DBT network programme enables northeastern students to deconstruct chemical interactions within local biodiversity

DBT's chemical ecology network programme entitled 'Chemical Ecology of the North East Region (NER) of India: A Collaborative Programme Linking NER and Bangalore Researchers' is a novel, exciting and multidisciplinary programme in the field of chemical ecology. It is also a multi-institutional programme linking three Bengaluru-based institutions, i.e. National Centre for Biological Sciences (NCBS, TIFR), University of Agricultural Sciences (UAS) and Indian Institute of Science (IISc) with five institutions from the North East, i.e., Nagaland Science and Technology Council, Kohima; North-Eastern Hill University, Shillong; Institute of Bioresources and Sustainable Development, Imphal; Regional Centre–Institute of Bioresources and Sustainable Development, Sikkim, and Rajiv Gandhi University, Itanagar. The programme leverages opportunities in the NE states, which offer unique natural resources and possibilities for field research in chemical ecology.

One of the major goals of this programme is capacity development, including tailored interdisciplinary training to Ph D students from the northeast. As coordinating partner, the NCBS, TIFR is leading the capacity-building activities of this flagship programme. Since its inception in 2015, several capacity-development activities have been organized. Some of the important programmes conducted for students from the NE during 2016–17 are as follows.

(1) Course work on chemical ecology: A five-month course work on chemical ecology was organized for 15 JRFs from the above-mentioned five NE institutions. The aim was to develop a general understanding of the chemoecological rationale and a prospective thinking among the participants. The ultimate aim was to prepare a team of creative, thoughtful and inquisitive chemical ecologists. The courses embraced multiple modes of teaching including classroom teaching, discussions with critical analysis of the subject, inquiry-based case studies, practical sessions involving observation of natural phenomena with hypothesis testing, field observations of wildlife, biodiversity and plant–animal interactions. More than 250 hours of teaching and practical courses were conducted. The training course was facilitated by 12 faculty members from NCBS, UAS and IISc. We hope it stimulated the interests of the researchers involved and has helped in strengthening their understanding of chemical ecology.

(2) Training on the use of HPLC and GC-MS: The northeast JRFs were offered theoretical as well as practical knowledge on the use of HPLC and GC-MS at Agilent Technologies, Bengaluru. Training was provided, including theory and fundamentals of chromatography and mass spectrometry, followed by equipment demonstration of various hardware modules and software parameters, and finally experimental demonstration and data processing for qualitative and quantitative studies.

(3) Training on tools and techniques: JRFs were also sent to the Indian Institute of Integrative Medicine, Jammu for a 15-day training on the use of tools and techniques in chemical ecology. This training course instructed northeast students on the use of advanced scientific equipment like GC-MS, HPLC and NMR. Students were provided theoretical knowledge, practical demonstration and hands-on training on the following:

- Principle and operation of HPLC, GC-MS and NMR.
- Hydro-distillation of aromatic plants for extraction of essential oils.
- Extraction of compounds using column chromatography.
- Isolation of endophytes and extraction of chemicals from microbial fungal source.
- Preparation method for sample analysis on GC-FID, TLC and HPTLC.
- Demonstrations on confocal and electron microscopy.

(4) Field training: A three-day field training was organized at Agumbe Rainforest Research Station to expose the students to the biodiversity-rich rainforests of the Western Ghats in India. Students were introduced to several endangered and endemic plants and animals species unique to the Western Ghats.

Additional capacity-development programmes including on-line lectures on chemical ecology are being planned for undergraduate and postgraduate students as well as young scientists of the northeastern institutes and other parts of the country.

We are hopeful that the multi-institutional and multidisciplinary nature of this programme linking Bengaluru-based scientists with various institutions in the northeast India will lead to new scientific developments that increase our understanding of chemoecological interactions in an exceptionally biodiverse region of the world. We expect that such programmes will also create knowledge and build local frameworks to continue investigating and exploring new horizons. On the flip side, driving such scientific capacity-building activities will provide Indian scientists with unique perspectives and opportunities to participate in career development opportunities.

For more information please visit: https://www.ncbs.res.in/ChemicalEcology/home; https://scenicprogram.blog/

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