

Assessing microplastics in water and sediment at river mouth of Nilwala basin

H.B. Asanthi*, A.M.R.C. Attanayake and U.A.D. Jayasinghe

Department of Limnology & Water Technology, Faculty of Fisheries and Marine Sciences & Technology, University of Ruhuna, Matara, Sri Lanka

Abstract

The amount of mismanaged plastics entering into the aquatic system has increased with the demand for synthetic plastics around the world. Among these plastics, particles with a diameter less than 5 mm are defined as Microplastics (MP). There exists a gap in documented types of MPs that contribute to plastic pollution in coastal waters. Therefore, the aim of this study was to evaluate the MP content at the Nilwala River mouth, Sri Lanka. Investigations were carried out for three consecutive months from January 2020, by collecting samples bi-weekly. A total of 162 water samples collected from bulk sampling and 54 sediment samples collected using Ekman grab were collected from three sites (S1, S2 & S3) located with a gap of 1 km in between starting from the river mouth to upstream. Samples were filtered using a 30 µm mesh sieve and digested using 30% H₂O₂. Finally, the samples were filtered using Glass Fiber grade C (GF/C) filter papers and observed under a stereomicroscope. Identification was carried out using Nile Red analysis and or hot needle test. The shape and color of MPs were recorded. The mean abundance of MPs in water was 93.85± 32.63 particles per liter of water sample, while the minimum and maximum values recorded were 64 and 130 particles per liter of the water sample. In sediment, it was varying from 69 to 140 with a mean value of 102.85±40.07 particles per kg of dry weight. Of those 3 months results, the highest MP particle abundance was recorded in February for water and in January for sediment. Of the different shapes of MPs observed, fibers were the most abundant as 71% in water and 67% in sediment. The most recorded color of MP was blue colored fibers and fragments in both sediment and water samples. The highest mean abundance of MPs was recorded as fibers (109.33 ± 24.70) particles per liter of the water sample from site 2 in February. There was no significant difference of mean abundance in the types of microplastics in water and sediment samples among the three sites (P>0.05). More studies are needed to make a comprehensive assessment of MP pollution in Nilwala river basin.

Keywords: Aquatic pollution, Microplastic, Nilwala basin, River mouth, Sediment contamination

*Corresponding Author: asanthi@fish.ruh.ac.lk