underscored the critical role of science and technology in addressing the unique challenges of the North East region. He highlighted the region's potential in biodiversity, natural resources, and human talent, urging focused S&T efforts for sustainable and inclusive development.

The session drew participation from distinguished scientists, policymakers, educators, students, and innovators from India and abroad. Discussions revolved around leveraging scientific advancements to address regional challenges and unlock development opportunities in the North East.

The event aimed to present the current state of S&T in the North East and explore solutions to the region's unique challenges. The inaugural session also included a panel discussion featuring leaders and representatives from the S&T departments of the North Eastern states. Experts emphasized the importance of focused interventions, capacity building, and infrastructural support for inclusive and sustainable development in this highly resource-rich region.

With lakhs of attendees expected, IISF-2024 provides a platform for the public to engage with India's S&T advancements and explore opportunities for implementing these innovations in the North-East region. The festival, organized by the Ministry of Science & Technology in collaboration with Vijnana Bharati and other major scientific organizations, promises to inspire future collaborations and drive the region's scientific and technological growth.

CSIR-NORTH EAST INSTITUTE OF SCIENCE AND TECHNOLOGY JORHAT HOSTS AN INSPIRING TALK ON INNOVATIVE WATER PURIFICATION TECHNOLOGY

(From right) Dr Dipul Kalita, Senior Principal Scientist, CSIR-NEIST, felicitating Mr Anjan Mukherjee, Founder and CEO of Taraltec Solutions Pvt Ltd

On 12th December 2024, CSIR-North East Institute of Science and Technology Jorhat organized an engaging session at Iyengar Hall, featuring a keynote address by Mr Anjan Mukherjee, Founder and CEO of Taraltec Solutions Pvt Ltd. Mr Mukherjee's company is renowned for water technology based solutions aimed at revolutionizing water purification in India. Mr Mukherjee is DMET, First Class Cert of Competency (M), Govt of India (Marine Chief Engineer on board merchant ships), C.Engg, PDGM (MBA, IIM Bangalore) and an entrepreneur and innovator with more than three decades of cross-functional experience (two decades as a first-generation entrepreneur). He has co-authored a seminal technical book and has four granted and few pending patents.

Mr Mukherjee's presentation traced the inspiration behind his innovation to nature, particularly the snapping shrimp, a marine creature capable of killing microbes underwater. This fascinating phenomenon led his thoughts to the development of a technology aimed at purifying water across India.

Mr Anjan Mukherjee, Founder & CEO, Taraltec solutions Pvt Ltd, sharing his thoughts to the attandees

Sharing his entrepreneurial journey, Mr Mukherjee encouraged attendees, especially students, to embrace decisions and pursue entrepreneurship. With his powerful statement "If I can, then anybody can", Mr Mukherjee inspired the attendees by mentioning that if anyone wants to succeed in business then take the leap early, build strong networks and remain resilient.

He detailed his journey of establishing Taraltec Solutions, transforming it into a successful venture that tackles critical water issues across the country. The talk underscored the transformative potential of technology in solving real world water purification problems.

During the interactive session, scientists raised concerns about the technology's adaptability to the challenges of the North East region. Mr Mukherjee assured them of the product's versatility and highlighted his company's commitment to addressing diverse regional needs.

The session concluded with an enthusiastic response, leaving the audience motivated

towards innovation and entrepreneurship for societal impact.

VALEDICTORY FUNCTION OF OMICSBIOMAPP CONCLUDES SUCCESSFULLY AT CSIR-NEIST

(Left) Dr V M Tiwari, Director, CSIR-NEIST, and Dr Ajit Kumar Shasany, Director of CSIR-NBRI (Right) while attending the function

The valedictory function of the OmicsBioMApp training program, organized by CSIR-North East Institute of Science and Technology (CSIR-NEIST), was held successfully at the Training & Skill Development Centre, STINER Hub, CSIR-NEIST. OmicsBioMApp aimed to empower participants from the North Eastern Region (NER) states, including Assam, Manipur, Meghalaya, Mizoram, Nagaland, and Sikkim, with advanced knowledge and skills in sequencing technologies and bioinformatics.

The event was graced by the presence of the Chief Guest, Dr Ajit Kumar Shasany, Director of CSIR-NBRI, who delivered an inspiring speech highlighting the program's significance and its transformative impact on the region. Dr Virendra M Tiwari, Director of CSIR-NEIST, felicitated the Chief Guest and addressed the gathering with an insightful speech emphasizing the institute’s commitment to fostering knowledge and skills in the scientific fields.

The program coordinators, Dr Romi Wahengbam and Dr Shridhar S Hiremath, played pivotal roles in ensuring the training program's success. Esteemed guests, including the coordinators and participants, shared their thoughts on the importance and impact of the training.

Group photo of esteemed guests and participants during the release of the OmicsBioMApp Training Compendium Book

A notable highlight of the valedictory function was the release of the OmicsBioMApp Training Compendium Book, a comprehensive document containing the essence of the training program. The book was released by the distinguished guests, program coordinators, and co-coordinators, marking a significant milestone in the program.

Group photo of esteemed guests and participants of the OmicsBioMApp

The OmicsBioMApp initiative has empowered participants with advanced skills while enhancing the scientific capabilities of the North Eastern Region, reflecting CSIR-NEIST’s commitment to fostering knowledge-driven growth in the area.

INAUGURATIONS:

Dr V M Tiwari, Director, CSIR-NEIST, inaugurated a two day Chrysanthemum & Coleus 2024 started on 14th December 2024 at CSIR-NBRI in presence of Dr P K Trivedi, Director, CSIR-CIMAP, Dr Bhaskar Narayan, Director, CSIR-IITR & Dr A K Shasany, Director, CSIR-NBRI, Lucknow.

ACHIEVEMENTS:


4th International Conference on Bioprocess for Sustainable Environment and Energy – 2024

ICBSEE

Certificate of Recognition

Presented to

Gyanab Konwar

For his invaluable contribution as Best Flask Talk

For the topic entitled

Identification of carbohydrate rich algal species from North East India for 3G bioethanol production

during the

4th International Conference on Bioprocess for Sustainable Environment and Energy (ICBSEE) - 2024

held on Nov. 29 – Dec. 01, 2024, at the National Institute of Technology Rourkela

Prof. Angana Sarkar, Organizing Secretary, ICBSEE-2024, NIT Rourkela

Prof. Asoke Kumar Dutta, Organizing Secretary, ICBSEE-2024, NIT Rourkela

Prof. Sivananda Kundu, Conference Chairman, ICBSEE-2024, NIT Rourkela

Prof. S. K. Patra, Dean, SCR&CCE, NIT Rourkela

Mr Gyanab Konwar, PhD Scholar Biological Science & Technology Division, CSIR-NEIST, has been honored with the Best Flask Talk Award for his presentation of PhD research at the 4th International Conference on Bioprocess for Sustainable Environment and Energy (ICBSEE-2024). The award not only reflects Mr Gyanab Konwar's academic excellence but also underscores CSIR-NEIST's commitment to research and fostering young talent in emerging scientific domains.

PAPER PUBLISHED:

In International Peer Reviewed Journals

1. **Title**: **Assessment of AMMI model for delineating the stability indices of high yielding variety of Java Citronella (Jor Lab C-5) evaluated in different location of NE India**
   Authors: Mohan Lal, Tanmita Gupta,Anindita Gogoi, Sita Devi Sarma, Twahira Begum
   Journal: *JOURNAL OF ESSENTIAL OIL BEARING PLANTS 2024*
   IF: 2.4
2. **Title**: **Expression of concern: Reduced graphene oxide nanosheets decorated with Au, Pd and Au–Pd bimetallic nanoparticles as highly efficient catalysts for electrochemical hydrogen generation**
   Authors: Gitashree Darabdhara, Manash R Das, Volodymyr Turcheniuk, Kostiantyn Turcheniuk,

Vladimir Zaitsev, Rabah Boukherroubc and Sabine Szunerits.
Journal: *Journal of Materials Chemistry B*
IF: 7

3. **Title**: **Expression of concern: Reduced graphene oxide nanosheets decorated with AuPd bimetallic nanoparticles: a multifunctional material for photothermal therapy of cancer cells**
Authors: Gitashree Darabdhara, Manash R Das, Volodymyr Turcheniuk, Kostiantyn Turcheniuk, Vladimir Zaitsev, Rabah Boukherroubc and Sabine Szunerits.
Journal: *Journal of Materials Chemistry B: Materials for Biology and Medicine 2024*
IF: 7
4. **Title**: **Synergistic optical sensing of heavy metal ions using Mesua Ferrea derived carbon dot embedded Alginate based biopolymeric film as a sensor platform International**
Authors: Sudeepta Baruah, Pallabi Hazarika, Achyut Konwar, Krishna Kamal Hazarika,Swapnali Hazarika
Journal: *Journal of Biological Macromolecules 2024*
IF: 8.2
5. **Title**: **Rhodamine-Based Fluorescence Probe for Monitoring of Lysosomal pH: Spectroscopic Insights and Cellular Applications**
Authors: Parnashree Bhuinya, Subhabrata Guha, Swarnak Roy, Prakash Dutta, Sandeep Kumar Dey, Pradip Kumar Sukul, Gaurav Das, Tamal Goswami, Chirantan Kar
Journal: *CHEMISTRYSELECT 2024*
IF: 2.4
6. **Title**: **Multifaceted in-vitro and in-silico evaluation of Pimenta racemosa (Mill.) essential oil: A potential alternative source of eugenol**
Authors:
Ankita Gogoi Prajisha Jayaprakash, Raghu Tamang, Twahira Begum, Neelav Sarma, Samarjeet Saikia, Mohan Lal
Journal: *Industrial Crops and Products 2024*
IF: 5.9
7. **Title**: **Exploring the role of carbon quantum dots as countermeasure for SARS-CoV-2 virus**
Authors: Kallol Roy, Binoy K Saikia, Rituraj Konwar
Journal: *Virology 2024*
IF: 3.7
8. **Title**: **Bimetallic Cooperativity of a Ferrocene-based Iridium NHC Complex in Water Oxidation Catalysis: A New Frontier for Efficient Oxygen Evolution**
Authors: Debashree Bora, Himangshu Pratim Bhattacharyya, Firdaus Rahaman Gayen, Sudip Baguli, Pitambar Patel, Manabendra Sarma, Biswajit Saha
Journal: *Chemistry-An Asian Journal 2024*
IF: 4.1
9. **Title**: **Effect of Different Nanofillers in Mixed Matrix Membranes for CO2 Separation**
Authors: Gauri Hazarika, Subrata Goswami, Moucham Borpatra Gohain, Pravin G Ingole
Journal: *ACS Applied Polymer Materials*
IF: 5
10. **Title**: **Ultra-Fine Palladium Nanoparticle-Encapsulated Graphene Oxide Framework: A Bifunctional Photonanozyme for Colorimetric Detection of Dopamine**
Authors: Diksha J Baruah, Ashutosh Thakur, Hiranmoy Barman, Prasenjit Manna & Manash R Das
Journal: *ACS Applied Nano Materials 2024*
IF: 5.9
11. **Title**: **Network pharmacology-integrated molecular modeling analysis of Aquilaria malaccensis L. (agarwood) essential oil phytocompounds**

Authors: Prajisha Jayaprakash, Twahira Begum & Mohan Lal
Journal: *In silico pharmacology 2024*
IF:

12. **Title**: **Aqueous oxidation of coal-associated pyrite and standard pyrite mineral towards understanding the depyritization kinetics and acid formations**
Authors: Angana Mahanta, Binud Attry & Binoy K Saikia
Journal: *INTERNATIONAL JOURNAL OF COAL SCIENCE & TECHNOLOGY 2024*
IF:
13. **Title**: **Pd(II)-catalyzed hydroxy group directed synthesis of spiro-fused succinimide isochromenochromenones**
Authors:
Kongkona Gogoi, Bondana Bora, Geeti ka Borah and Sanjib Gogoi
Journal: *Tetrahedron Letters 2024*
IF: 1.8

RETIREMENT:

1. Mr Ajit Chandra Dutta, ASO, CSIR-NEIST

PROGRESS REPORT FOR THE MONTH OF December/2024

DIV/SEC.: **NEIST Br. Itanagar**

MONTHLY HIGHLIGHTS OF ACTIVITIES

1. Mushroom Spawn Production and Distribution

This month, 200 packets of mushroom spawn were prepared, of which 154 packets were supplied to local beneficiaries. The initiative generated revenue of ₹3,850 through the sale of mushroom spawn, supporting community engagement in sustainable mushroom cultivation.

2. Editorial Board Invitation for Dr Chandan Tamuly

Dr Chandan Tamuly was invited to join the Editorial Board of the prestigious journal *Scientific Reports* (Impact Factor: 3.8), published by Nature Springer. In this capacity, Dr. Tamuly is handling manuscripts in the field of Food Sciences.

3. Extraction and Analysis of Zanthoxylum oxyphyllum

The fruits of *Zanthoxylum oxyphyllum* were extracted using various drying methods for further scientific study.

- **Antiurease Activity Study**: Research was conducted to evaluate the antiurease activity of sun-dried *Zanthoxylum oxyphyllum* fruits against *Helicobacter pylori*, an antibiotic-resistant, ureolytic bacterium responsible for gastroduodenal diseases. The study revealed mild inhibitory activity against the urease enzyme, highlighting its potential medicinal applications.
- **HRMS and HPLC Analysis**: The fraction ZAB-1 from *Zanthoxylum oxyphyllum* was analyzed using High-Resolution Mass Spectrometry (HRMS) and High-Performance Liquid Chromatography (HPLC). The analysis indicated the presence of bioactive compounds such as caffeic acid and chlorogenic acid.

4. Cultivation of Medicinal and Aromatic Plants

Preparations for cultivating medicinal and aromatic plants are underway. Approximately 1,000 lemongrass seedlings were planted, alongside 150 medicinal plants strategically placed at different locations across the campus. These efforts aim to enhance biodiversity and promote sustainable cultivation practices.

Proposed Work for the Upcoming Month

1. Externally Funded Projects

GPP-418: Livelihood Enhancement of the Monpa Tribe through Technological Interventions in Ethnic Food Items

- Experimentation of prepared millet wines in accordance with FSSAI guidelines has been conducted. GC-MS analysis revealed an ethyl alcohol concentration of 7%, residue volatile acids of 0.42 g/L, total esters at 3.94 g/L, and total volatile acids at 1.76 g/L, indicating compliance with regulatory standards.
- Proximate analysis of spent grains from millet and banana wine production revealed millet spent grains contain 12.64% protein, 18.80% carbohydrates, and 1.5% fat, while banana spent grains have 6.47% protein, 49.31% carbohydrates, and 0.78% fat.
- Nutritional analysis of *Stixis suaveolens* fruit was conducted, revealing a carbohydrate content of 26.35% through the anthrone method.
- Nutritional analysis of by-products from Bhim Kol (*Musa balbisiana*) wine preparation showed approximately 49.31% carbohydrates and 0.78% fat, suggesting potential applications in food and pharmaceutical industries.
- Broth sub-culture of bacterial species (*E. coli*, *S. aureus*, *L. innocua*) and solid media sub-culture of fungal species (*A. niger*, *F. keratoplasticum*, *C. albicans*) were performed.
- Literature study for the isolation of microbes from various plant parts is ongoing.
- Seven students from Himalayan University were trained in vermicomposting, receiving both lectures and practical sessions on vermiculture and its maintenance.

CSIR-FTT Project (FTT-020509):

- Dr Natarajan Velmurugan presented research on *Thraustochytrids* as microbial cell factories for aquaculture feed at the 51st Annual Meeting of the Mycological Society of India, Jodhpur.
- Dr Bhagyashree Bora and Mr. Takum Akash also attended the conference, with Dr. Bora securing the Best Poster Presentation Award for her research.
- Evaluation of new isolates for nutritionally enriched fruit peel waste composites through solid-state fermentation is in progress.
- Procurement of a solid-state bioreactor and a fish feed-making machine is underway.

Arunachal Pradesh Government Project (GPP-419):

- Preparatory work for *in planta* validation of potential strains in crops like tomato and chili at Ziro, Basar, and Naharlagun is in progress.

SERB-CRG Project (GPP-434):

- Ongoing evaluation of potential candidates for metabolic stability and the establishment of artificial symbiotic systems.

This month's proposed work demonstrates a multifaceted approach towards research and development, integrating technological, agricultural, and industrial advancements.

S&T Services:

Summer Training Program

One student participated in the summer training program, gaining hands-on experience and exposure to advanced scientific practices.

Other Significant Activities

ACADEMIC CONTRIBUTIONS THROUGH PEER REVIEW

Dr Chandan Tamuly actively contributed to the advancement of scientific research by reviewing manuscripts for leading international journals. The journals include:

- *Food Chemistry*
- *Talanta*
- *Natural Product Communications*
- *International Journal of Food Properties*

Dr Tamuly's insightful evaluations and constructive feedback underscore his expertise and commitment to ensuring the quality of published research.

SKILL DEVELOPMENT TRAINING FOR STUDENTS

Students from the Department of Agriculture, Himalayan University, were provided specialized training on analytical techniques. During the session, the following processes were demonstrated and explained:

- **Infrared Digestion**: A precise method for sample preparation in various chemical analyses.
- **Steam Distillation using the Kjeldahl Method**: A widely-used technique for determining nitrogen content, critical in agricultural and food analysis.

This training equipped the students with practical knowledge of advanced laboratory procedures, enhancing their academic and professional readiness.

NATIONAL SEMINAR ON WORLD SOIL DAY

Dr Chandan Tamuly participated as the Chief Guest and Keynote Speaker at a National Seminar organized by the Department of Agriculture, Himalayan University, Itanagar, on the occasion of *World Soil Day* (December 5, 2024). The seminar focused on the theme **"Caring for Soils: Measure, Monitor, Manage"** and highlighted the critical role of soil health in sustainable agriculture and environmental conservation.

In his keynote address, Dr Tamuly delivered an engaging talk titled **"Soil: Composition, Quality, and Impact on Plant Growth."** He elaborated on the fundamental components of soil, emphasizing its physical, chemical, and biological properties. Dr. Tamuly also discussed the importance of soil quality in determining crop productivity and the broader implications of soil health on plant growth and food security.

The seminar brought together experts, academicians, and students to foster discussions on innovative methods for monitoring and managing soil health, aligning with global efforts to promote

sustainable agricultural practices. Dr. Tamuly's insightful presentation was well-received, underscoring the significance of soil conservation for a thriving ecosystem.

RESEARCH PRESENTATION AT THE 51ST ANNUAL MEETING OF THE MYCOLOGICAL SOCIETY OF INDIA

Dr Natarajan Velmurugan attended the **51st Annual Meeting of the Mycological Society of India** held at Jai Narain Vyas University, Jodhpur, Rajasthan, from November 27–29, 2024. He presented his research progress titled **"Thraustochytrids: Promising Microbial Cell Factories for the Production of Aquaculture Feed."**

The presentation highlighted the potential of *Thraustochytrids* in sustainable fish feed formulations and their importance in aquaculture. It was attended by senior faculty, researchers, and students at various academic levels. Dr Velmurugan's work was widely appreciated for its innovation and practical relevance.

TRAINING ON MUSHROOM CULTIVATION AND VERMICOMPOST PRODUCTION

A 30-day training program on **Mushroom Culture, Mushroom Spawn Production, Mushroom Cultivation Techniques, and Vermicompost Production** was organized for B.Sc. Agriculture students from **Dolphin (PG) Institute of Biomedical & Natural Sciences, Dehradun, Uttarakhand**.

The program was conducted under the technical guidance of **CSIR-NEIST, Branch Itanagar, Arunachal Pradesh**, and provided hands-on training in advanced agricultural practices. Participants gained practical knowledge on the complete lifecycle of mushroom cultivation, from culture and spawn production to harvesting. Additionally, they learned vermicompost production techniques, which are essential for sustainable organic farming.