

Assessment of microplastic pollution in water and sediment: a preliminary study in Uma-o-ya and Badulu-o-ya sub-catchments of the Mahaweli river, Sri Lanka

Chandana N. T.¹, De Silva D. S. M.^{1*}, Amarathunga A. A. D.², Hettige N. D.², and Perera H. A. C. C.³

¹ Department of Chemistry, University of Kelaniya, Kelaniya, Sri Lanka.

² Environmental Studies Division, National Aquatic Resource Research and Development Agency (NARA),
Crow Island, Sri Lanka.

³ Department of Zoology and Environmental Management, University of Kelaniya, Kelaniya, Sri Lanka.

* sujeewa@kln.ac.lk

Microplastics (≤ 5 mm) are emerging global pollutants. Their accumulation in freshwater ecosystems converts these into contaminant sinks, making microplastic pollution a significant global issue. While numerous studies have examined microplastics in marine ecosystems, research on microplastic pollution in Sri Lankan rivers remains limited. Hence, this study investigated the presence of MPs in the Uma-Oya (UO) and Badulu-Oya (BO) sub-catchments of the Mahaweli River. In June 2024, water and sediment samples were collected from ten sites, with a total of 20 surface water samples ($n=20$) and 30 sediment samples ($n=30$) analyzed. MPs in sediments were extracted using density separation and organic matter digestion, while surface water residues (0.125–5 mm) underwent KOH digestion and density separation with NaCl. Filtered samples were analyzed using a stereomicroscope, and ATR-FTIR identified polymer types in particles larger than 5 mm. Microplastics (MPs) in the sediments of Uma Oya and Badulu Oya were found in various colors, with blue being the most dominant, accounting for 35.14% and 35.53%, respectively. Similarly, in surface water, blue MPs were the most prevalent, making up 29.25% and 27.37%, respectively. Fiber-shaped MPs were the most abundant in sediments (UO; 67.56%, BO; 76.32%) and surface water (UO;

53.06%, BO; 50.43%). The most common MP size in sediments was 1–2.5 mm (UO; 43.24%, BO; 40.79%), while in surface water, it ranged from 1–2.5 mm (UO; 38.1%, BO; 36.49%). The mean MP abundance in surface water was 1.05 ± 0.095 and 2.67 ± 1.51 items/ m^3 , while in sediments, it was 9.99 ± 5.39 and 12.49 ± 11.02 items/kg. ATR-FTIR identified polypropylene, high-density polyethylene, styrene ethylene butylene styrene, polyethylene terephthalate and polypropylene copolymer as polymer types. This study demonstrates the widespread presence of microplastics in Uma Oya and Badulu Oya, highlighting their significant contribution to freshwater pollution and underscoring the need for targeted pollution management strategies.

Keywords:

Badulu oya; freshwater; microplastics; sediment; Uma oya

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