
Microplastics extraction efficiency using different salts and hydrogen peroxide

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Abstract

Microplastic extraction from different environmental matrices is a key step for the assessment of this type of pollutant. Among these matrixes, marine sediment is widely studied, but the microplastic extraction is complex. Density separation is one of the most used extraction techniques, there is still a lack of a standardized compound due to the different characteristics of the salts used regarding cost, safety and effectiveness. Hydrogen peroxide (H₂O₂), which is widely used as a pre-treatment to remove organic matter before microplastic extraction, could facilitate the extraction of microplastics. In this study, through a laboratory approach, we inoculated sediment with 13 different plastic polymers of different sizes and tested the microplastic extraction efficiency using saturated solutions of sodium chloride (NaCl), calcium chloride (CaCl₂), zinc chloride (ZnCl₂) and H₂O₂, separately; and two combinations of NaCl and H₂O₂ (NaCl:H₂O₂ with a 1:1 proportion and NaCl:H₂O₂ with increasing proportion). Results show that there are significant differences in recovery rate between the tested treatments, especially for high density polymers, such as polyethylene terephthalate (PET) and polyvinyl chloride (PVC). It's been proven that other treatments have greater recovery rates than a solution of commonly used NaCl. This study suggests that H₂O₂ could be one of the best substances for microplastic extraction using density separation in complex matrices such as sediments.

Keywords: microplastics, density separation, salt, hydrogen peroxide, sediment

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