Microplastic Contamination in the Waters of Certain Rivers in Basrah City, Iraq: statistical study

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Abstract

Microplastics (MPs) are recognized worldwide as a growing environmental threat, especially in aquatic ecosystems. This raises concerns for human life and the environment due to the increased use and mishandling of plastics, particularly in urban waterways. This research presents statistics on the prevalence of microplastic particles in waters of five sites within the tributaries and the Shatt al-Arab River in Basrah, southern Iraq: the Qarmat Ali, Al-Khandaq, Al-Nadi Al-Athori, Shatt al-Arab, and Al-Bahadriya rivers. Chemical digestion using 30% H_2O_2 and density separation were used to remove unwanted substances. The water was then examined using optical microscopy and Fourier-transform infrared (FTIR) spectroscopy. The results indicated the existence of microplastics in all samples. The highest MP count was 15 particles/20 L at the Al-Khandaq and Al-Bahadriya River sites using a 125 µm sieve. The highest MPs count was 15.5 particles/20 L at the Al-Nadi-Al Athori River site using a 150 µm sieve. The highest MPs count was 15.5 particles/20 L at the Al-Nadi-Al Athori River site using a 150 µm sieve. The predominant form of microplastics across all study sites was fiber, accounting for 42% of the total. Similarly, the blue color 40% of microplastic was the predominant color across all water samples. FTIR measurements revealed that the predominant MP types were polypropylene 39.3%, low density polyethylene 35.5% and polystyrene 25.2%. MPs in these rivers are affected by human activity along their banks, such as industries, markets, and residential areas.

Keywords: Microplastics, polyethylene, polystyrene, low-density polyethylene, freshwater pollution, FTIR.

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