



# Bio-Innovate



सत्यमेव जयते

DEPARTMENT OF BIOTECHNOLOGY  
Ministry of Science & Technology  
Government of India

*New Bulletin of Institutional Biotech-Hub, Nanda Nath Saikia College, Titabar, Assam- 785630*

*Sponsored by- Department of Biotechnology Ministry of Science & Technology, Govt. of India*

## Annual News Bulletin

*1<sup>st</sup> April 2023 to 31<sup>st</sup> March 2024*

*DBT-IBT Hub, Nanda Nath Saikia College, Titabar, Assam*

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## **Principal's Column:**

*I am very delighted to know that Institutional Biotech Hub of N. N. Saikia College, sponsored by Department of Biotechnology under the Ministry of Science and Technology, Government of India, is going to release its inaugural newsletter "Bio-Innovate" for the 2023-2024 academic year. The DBT-IBT Hub at our college has been diligently fostering a scientific mindset with unwavering enthusiasm and dedication among both students, researchers and educators in Titabar, Jorhat, Assam.*

*I anticipate that in the days to come the hub will adopt innovative strategies to promote biotechnology education among students, facilitate research endeavors, and contribute to the expansion of knowledge. I expect the hub to demonstrate increased dedication and vigor in advancing biotechnology education among students and conducting research across diverse fields, leveraging local resources. Additionally, I extend my best wishes to the Biotech Hub for success in all their forthcoming academic pursuits.*

*Dr. Litoool Boruah  
Principal  
N. N. Saikia College, Titabar, Assam*

## **Principal Investigator's message:**

*We are delighted to present the newsletter for the "DBT-NER Institutional Biotech Hubs at N.N. Saikia College, Titabar, Jorhat, Assam (Phase-II)" project, covering the year 2023-24. This report marks the successful completion of 12 months of our research, aimed at promoting scientific and technological knowledge among students, researchers, faculties and the general public. During this time, we have achieved some significant milestones.*

*We have successfully met all the objectives of our project within the set timelines. The interim findings of our ongoing research were published in several high-impact international journals. Additionally, we presented our findings at the 8th Asia Conference on Environment and Sustainable Development (ACESD 2023) held in Sapporo, Japan, from November 3rd to 5th, 2023.*

*On behalf of the entire project team, I would like to express our gratitude to the Department of Biotechnology, Government of India for providing us with financial support (Grant No. BT/NER/143/SP44344/2021 dated 01/02/2023). I also extend my thanks to all those who have contributed to the project's success.*

*-- Dr. N. F. Islam  
Principal Investigator  
DBT- IBT Hub, N. N. Saikia College Titabar*



# Hands on Training Courses/Workshop Programs (From 2023-2024)

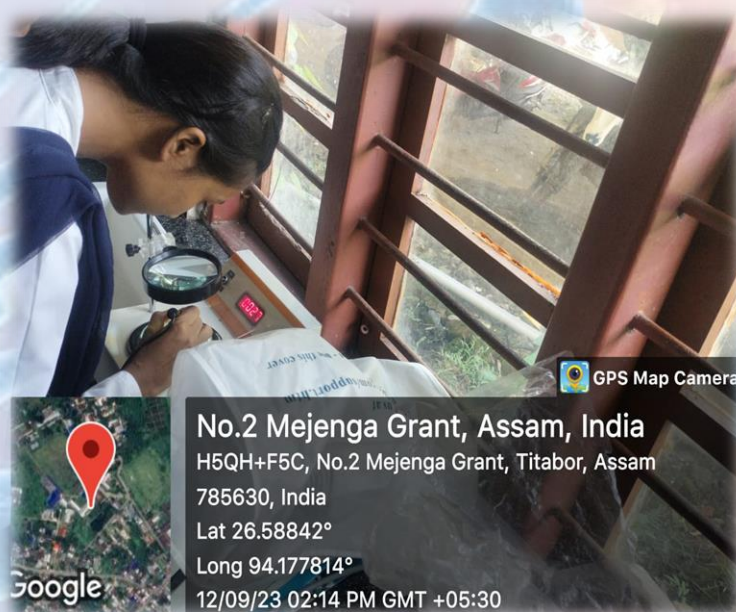
SI. No.	Topic	Venue	Date & Duration	Name of the invited speaker/ presenter	No. of Participants	Level of participation
1.	Isolation and screening of beneficial microbe's from rhizosphere soil using culture-based approach	N.N. Saikia College, Titabar, Assam	2 Days, 11 <sup>th</sup> & 12 <sup>th</sup> Sept, 2023	Dr. Pranaba Nanda Bhattacharyya (Assistant Professor, Department of Botany, N. N. Saikia College, Titabar)	60	Students of <ul style="list-style-type: none"> <li>• N. N. Saikia College</li> <li>• D.C.B. Girls College, Jorhat</li> <li>• Mariani College, Mariani</li> </ul>
2.	Hands on training on Microbial Fuel Cell (MFC) for sustainable remediation of wastewater	N.N. Saikia College, Titabar, Assam	2 Days, 12 <sup>th</sup> & 13 <sup>th</sup> Dec, 2023	Dr. Pranaba Nanda Bhattacharyya (Assistant Professor, Department of Botany, N. N. Saikia College, Titabar) & Mr. Bhoirob Gogoi (Technical Assistant, DBT- IBT Hub, N. N. Saikia College)	71	Students of <ul style="list-style-type: none"> <li>• N. N. Saikia College, Titabar</li> <li>• D.C.B. Girls College, Jorhat</li> <li>• J.B. College, Jorhat</li> <li>• M.R.S. Higher Secondary School, Titabar</li> <li>• Jawahar Navodaya Vidyalaya, Jorhat</li> </ul>



# Hands on Training Courses/Workshop Programs (From 2023- 2024)



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2 Days Hands on training courses/workshop on *“Isolation and screening of beneficial microbes from Rhizosphere soil using culture-based approach”* at Nanda Nath Saikia College. Titabar, Assam



# Hands on Training Courses/Workshop Programs (From 2023- 2024)



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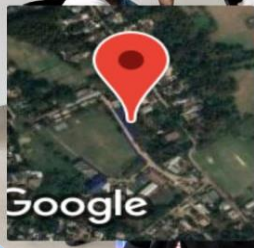
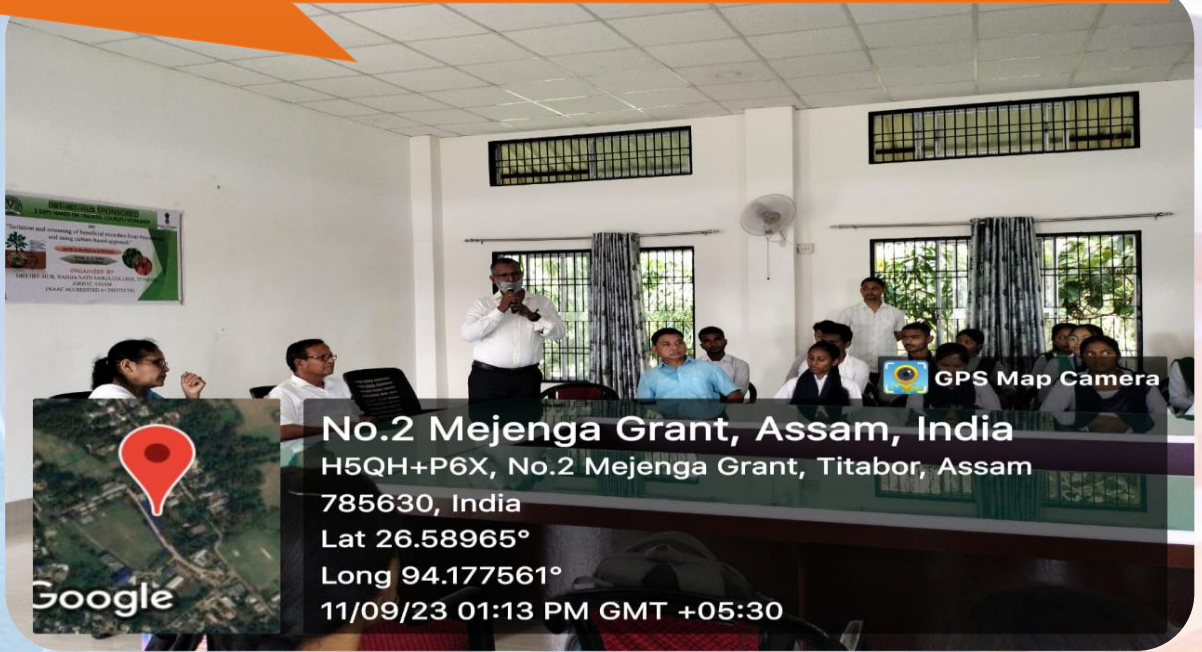
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Hands on training on “*Microbial Fuel Cell (MFC)*” at Nanda Nath Saikia College. Titabar, Assam



# Hands on Training Courses/Workshop Programs (From 2023- 2024)

A talk was delivered by Dr. Bhaskar Buragohain (Assistant Professor, Department of Botany, Mariani College) on 2 Days Hands on training course/workshop on *“Isolation and screening of beneficial microbes from Rhizosphere soil using culture-based approach”*, dated 11/09/2023 and 12/09/2023



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A talk was delivered by Dr. Pranaba Nanda Bhattacharyya (Assistant Professor, Department of Botany, N. N. Saikia College) on Workshop cum Hands on training on *“Microbial Fuel Cell (MFC)”*, dated 12/12/2023 and 13/12/2023



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# Hands on Training Courses/Workshop Programs (From 2023- 2024)



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**Hands on training of culture media preparation by the students of Mariani College & D.C.B. Girls College**



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**Practical session on Microbial Fuel Cell (MFC) done by Mr. Bhoirob Gogoi**





# Hands on Training Courses/Workshop Programs (From 2023- 2024)



Participants of the workshop on *“Microbial Fuel Cell (MFC)”*, dated 12/12/2023

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Participants showing their interest in the Practical Session, dated 13/12/2023



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Introducing Biotechnology instruments to the participants, dated 11/09/2023

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Students immensely doing gram staining of bacteria, dated 12/09/2023



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# Outreach Activities (From 2023- 2024)

Sl. No.	Topic	Venue	Date& Duration	Name of the invited speaker/ presenter	No. of Participants	Level of participation
1	Technology for quality manure production (Vermicompost, Organic biostimulants for sustainability in agriculture)	Na-Shyam Gaon, Titabar, Assam	5 Days, 25 <sup>th</sup> – 29 <sup>th</sup> May, 2023	Dr. Pranaba Nanda Bhattacharyya (Assistant Professor, Department of Botany, Nanda Nath Saikia College, Titabar) & Dr. Bharat Chandra Nath (Junior Scientist, Assam Agriculture University, Jorhat)	24	Local villagers of Na-Shyam Gaon, Titabar, Assam



**Participants of 5 Days Workshop on “ Technology for Quality Manure Production” was organized at Na-Shyam Gaon, Titabar, Assam, dated 25th – 29th May, 2023**



# Outreach Activities (From 2023- 2024)



**A 5 Days Workshop on “ Technology for Quality Manure Production” was organized at Na-Shyam Gaon, Titabar, Assam, dated 25th – 29th May, 2023**



# Training Programs for Faculty Improvement (From 2023- 2024)

SI No.	Topic	Venue	Date & duration	Name of the presenter/ speaker	No. of Participants	Level of participation
1.	Bio-based Technology for Green Application	N.N. Saikia College, Titabar, Assam	7 Days, 04/03/2024 to 10/03/2024	<ul style="list-style-type: none"> <li>➤ Prof. M. N. V. Prasad (Retired Professor, Environmental Biotechnology, Department of Plant Science, University of Hyderabad)</li> <li>➤ Dr. Hemen Sarma (Associate Professor, Department of Botany, Bodoland University, Assam)</li> <li>➤ Dr. Robin Chandra Boro (Assistant Professor, Department of Agricultural Biotechnology, Assam Agricultural University, Jorhat)</li> <li>➤ Dr. Biswajit Saha (Senior Scientist, Advanced Material Science Technology Division, CSIR-NEIST, Jorhat)</li> <li>➤ Dr. Leong Kah Hon (Associate Professor &amp; Deputy Dean Faculty of Engineering and Green Technology, UTAR Kampur, Malaysia)</li> <li>➤ Prof. Sabitry Choudhuri Bordoloi (Scientist 'G' (Retired), Institute of Advanced Study in Science &amp; Technology, Guwahati)</li> <li>➤ Dr. Yulia Irnidayanti (Department of Biology, Faculty of Mathematics and Science &amp; Technology, Guwahati)</li> <li>➤ Dr. Bipin Kumar Sharma (Assistant Professor Department of Microbiology Tripura University)</li> <li>➤ Madhumita Barooah (Department of Agricultural Biotechnology Assam Agricultural University)</li> </ul>	97	Faculty members, Researchers from universities, colleges, and research institutes across the country & abroad



# Training Programs for Faculty Improvement (From 2023- 2024)

SI No.	Topic	Venue	Date & duration	Name of the presenter/speaker	No. of Participants	Level of participation
1.	Bio-based Technology for Green Application	N.N. Saikia College, Titabar, Assam	7 Days 04/03/2024 to 10/03/2024	<ul style="list-style-type: none"> <li>➤ Dr. Sofia Banu (Assistant Professor, Department of Bioengineering and Technology, Gauhati University)</li> <li>➤ Dr. Anil Hazarika (Assistant Professor, Department of Physics, Cotton University)</li> <li>➤ Prof. Utpal Bora (Department of Bioscience &amp; Bioengineering, Indian Institute of Technology, Guwahati)</li> <li>➤ Mr. Amod Karmacharya (Director, Bhoomithan, Kathmandu, Nepal)</li> <li>➤ Prof. S. K. Mehta, (Department of Botany, Mizoram University)</li> <li>➤ Dr. D. J. Rajkhowa (Ex-Joint Director, ICAR, Medziphema, Nagaland)</li> <li>➤ Dr. Nilkamal Mahanta (Assistant Professor, Department of Chemistry, Indian Institute of Technology, Dharwad, Karnataka)</li> <li>➤ Dr. Amit Kumar Mishra (Department of Botany, Mizoram University)</li> <li>➤ Prof. Tanmoy Karak (FRSC) (Department of Soil Science, School of Agricultural Science, Medziphema, Nagaland)</li> <li>➤ Prof. Sanket J. Joshi (Deputy Director, Amity Institute of Microbial Technology)</li> <li>➤ Dr. Abhay Kumar Pandey (Scientist, Department of Mycology &amp; Microbiology, Tocklai Tea Research Institute, TRA, Jorhat)</li> <li>➤ Prof. Joginder Singh (Department of Botany, Nagaland University)</li> </ul>	97	Faculty members, Researchers from universities, colleges, and research institutes across the country & abroad



# Training Programs for Faculty Improvement (From 2023- 2024)

A 7 Days Faculty Improvement Program on “ Bio-based Technology for Green Application” was organized from 4<sup>th</sup> March to 10<sup>th</sup> March

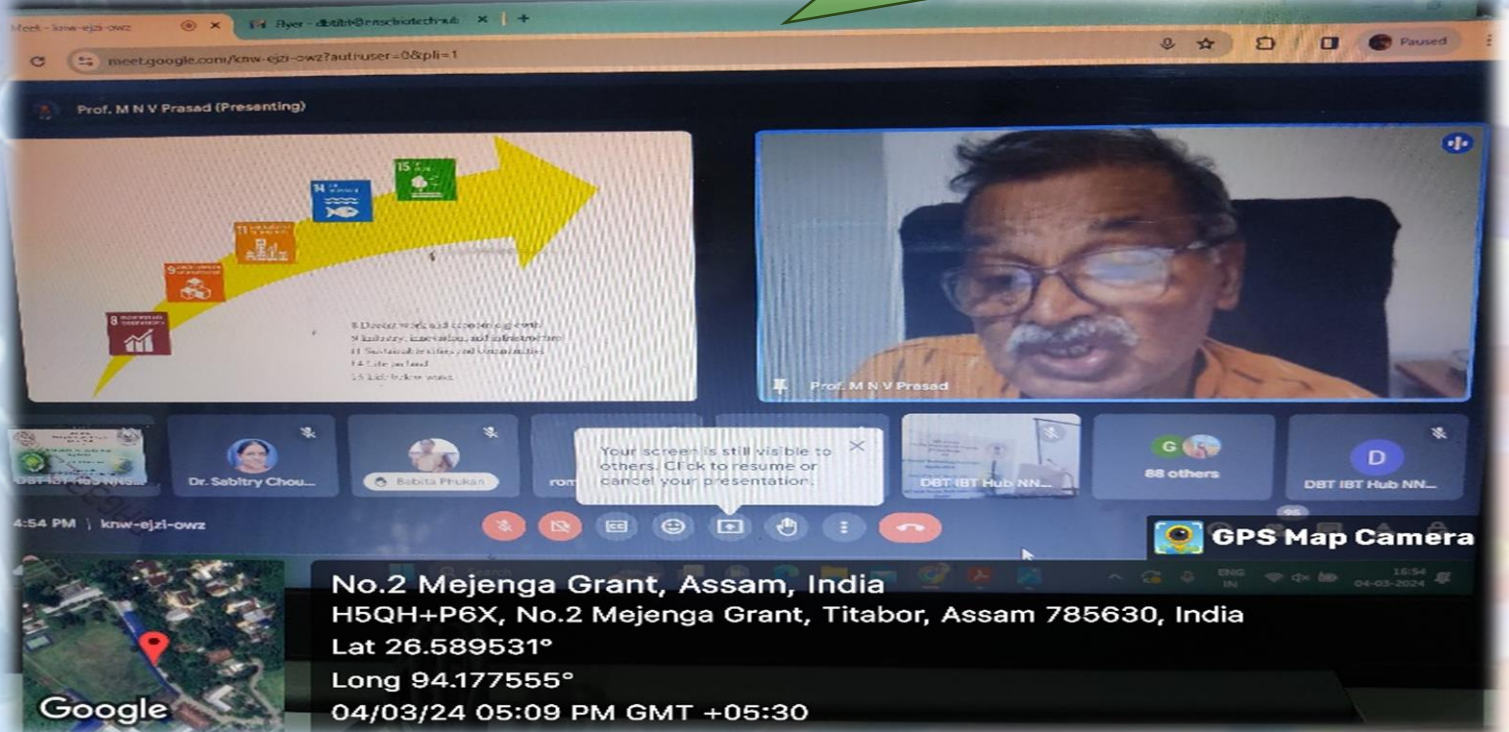




# Training Programs for Faculty Improvement (From 2023- 2024)

A KEYNOTE SPEECH WAS DELIVERED BY **PROF. M. N. V. PRASAD** (RETIRED PROFESSOR, ENVIRONMENTAL BIOTECHNOLOGY, DEPARTMENT OF PLANT SCIENCE, UNIVERSITY OF HYDERABAD)

ON **"FACULTY IMPROVEMENT PROGRAMME"**, DATED 04/03/2024.



Prof. M. N. V. Prasad (Presenting)

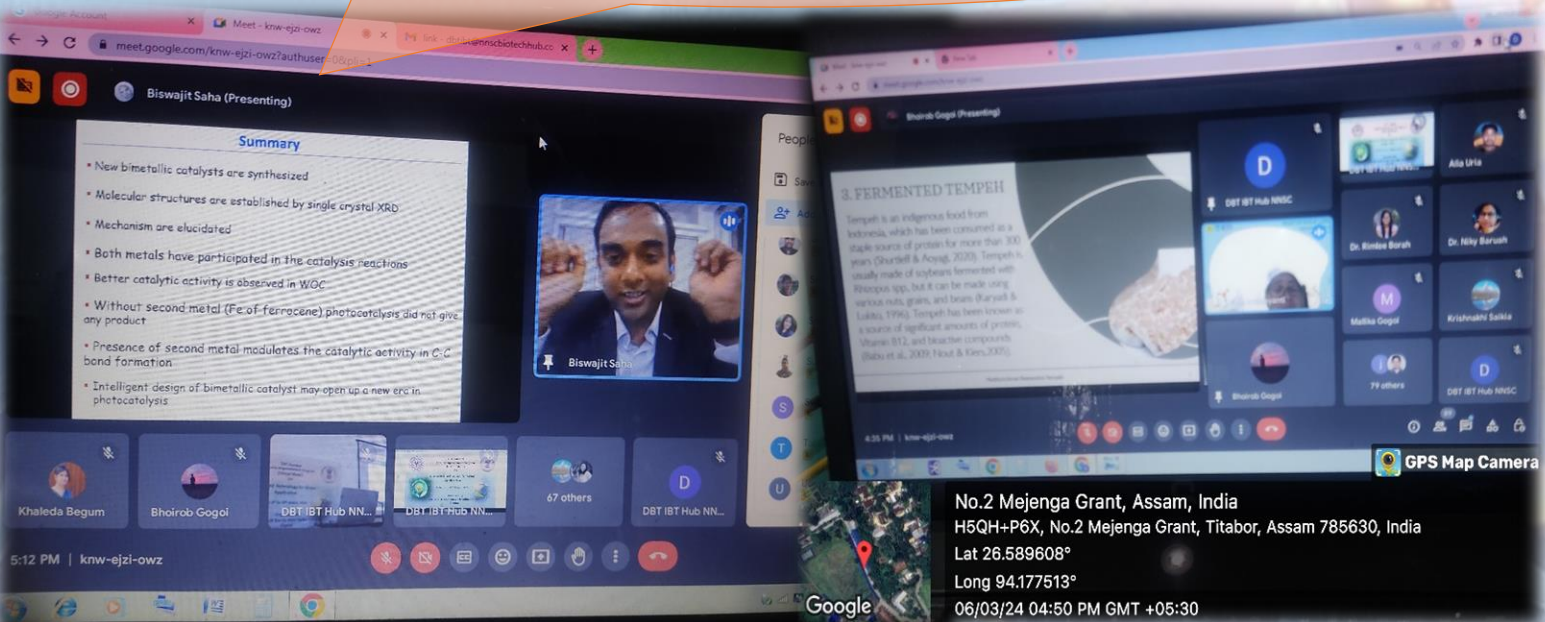
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RESOURCE PERSONS DELIVERED THEIR PRESENTATION ON ON 7 DAYS **"FACULTY IMPROVEMENT PROGRAMME"**



Biswajit Saha (Presenting)

Summary

- New bimetallic catalysts are synthesized
- Molecular structures are established by single crystal XRD
- Mechanism are elucidated
- Both metals have participated in the catalysis reactions
- Better catalytic activity is observed in WOC
- Without second metal (Fe of ferrocene) photocatalysis did not give any product
- Presence of second metal modulates the catalytic activity in C-C bond formation
- Intelligent design of bimetallic catalyst may open up a new era in photocatalysis

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# Awareness Programs (From 2023- 2024)

Sl. No.	Topic	Venue	Date& duration	Name of the presenter/ speaker	No. of Participants	Level of participation
1.	Awareness program on International day for Biodiversity celebration	No.1. Mohbondha Grant, Jorhat, Assam	1 Day, 22 <sup>th</sup> May, 2023	Mr. Bhoirob Gogoi (Technical Assistant of DBT-IBT Hub, N. N. Saikia College, Titabar )	57	Local community people of Sangsua Tea Estate
2.	Awareness program on World Environment Day celebration	Hatichungi Gaon, Jorhat, Assam	1 Day, 5 <sup>th</sup> June, 2023	Dr. Pranaba Nanda Bhattacharyya (Assistant Professor, Department of Botany, Nanda Nath Saikia College, Titabar)	61	Local people of Hatichungi Gaon, Jorhat, Assam
3.	Awareness Program on World Children's Day	Chengelichuk Village, Titabar	1 Day, 20 <sup>th</sup> Nov, 2023	Mr. Bhoirob Gogoi (Technical Assistant of DBT-IBT Hub, N. N. Saikia College, Titabar )	60	Local people of Chengelichuk Gaon, Titabar, Assam



# Awareness Programs (From 2023- 2024)



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## *Celebration of “International Day for Biodiversity” on 22/05/2023 at No.1. Mohbondha Grant, Jorhat, Assam*



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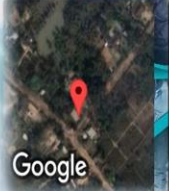
## *Celebration of “World Environment Day” on 05/06/2023 at Hatichungi Gaon, Jorhat, Assam*



# Awareness Programs (From 2023- 2024)



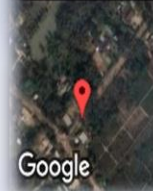
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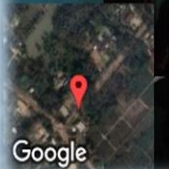
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*Celebration of "World Children's Day" on 20/12/2023 at Chengelichuk Village, Titabar Jorhat, Assam*



# Popular Lecture (From 2023- 2024)

SI No.	Topic	Venue	Date & Duration	Name of the presenter/ speaker	No. of Participants	Level of participation
1.	Recent Advancements in Biotechnology	N.N. Saikia College, Titabar, Assam	1 Day, 3 <sup>rd</sup> February, 2024	Dr. Sangeeta Borchetia (Scientist 'C', I/C Biotechnology Department, Tocklai Tea Research Institute, Jorhat)	84	Students of Department of Botany & Department of Zoology of N. N. Saikia College, Titabar
2.	Recent Advancements in Biological Science: Looking Beyond Boundaries	N.N. Saikia College, Titabar, Assam	1 Day, 10 <sup>th</sup> February, 2024	Dr. Pranaba Nanda Bhattacharyya (Assistant Professor, Department of Botany, Nanda Nath Saiki College, Titabar)	84	Students of Department of Botany & Department of Zoology of N. N. Saikia College, Titabar



# Popular Lecture (From 2023- 2024)

## Speaker:

A Popular lecture was delivered by Dr. Sangeeta Borchetia (Scientist 'C', I/C Biotechnology Department, Tocklai Tea Research Institute, Jorhat) on "*Recent Advancements In Biotechnology*", dated 03/02/2024.



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## Speaker:

A Popular lecture was delivered by Dr. P. N. Bhattacharyya (Assistant Professor, Department of Botany, N. N. Saikia College, Titabar) on "*RECENT ADVANCEMENTS IN BIOLOGICAL SCIENCE: LOOKING BEYOND BOUNDARIES*", dated 10/02/2024.



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## Paper(s) in Journals

1. Bhattacharyya, P. N., Islam, N. F., Sarma, B., Nath, B. C., Al-Ani, L. K. T., & Lesueur, D. (2024). Frankia-actinorhizal symbiosis: a non-chemical biological assemblage for enhanced plant growth, nodulation and reclamation of degraded soils. *Symbiosis*, 92(1), 1–26. <https://doi.org/10.1007/s13199-023-00956-2>
2. Bhattacharyya, P. N., Sandilya, S. P., Sarma, B., Pandey, A. K., Dutta, J., Mahanta, K., Lesueur, D., Nath, B. C., Borah, D., & Borgohain, D. J. (2024). Biochar as Soil Amendment in Climate-Smart Agriculture: Opportunities, Future Prospects, and Challenges. *Journal of Soil Science and Plant Nutrition*, 24(1), 135–158. <https://doi.org/10.1007/s42729-024-01629-9>
3. Borah, D., Bhattacharyya, P. N., & Islam, N. F. (2024). Acceptorless Dehydrogenation of Primary and Secondary Alcohols Catalysed by Phosphine-free C, C Chelated Ir (III) NHC Complexes. *ChemistrySelect*, 9(11). <https://doi.org/10.1002/slct.202304134>
4. Borah, D., Bhattacharyya, P. N., Nath, B. C., Chetia, R., Islam, N. F., & Sarma, B. (2024). Synthesis and antagonistic evaluation of fluorinated imidazolium salt [1-(2,6-diisopropylphenyl)-3-(2-fluoro-benzyl)-1H-imidazol-3-ium bromide] against significant phytopathogens in agriculture. *Journal of Fluorine Chemistry*, 274, 110259. <https://doi.org/10.1016/j.jfluchem.2024.110259>
5. Newar, R., Sultana, N., Das, S., Gogoi, B., Islam, N. F., Sarma, H., & Baruah, A. (2024). Development of FRET-based optical sensors using N-doped carbon dots for detection of chromium (VI) and manganese (VII) in water for a sustainable future. *Journal of Environmental Chemical Engineering*, 12(1), 111721. <https://doi.org/10.1016/j.jece.2023.111721>
6. Hossein, M., Asha, R., Bakari, R., Islam, N. F., Jiang, G., & Sarma, H. (2023). Exploring eco-friendly approaches for mitigating pharmaceutical and personal care products in aquatic ecosystems: A sustainability assessment. *Chemosphere*, 316, 137715. <https://doi.org/10.1016/j.chemosphere.2022.137715>
7. Patowary, K., Bhuyan, T., Patowary, R., Mohanta, Y. K., Panda, B. P., Deka, S., Islam, N. F., Joshi, S. J., & Sarma, H. (2023). Soil treatment using a biosurfactant producing bacterial consortium in rice fields contaminated with oily sludge— a sustainable approach. *Environmental Research*, 220, 115092. <https://doi.org/10.1016/j.envres.2022.115092>
8. Shelke, D. B., Islam, N. F., Chambhare, M. R., Sonawane, H. B., Patowary, R., Prasad, R., & Sarma, H. (2023). Enhancing secondary metabolites and alleviating environmental stress in crops with mycogenic nanoparticles: A comprehensive review. *Biocatalysis and Agricultural Biotechnology*, 52, 102805. <https://doi.org/10.1016/j.bcab.2023.102805>
9. Sonawane, H., Shelke, D., Chambhare, M., Dixit, N., Math, S., Sen, S., Borah, S. N., Islam, N. F., Joshi, S. J., Yousaf, B., Rinklebe, J., & Sarma, H. (2022). Fungi-derived agriculturally important nanoparticles and their application in crop stress management – Prospects and environmental risks. *Environmental Research*, 212, 113543. <https://doi.org/10.1016/j.envres.2022.113543>
10. Sonowal S, Nava A R, Joshi S J, Borah S N, Islam N F, Pandit S, Prasad R and Sarma H (2022). Biosurfactant-assisted phytoremediation of potentially toxic elements in soil: Green technology for meeting the United Nations Sustainable Development Goals. *Pedosphere*, 32(1), 198–210. [https://doi.org/10.1016/S1002-0160\(21\)60067-X](https://doi.org/10.1016/S1002-0160(21)60067-X)



# Research Publications

## Chapter(s) In Book

1. Gogoi, B., Islam, N. F., & Sarma, H. (2024). Microbes are the natural ecological engineers in the forest ecosystem. In *Biotechnology of Emerging Microbes* (pp. 163–187). Elsevier. <https://doi.org/10.1016/B978-0-443-15397-6.00011-5>
2. Islam, N. F., & Sarma, H. (2021). Metagenomics Approach for Selection of Biosurfactant Producing Bacteria from Oil Contaminated Soil. In *Biosurfactants for a Sustainable Future* (pp. 43–58). Wiley. <https://doi.org/10.1002/9781119671022.ch2>

## Paper Presentation in Conference



Paper presented by Dr. N. F. Islam on 8<sup>th</sup> Asia Conference on Environment and Sustainable Development (ACESD 2023) – ***“Biosurfactant Based Remediation of Crude Oil Contaminated Soil: A promising Approach”***, From November 3 to 5, 2023, Sapporo, Japan



# New leads obtained during the year 2023- 2024

- Developed a consortium of two biosurfactant-producing bacteria, *Bacillus pumilus* KS2 and *Bacillus cereus* R2, to address petroleum hydrocarbon pollution in paddy soil. Over a six-month period, the considerable degradation of total petroleum hydrocarbons (TPH) (91.24%, 74.35%) in the treated soil samples was observed. With the decrease in the TPH level in the polluted soil, a significant improvement in the soil's physicochemical qualities (such as pH, electrical conductivity, total organic content, and water-holding capacity) was observed.
- An unsymmetrical imidazolium salt, [1-(2,6-diisopropylphenyl)-3-(2-fluoro-benzyl)-1H-imidazol-3-ium bromide], with a fluorine atom in the ortho position, was synthesized to combat different phytopathogens. Antimicrobial experiments were performed to determine its activity against certain Gram-negative bacterial phytopathogens such as *Ralstonia solanacearum* and *Xanthomonas citri* pv. *citri*, as well as two fungal phytopathogens, *Fusarium solani* and *Pseudopestalotiopsis chinensis*. The study reveals that the fluorinated imidazolium salt has potential as a commercial antimicrobial agent for integrated disease management methods targeted at combating important phytopathogenic infections in agriculture, especially those impacting tea growing. These findings provide an intriguing route for future research in the field of plant disease control, perhaps opening the path for more sustainable agriculture.
- Successfully blue luminous N-doped carbon dots (NCDs) were synthesized using *Alstonia scholaris* leaves and ethylenediamine in a hydrothermal process. The resultant NCDs exhibited good chemical and physical properties, with a notable quantum yield of 21%. These NCDs were applied for the FRET-based detection of Cr<sup>6+</sup> and Mn<sup>7+</sup> ions in water samples to investigate their suitability as fluorescent probes. The detection limit was 0.173 μM and 0.394 μM for Cr<sup>6+</sup> and Mn<sup>7+</sup>, respectively. Overall, this work highlights an environmentally friendly technique for readily producing blue fluorescent NCDs, implying that they have great promise for future sensing applications, particularly for detecting heavy metal ions in water.
- An efficient and environmentally friendly catalytic method was developed for synthesizing ketones and aldehydes through acceptorless dehydrogenation of alcohols. The procedure uses C,C-chelated Ir(III) NHC complexes as catalysts to dehydrogenate both secondary and primary alcohols. Importantly, primary alcohols were selectively oxidized to yield the appropriate aldehydes while reducing the generation of ester byproducts. A wide range of aliphatic and aromatic aldehydes and ketones, including challenging carbonyl compounds bearing heterocyclic rings, were obtained in moderate to high yields by employing C,C-chelated Ir(III) NHC complexes (at a catalyst loading of 0.1 mol%) in combination with a catalytic amount of t BuONa base (5 mol%). Furthermore, the approach was successful in synthesizing industrially relevant compounds such as heliotropin and 3,4,5-trimethoxy acetophenone at moderate quantities. Notably, the catalytic system allows for the simple synthesis of potentially bioactive compounds such as cholest-4-en-3-one via acceptorless dehydrogenation followed by double bond isomerization under the reaction conditions. This catalytic process has minimal catalyst loading, mild reaction conditions, good selectivity, fast reaction durations, and a broad substrate scope, making it a potential strategy for the synthesis of different ketones and aldehydes.



# Student-oriented small research projects (From 2023- 2024)

SI No.	Title	Person Involved	Status
1	Hands on training on B.Sc. students on DNA estimation by diphenylamine reagent/UV Spectrophotometry, isolation of genomic DNA from bacteria	Miss Khaleda Begum	Completed
2	Isolation of Root Nodule Bacteria.	Dr. N. F. Islam	Completed
3	Study of pollen grain using Acetolysis Mixture	Miss Khaleda Begum	Completed

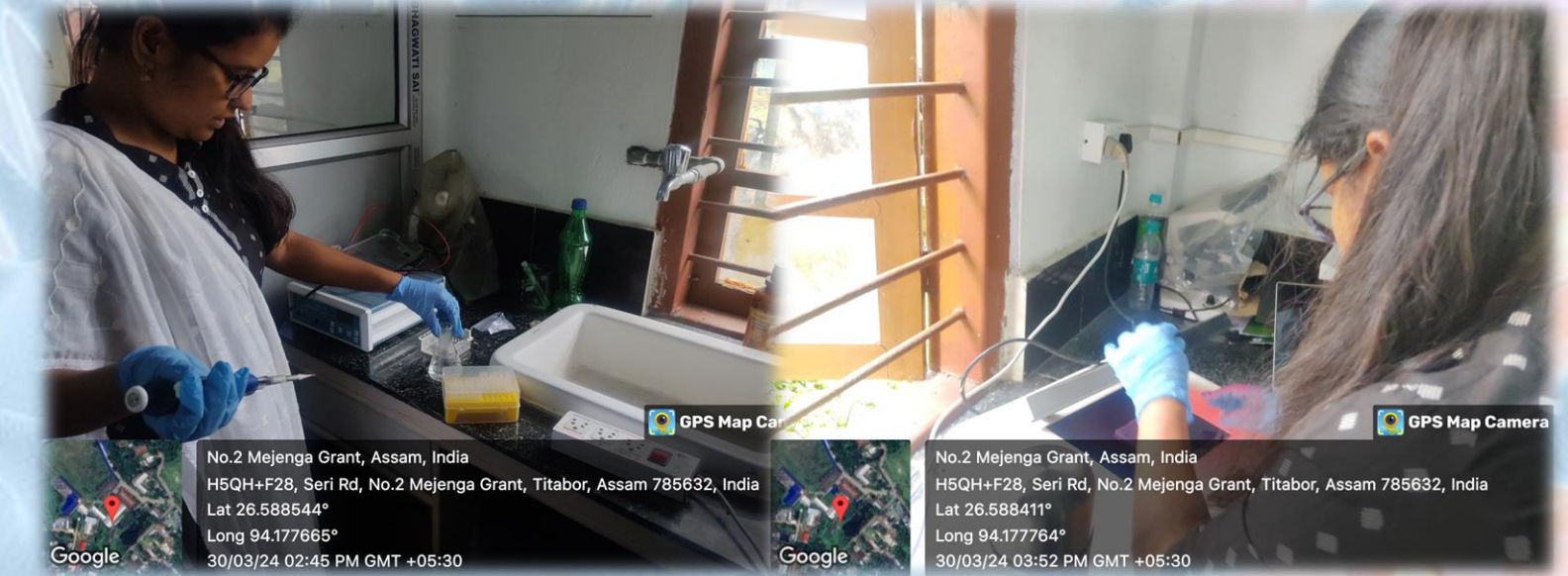


# Student-oriented small research projects (From 2023- 2024)



No.2 Mejenga Grant, Assam, India  
H5QH+F28, Seri Rd, No.2 Mejenga Grant, Titabor, Assam 785632, India  
Lat 26.588548°  
Long 94.177774°  
30/03/24 01:41 PM GMT +05:30

No.2 Mejenga Grant, Assam, India  
H5QH+F28, Seri Rd, No.2 Mejenga Grant, Titabor, Assam 785632, India  
Lat 26.588536°  
Long 94.177652°  
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No.2 Mejenga Grant, Assam, India  
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No.2 Mejenga Grant, Assam, India  
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Lat 26.588411°  
Long 94.177764°  
30/03/24 03:52 PM GMT +05:30

*“DNA estimation by diphenylamine reagent/UV Spectrophotometry, isolation of genomic DNA from bacteria”, dated 30/03/2024*





Participants of the 5 Days Workshop on **“Technology for Quality Manure Production”** dated 25th – 29th May, 2023

Participants interacting with the Resource Person, dated 03/02/2024



Organizing Team of One week Faculty Improvement Programme on **“Bio-based Technology for Green Application”**

Students immensely doing hands on training on **“DNA estimation”**, dated 30/03/2024

