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Abstract

Microplastic pollution has emerged as a critical environmental concern due to its widespread presence and persistence in aquatic ecosystems. This study presents a comprehensive analysis of microplastic pollution in water, aiming to assess its occurrence, distribution, and potential environmental implications. Water samples were collected from selected aquatic environments and analysed using standardized sampling, filtration, and stereomicroscopic examination techniques for the identification and characterization of microplastics. The extracted microplastic particles were categorized based on size, shape, color, and polymer type to better understand their sources and behaviour in aquatic systems. The results revealed a significant presence of microplastics across all sampled locations, with fibers and fragments identified as the dominant forms under stereomicroscopic observation. Size distribution analysis indicated a higher abundance of particles smaller than 1 mm, highlighting their increased potential for ingestion by aquatic organisms. Variations in microplastic concentration were observed among sampling sites, suggesting the influence of anthropogenic activities such as urban discharge, wastewater effluents, and improper plastic waste management. The detection of diverse polymer types further indicates multiple sources of plastic input into water bodies. This study underscores the growing threat posed by microplastic pollution to aquatic environments, including potential risks to aquatic life and human health through bioaccumulation and trophic transfer. The findings emphasize the urgent need for improved waste management strategies, enhanced public awareness, and strengthened regulatory measures to mitigate microplastic pollution. Overall, this research provides valuable baseline data for future monitoring efforts and supports the development of effective strategies to address microplastic contamination in water resources.

Keywords: Microplastic, Plastic pollution, fibers, fragments, water contamination.

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