



MICROPLASTIC POLLUTION IN A TRIBUTARY OF THE ITAIPU RESERVOIR: ABUNDANCE, MORPHOLOGY, AND POLYMER COMPOSITION

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Microplastic (MP, < 5 mm) pollution in aquatic environments is a growing concern due to its adverse impacts on ecosystems and biota. Although well-documented in marine environments, significant gaps persist regarding MP dynamics in freshwater ecosystems. This study aimed to qualitatively and quantitatively characterize MP pollution in the Ocoí river, a branch of the Itaipu Reservoir, an area surrounded by intense anthropogenic activity. Sampling campaigns were conducted in September (winter) and November (spring) 2025 across five sites along the main channel of the Ocoí river branch. At each site, a total volume of 1,500 L of water was collected in triplicate at three different depths (~ 1 m, 6 m and 12 m) using a suction pump coupled to a 68 µm plankton net. In the laboratory, samples underwent sieving, organic matter digestion, and vacuum filtration on glass fiber (1.2 µm) and nylon (0.45 µm) filters. Filters were examined under a stereomicroscope to determine MP density and to characterize particles by morphology, color, and size. Polymer composition was confirmed using Micro-Fourier Transform Infrared Spectroscopy (µ-FTIR). Higher MP abundances were observed at downstream sites, with mean densities of 0.024 ± 0.006 particles/L in winter and 0.021 ± 0.002 particles/L in spring. The predominant particles were fibers smaller than 0.3 mm, mostly transparent (38%, winter) and blue (57%, spring). µ-FTIR analysis identified polyamide as the prevalent polymer. MP concentrations were low compared with those reported for other Brazilian ecosystems and for rivers in China, Japan, and the United States, suggesting incipient contamination. Nevertheless, the detection of MP reinforces the need for continuous monitoring, since its dynamics of input and accumulation in freshwater ecosystems remain poorly understood and may pose increasing risks to aquatic ecosystems.

Keywords: plastic pollution, freshwater, environmental monitoring, µ-FTIR.

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