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Notice for the PhD Viva Voce Examination

Ms Irene Monica J, Registration Number: 2170189, PhD Scholar at the Department of Life Sciences, School of Sciences, CHRIST (Deemed to be University) will defend her PhD thesis at the public viva-voce examination on Thursday, 22 January 2026 at 11.00 am in Room No. 044, Ground Floor, R&D Block, CHRIST (Deemed to be University), Bengaluru - 560029, Karnataka, India.

Title of the Thesis	:	**Ecotoxicological Assessment of Microplastic Contamination In Bangalore's Freshwater Lakes: Implications for Aquatic Ecology with a Focus on *Oreochromis niloticus***
Discipline	:	**Zoology**
External Examiner - I	:	**Dr A Uthpala A Jayawardena** Professor & Head Department of Zoology, Central Campus The Open University of Sri Lanka, Nawala, Nugegoda
External Examiner - II	:	**Dr Subburaman Senthilkumar** Professor and Head Department of Biotechnology School of Biological Sciences St. Joseph's College (Autonomous) Tiruchirappalli – 620002 Tamil Nadu
Supervisor	:	**Dr Majesh Tomson** Assistant Professor Department of Life Sciences School of Sciences CHRIST (Deemed to be University) Bengaluru – 560029 Karnataka, India

The members of the Research Advisory Committee of the Scholar, the faculty members of the Department and the School, interested experts and research scholars of all the branches of research are cordially invited to attend this open viva – voce examination.

Registrar (Academics)

Place: Bengaluru
Date: 09 January 2026

ABSTRACT

Microplastics, defined as plastic particles smaller than 5 mm, are increasingly recognised as pollutants of emerging concern due to their adverse effects on aquatic biota with broader ecological implications. The present study evaluated their prevalence and distribution in the water column and bank sediments of four urban lakes in Bengaluru - Seetharampalya, Puttenahalli, Bellandur, and Madiwala, each impacted by anthropogenic activities such as improper waste disposal and effluent discharges from wastewater treatment facilities. Water and bank sediment samples were systematically collected and processed using the Wet Peroxide Oxidation (WPO) method, enabling the degradation of organic matter and subsequent isolation and characterisation of plastic particles. Scanning Electron Microscopy (SEM) revealed that microplastics in Seetharampalya Lake water appeared as clustered, irregular fragments, whereas those in its bank sediment displayed sheet-like structures with occasional clumps. Puttenahalli Lake water contained uneven, roughly rectangular particles, while its sediment predominantly comprised globular masses in sheath-like formations. No microplastics were detected in the water of Bellandur and Madiwala Lakes; however, their sediments contained irregular, sheath-like structures (Bellandur) and globular sheath-like aggregates (Madiwala). Energy Dispersive X-ray Analysis (EDAX) consistently confirmed the presence of carbon and oxygen, while Fourier Transform Infrared Spectroscopy (FTIR) identified polymer types: Delrin and Polypropylene (Seetharampalya water), Polyethylene (Puttenahalli water), Polyethylene Terephthalate and Polystyrene (Puttenahalli bank sediment), Acrylonitrile Butadiene Styrene and Polystyrene (Bellandur bank sediment), and Polypropylene, Polystyrene, and ABS (Madiwala bank sediment). X-Ray Diffraction (XRD) revealed crystallinity (2θ: 19°–27°), though environmental degradation might have altered structural forms. Biochemical assays of Oreochromis niloticus exposed to microplastics for 60 days demonstrated elevated digestive, metabolic, and antioxidant enzyme activities compared with unexposed controls. Field-collected samples exhibited reduced biochemical constituents and histopathological abnormalities across gill, gut, muscle, kidney, and liver, including mononuclear cell infiltration. Cytochrome P450 (CYP1A) expression was markedly upregulated in laboratory-exposed fish, followed by Puttenahalli samples, with slight elevation in Seetharampalya and Madiwala specimens. This study constitutes the first systematic assessment of microplastics in Bengaluru lakes, underscoring the urgent need for effective mitigation strategies to safeguard freshwater ecosystem integrity and regional water quality.

Keywords: Microplastics, freshwater, pollution, ecology, diversity, analytical techniques, Oreochromis niloticus, CYP450

Publications:

1. I. M. Jaikumar and M. Tomson, 'A Pilot Study on Detection of Microplastics for Environmental monitoring using Inland Lakes as Ecological Indicators', Indian J. Environ. Prot., vol. 44, no. 11, pp. 963–976, Nov. 2024.
2. I. M. Jaikumar and M. Tomson, 'Exploring Microplastic Pollution in Bellandur and Madiwala Lakes of Bangalore: A Preliminary Study', Water Resour., vol. 52, no. 2, pp. 355–371, Apr. 2025, doi: 10.1134/S0097807824604977.
3. I. M. Jaikumar et al., 'Detrimental effects of microplastics in aquatic fauna on marine and freshwater environments – A comprehensive review', J. Appl. Biol. Biotechnol., Jan. 2022, doi: 10.7324/JABB.2023.110104.
4. I. M. Jaikumar et al., 'A comprehensive review of microplastic pollution in freshwater and marine environments', Green Anal. Chem., vol. 12, p. 100202, Mar. 2025, doi: 10.1016/j.greeac.2024.100202.
5. I. M. Jaikumar and M. Tomson, 'Harnessing Green Technologies for Insect Pest Management - a Sustainable Path for Better Tomorrow', in Harmony in Agriculture - Harnessing Green Technologies for Eco-friendly Insect Pest Management, Cornous Publications LLP, 2025, pp. 79–86. doi: 10.37446/edibook082025/79-86.