

**QUANTITATIVE ANALYSIS OF MICROPLASTICS
IN SURFACE WATER, OFF COLOMBO WEST
COAST OF SRI LANKA**

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Abstract

The ubiquitous presence of plastic litter in coastal environment is a particular concern thus these contaminants represent an increasing threat to marine environment. Hence, this study mainly addresses morphological identification and quantification of microplastics (0.25–5 mm) with spatial variability in surface waters of seven sites namely Uswetakeiyawa, Kerawalapitiya, Dikowita, Portcity, Kollupitiya, Bambalapitiya and Wellawatta along west coast-off Colombo during August-November 2017. Marine floating litter was collected, by towing a manta net, mesh size of 300 μm and microplastics were recovered from samples using visual and microscopic observation. Visually identified microplastics (1-5 mm) were confirmed by hot needle test and categorized into 4 classes based on color: black, white, colored and transparent. Remaining residuals were subjected to wet peroxide oxidation and observed under light microscope. Total microplastics were categorized in to three classes based on the shape: filaments, films and fragments. Sorted plastics were quantified as number and weight. Overall mean concentration of microplastics was 140.16 ± 13.99 items/ m^3 . Significantly highest ($p < 0.05$) abundance of microplastics was observed in Wellawatta (316.04 ± 64.10 items/ m^3) by number of items. Mean abundance of visually identified microplastics 0.33 ± 0.13 mg/ m^3 and 0.39 ± 0.05 items/ m^3 by weight and number of items respectively. Abundance of white colored visually identified microplastics significantly varied spatially, due to site-specific anthropogenic activities ($p < 0.05$). Highest number of white microplastics accumulated in water samples of Uswetakeiyawa (0.35 ± 0.06 items/ m^3) by land based sources of tourism and recreational activities. Abundance of total micro-filaments was significantly varied among geographical locations ($p < 0.05$). Significantly highest micro-filament abundance was recorded from Wellawatta (263.172 ± 43.755 items/ m^3) by number of items due to fisheries activities. According to results, all study sites are affected by plastic pollution and cause significant health risk on coastal biota. Microplastic contamination level in surface waters acts as a key indicator on high pollution level in west coast. Site specific management measures are suggested to mitigate microplastic pollution. Frequent estimations of microplastic abundance in surface water are recommended throughout year in west coast of Sri Lanka. This study provides baseline information on microplastics level in surface water of west coast.

Keywords: Microplastic abundance, spatial variation, Surface coastal water, West coast