Analysis and characterisation of microplastics in marine environment

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Abstract

Microplastics (MPs) have emerged as an environmental problem. Once released into the environment, MPs travel all over the planet by the action of various factors such as sea currents and winds. They are constantly exposed to degradation processes, which change their properties. The MPs composition is diverse and their morphology varies from fibers and fragments, to pellets, spheres or films, among others. MPs are distributed globally, being more concentrated in sea routes and urban areas, especially in largely populated regions. The present work is a contribution to the establishment of a methodology for the analysis of microplastics present in freshwater, covering sample stabilization, MPs separation by size, analysis and characterization. The collected samples were observed under a Digital Microscope to visualize the presence of MPs, their shapes and dimensions. Filtration procedures were tested, and finally, the MPs collected from a reference volume of freshwater using a chosen filter with 10x10 mm2 of area, were analyzed by Raman spectroscopy. The identification and characterization of the MPs was carried out on a Raman spectrometer Horiba LabRAM HR Evolution microscope, equipped with the software Particle Finder.

Keywords: Microplastics, analysis, characterization, quantification, separation, waters treatment, Raman

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