



## Marine Bioresources and Pollutant Biomarkers 13<sup>th</sup> to 19<sup>th</sup> October 2022

The DST STUTI sponsored National Workshop on “Marine Bioresources and Pollutant Biomarkers” was organized by the schools of Environmental Sciences and Marine Sciences of Bharathidasan University, Tiruchirappalli in collaboration with JSS AHER, Mysore during 13<sup>th</sup> to 19<sup>th</sup> October 2022. The Organising Secretaries are Dr. K. Thamaraiselvi, Professor and Head, Department of Environmental Biotechnology, Chair - School of Environmental Sciences, Dr. M. Prashanthi Devi, Associate Professor, Department of Environmental Science and Management, Dr. P. Santhanam, Associate Professor, Department of Marine Science, Dr. S. Rajakumar, Assistant Professor, Department of Marine Biotechnology from Bharathidasan University and Dr. B.Madhu, Deputy Director of Research from JSS AHER.

The DST STUTI Training programme on Marine Bioresources and Pollutant Biomarkers mainly focused on of effective lectures and intensive hands-on training of analytical sessions to analyse the contaminants in the environment using high analytical techniques and biomarker tools with particular relation to marine resources and pollution. The major techniques focused were GCMS, CO<sub>2</sub> sequestration, mRNA isolation, cDNA construction, expression studies using RT PCR and result analysis.

The brochure for the training programme was widely circulated through the Bharathidasan University, JSS AHER websites as well as social media platforms, WhatsApp groups, etc. For the training programme, 107 applications were received out of which 30 participants were selected. The participants were Faculty Members, Teaching Assistants, Research Scholars, Post-doctoral Fellows and Post Graduate students from Engineering, Physics and Life Sciences backgrounds. All except the in-house participants were accommodated in the Pavendhar Illam (International Guest House) at Bharathidasan University Campus.

The programme was inaugurated on the 12<sup>th</sup> October around 4.00 pm at the AC auditorium of Bharathidasan University Tiruchirappalli after the registration of the participants. Dr. K. Thamaraiselvi welcomed the audience and Dr. Prashanth M. Viswanath, Director (Research), JSS AHER spoke about DST STUTI, its objectives and how JSS AHER has been organizing several training programmes under this banner. He also spoke on the importance of biomarkers and marine pollution as a research area to be explored by young research minds. Dr. Prashanthi Devi M spoke about the training schedules and detailed about what the participants can expect from this seven-day



hands on experience. The Registrar, Dr. L. Ganesan presided over the programme insisting on the utilization of the available analytical and intellectual resources of Bharathidasan university. Dr. A. Ilangovan, Dean of Sciences spoke on the importance of knowledge enhancement and how such events are helpful in bring intellectual resources under one roof. Dr. B. Madhu, Deputy Director of Research, JSS AHER threw light on the collaborative journey speaking on the expected outcomes of such research collaborations. Dr. R. Arthur James, Head, Department of Marine Sciences and Chair, School of Marine Sciences proposed the Vote of Thanks. The inauguration ceremony was followed by a cultural night by the students of Bharathidasan University exhibiting the cultural and modern skills and later ended with a high dinner.

The schedule of the programme included four sessions per day with resources lectures in the first session followed by hands on training for the second, third and session. The participants we offered working tea and lunch at the respective venues of the sessions. The day one started of with the introduction of the participants and their purpose of attending this training programme.

The first technical session of the Training programme started with a lecture by Dr. R. Rajaram, Associate Professor, Department of Marine Science, Bharathidasan University on the Standard operating procedures (SOPs) for analysis of metals in environmental samples using AAS. He provided extensive knowledge about the metals their sources and fate in the environment. He further indicated how Atomic absorption spectrometry (AAS) is an easy and inexpensive technology used primarily to analyse the concentrations of the metals in environmental and biotic samples and elements in either liquid or solid samples. The participants interacted well with the resource person. The participants were exposed to hands on training on AAS later in the Department of Marine Sciences. Each participant was given individual attention on handling the equipment.

The day two started with the resource lecture on GC-MS for Marine Pollutants Determination by Dr. R. Babu Rajendran, Professor, Department of Environmental Biotechnology, Bharathidasan University. The lecture was delivered through online mode as the resource person is currently a Visiting Professor at Kobe University, Japan. The lecture was followed by hands on session on GC-MS procedure for Determination of Plasticizers in Marine Samples. The participants were much enlightened by the session and gave positive feedback for the day.

For days three and four, a field trip to Rameswaram was arranged to collect marine samples and visit the Central Marine Fisheries and Research Institute, ICAR Institute, Mandapam. The participants left early in the morning on 15.10.2022 and reached



CMFRI for breakfast. Following which they had a lecture by Dr. R. Jayakumar, Principal Scientist, Finfish Culture Division, ICAR-CIBA, Chennai on Biotechnological applications in aquaculture.

He gave his views on the biotechnological applications such as protein expression, microsatellite markers, gene mapping, DNA vaccines, synthetic hormones, proteomics, probiotics, cryopreservation of fish milt, selective breeding, fish health diagnostics and bio remediation are widely used in aquaculture

The second session was handled by Dr. M. Sakthivel, Senior Scientist, CMFRI, Mandapam who delivered a lecture on Mariculture Technology. Mariculture is a specialized branch of aquaculture involving the cultivation of economically important marine plants and animals in the sea or any other natural water body having tidal influence and includes onshore facilities like hatcheries, nursery rearing and grow out systems using seawater. He pointed out that mariculture for seafood production has advanced only by a few infant steps and is an emerging sector in India.

After lunch the participants visited the Live Feed Culture, Hatchery, Ornamental Fish Culture, RAS Museum and the Aquarium followed by the cage cultures.

After the sessions, later in the evening, the participants were accompanied to the Memorial of Dr. APJ Abdul Kalam at Rameshwaram, to commemorate the Great Leader's birthday.

On 16.10.2022, the sampling of live fish was organized at the landing center and the participants were introduced to the different kinds of marine fish and their economic importance. Later, the participants were taken to Crusade islands, a Gulf of Mannar Bioserve island to see the coral reefs and the other marine species like star fish, turtles, urchins, etc. A visit to Dhanuskodi and Arichal Munai which are historically important places was arranged. At Arichal Munai, the eastern most point of Tamil Nadu and the nearest point to Srilanka, the participants were allowed to view the changing coastal line due to accretion and the changing sand dunes due to wind activity.

The participants returned to Bharathidasan University at 10.30 pm after two days of good learning experience and an explorative field trip. The participants expressed their knowledge gain and how much they learned in the field trip.

The day five started with a brief sharing about the participants' experience in the field trips and a feedback which was handled by Dr. S. Chandan, Assistant Professor of Bioinformatics, JSS AHER. He shed light on how training programmes coupled with field experience and sampling methods are important for researchers in the biological field.

The next session was a lecture on Biomarkers in carcinogenic



risk assessments with emphasis to environmental pollutants by Dr. R. Mohanraj, Professor, Dept. of Environmental Science and Management, Bharathidasan University. He emphasized that the Assessment environmental PAHS and their health implications and risks involve a tedious process of cohort or personal exposure study and toxicity investigations. As another option, biomarkers provide information about health effects of individual load of toxicant.

The session was followed by practical on qPCR techniques. The participants were allowed to dissect the fish samples each and the mRNA isolation procedure was demonstrated to them. They were then asked to individually carry out the procedure with their samples. Following the mRNA isolation, the participants carried out the cDNA construction procedures. They also were instructed to carry out the procedures individually.

On 18.10.2022, day six, Dr. P. Rajaguru, Professor and Head, Department of Life Sciences, Central University of Tamil Nadu delivered two lectures on Biomarkers for aquatic ecosystem monitoring and Biosensors for aquatic ecosystem monitoring during the morning.

He spoke on how changes observed in the functional and physiological properties of individual organisms or community belonging to phytoplankton, zooplankton, macrophytes, benthic macroinvertebrates, and fish are commonly used as bioindicator/biomarker for the quality assessment of aquatic ecosystems. He lectured on how bioindicators and biomarkers may be used as early warning indicators of the presence of stressors.

Later the participants had their practical on expression studies of qPCR methods.

The day seven started with a lecture on Environmental pollution associated neurodevelopment disorders by Dr. K. Emmanuvel Rajan, Professor, Dept. of Animal Sciences, Bharathidasan University. He spoke on maternal exposure to valproic acid/ valporate (VPA; active pharmaceutical ingredients in migraines, mood stabilizing drugs) during pregnancy increases the risk for the development of Autism Spectrum Disorder. He examined the prenatal exposure to VPA will alter expression of key genes, synaptic morphology of NGF and Reelin expressing neurons in the cortex of male offspring.

The session was followed by result analysis and interpretation of the qPCR methods done in the laboratory over the past three days. The participants interpreted their graphical results and sought the help of the research scholars to analyze the same.

The post lunch session was a feedback session and Panel discussion conducted by Dr. B E. Dhanya of JSS AHER and Dr. S. Achiraman of Bharathidasan University. The participants were allowed to share their experiences and their knowledge gain at this session. Drawbacks of the



training programme were also put forth.

The Panel discussion highlighted the importance of the resource's lectures and its relevance to the current day's research trend in the Marine forefront. The parallelly run practical session and the individual attention given was also discussed.

The participants also commended both JSS AHER And Bharathidasan University for offering a platform of the advanced techniques and instrumentation under the DST STUTI programme.

The day concluded with a Valedictory event presided over by Dr. M. Selvam, Vice Chancellor of Bharathidasan University. Dr. K.Anbarasu, Associate Professor, Department of Marine Biotechnology welcomed the dignitaries and Dr. P. Santhanam, Associate Professor, Department of Marine Science delivered the Training report in a illustrative manner.

Delivering the presiding note, the Vice Chancellor Dr. M. Selvam spelled out the objectives of STUTI and thanked JSS AHER for having partnered with Bharathidasan University in offering this training programme. He highlighted that sophisticated analytical equipment are available at Bharathidasan University and invited scholars from all over the nation to tap the resources. He insisted that more training programmes of such manner should be conducted to train the youth of India.

Dr.B.Madhu and Dr. B E Dhanya of JSS AHER felicitated mentioning how this is the first such programme with a field visit and how immensely the participants have benefitted from this programme. The certificates were distributed to the participants concluding with the Vote of Thanks by Dr. S. Rajakumar, Assistant Professor and Organizing Secretary, Department of Marine Biotechnology. Also, certificates were given to best performed participants based on a test.

