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Screening for microplastics in surface waters of Badulu Oya, Sri Lanka

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Recent research reveals that microplastics (MPs) (< 5 mm in diameter) are a widespread contaminant in both freshwater and marine ecosystem. These MPs can adversely affect human health and sustenance of aquatic organisms by their flow through the aquatic food webs. Therefore, in order to protect the environment and biota from their detrimental impacts it is important to detect MPs in water and remove them in an economical manner. This study is focused on the occurrence, quantification, and spatial distribution of MPs in the surface waters of Badulu Oya, Sri Lanka. Badulu Oya is a tributary of river Mahaweli and originates from Namunukula hills which is in the central highlands and it caters immensely to water needs of humans, and therefore, securing its water quality is of great importance. The present study aims to quantify the presence of MPs in Badulu Oya and identifying their potential sources and sinks of in this river basin. Twelve sampling sites were selected and samples were collected using a surface water sampling net (Neuston type). The samples were subjected to wet sieving, wet peroxide oxidation, density separation and finally microscopic examination. The types of MPs present were further confirmed using Fourier- Transform Infrared (FTIR) spectroscopy. MPs were categorized according to density, size, shape and color. MPs were grouped into five classes based on their size and shapes, and 13 color categories. Surface waters of Badulu Oya, contains large numbers of MPs and most of the MPs were less than 1 mm in size. FTIR spectrum analysis revealed that plastic litter around the Badulu Oya is the major source of MPs. The highest MPs concentrations were found near the Badulla solid waste dumpsite. Presence of MPs on average 16.83±4.24 items per m^3 therefore indicates a critical level of micro-plastic pollution in Badulu Oya.

Keywords: Microplastic, Surface water