



ANALYTICAL TECHNIQUES USED FOR DETERMINATION OF MICROPLASTIC IN AQUATIC ENVIRONMENT

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ABSTRACT:

The worldwide production of plastics has increased considerably since the development of synthetic polymers in the middle of the 20th century. When discarded in the marine environment, Plastics can become an environmental hazard. Although first steps towards a standardization of methodologies used for the detection and identification of microplastics in environmental samples are made, the comparability of data on microplastics is currently hampered by a huge variety of different methodologies, which result in the generation of data of extremely different quality and resolution. Microplastics were characterized using optical microscopy, scanning electron microscopy plus energy-dispersive x-ray spectroscopy (SEM/EDS), Fourier transform infrared (FTIR) micro-spectroscopy, and Raman micro-spectroscopy (RMS). Thus, a burning issue concerning current microplastic research is the generation of standards that allow for the assessment of reliable data on concentrations of microscopic plastic particles and the involved polymers with analytical laboratory techniques such as micro-FTIR or micro-Raman spectroscopy. This review summarises the currently used methodologies for sampling, extracting and identifying microplastics in three kinds of aquatic environmental matrices (water, sediment and aquatic biota) and includes a critical discussion of the advantages of these methodologies. Finally, this review highlights the current challenges and gives suggestions for the future research.

KEYWORDS: Microplastics, optical microscopy, scanning electron microscopy plus energy-dispersive x-ray spectroscopy (SEM/EDS), Fourier transform infrared (FTIR) micro-spectroscopy, and Raman micro-spectroscopy (RMS).

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