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Water Quality and Microplastic Contamination Status of Surface Water in the Head and Transitional Regions of the Maha Oya Basin, Sri Lanka

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Water is essential for all forms of life, serving as a critical component for biological processes, agriculture, and industrial activities. It is a vital resource that supports ecosystems, human health, and economic development, making its conservation and sustainable management crucial for the future. Therefore, this study was focused on determining the water quality and microplastic contamination status of surface water at the head and transitional regions of the Maha Oya basin. The Maha Oya crosses three provinces and four districts in Sri Lanka. Thirty surface water sampling locations were selected for the study by representing the head and transitional regions of the Maha Oya (50.8 Km) from the Ahupini Ella to Allawwa within February by using a grab sampling technique in the similar distance method. Sampling, transportation and analysis were performed using standard methods. Water samples were analysed for pH, Total Dissolved Solids (TDS), Electrical Conductivity (EC), turbidity, Chloride, Total Hardness (TH) and MPs. The pH, TDS, EC, and Chloride were in the desirable limit while increasing the turbidity levels along the river. According to Pearson correlation analysis, a moderate positive correlation was observed in EC and TDS with pH. Additionally, A moderate positive correlation was found between EC and TH. The location M1 has the highest concentration of microplastic particles, exceeding 250 particles/m³. The M10 has the lowest concentration of microplastic particles of 10 particles/m³. Fibers were the dominant type of microplastic in the Maha Oya surface water representing 70% of the total abundance of microplastics, particularly 38% of blue fibers and 20% of black fibers. It was noticed that there was no significant correlation between the abundance of microplastics and water quality parameters. However, the findings highlight the urgent need for effective management strategies to mitigate plastic pollution and preserve water quality in the Maha Oya basin.

Keywords: *Microplastics, Water quality, Maha Oya, Surface water*