

Micro- and nano-sized plastics in biological matrices: analysis and characterization through microscopic approaches

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As a result of the gradual fragmentation of larger plastics, micro- and nano-plastics have spread from the marine to the terrestrial environment, causing significant biological and ecological damage. Despite the dramatic environmental impact of plastic waste, micro- and nano-sized plastic contamination in living organisms continues to remain largely unknown, even in the absence of a methodological and standardized protocol for microplastics sampling, isolation and identification. The general approach for micro- and nanoplastics analysis is to first determine the physical characteristics of the plastic fragments, and then to determine the composition of those fragments in order to confirm their chemical identity. Microscopic techniques (i.e., fluorescence, stereo, atomic force, and electron microscopy) are the most utilized strategies to reach this goal. In this context, the main methodological approaches based on optical microscopy and high-resolution microscopy useful for the identification and structural characterization of micro- and nanoplastics will be discussed in this talk. Furthermore, the various limitations related to the sampling, isolation and collection of plastic samples from biological matrices will be addressed.