

## Let's jump in the plastics pool: How to detect unnoticed small plastic particles in our North Sea?

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There is growing awareness about possible adverse environmental effects and human health risks created by microplastics in the marine environment. Although there is now a considerable body of literature on the presence of larger microplastic particles (> 50 µm), there is - due to limitations in sampling and detection method - little information on the quantities and types of small microplastic particles (< 50 µm) present in marine environments. Here, we developed a simple, high-speed, and low-cost digestion and staining method to detect and visualize microplastics in seawater samples. First, seawater containing several types of artificial microplastics was filtered and a subsequent on-filter digestion protocol was applied, using chemical agents that do not visually modify the tested polymers. Subsequently, the microplastics on the filters were stained using Nile Red as fluorescent dye (according to Maes et al. 2017). This dye adsorbed to the plastic particles present on the filter, making them fluorescent when exposed to green, blue or ultraviolet light, allowing detection and visualization of the microplastics using a fluorescence microscope. A cross-validation of this detection method was performed by analyzing the irradiated plastic particles with a scanning electron microscope coupled to an Energy-Dispersive X-ray Spectroscopy (EDS) and with micro Fourier transform infrared (µFTIR) spectroscopy. The developed method will be applied to analyze small microplastic particles in North Sea water samples in a fast, reliable, and cost-efficient way. This may contribute to a robust, operational monitoring method of microplastics to inform and guide policy makers.

### Reference

- Maes T, Jessop R, Wellner N, Haupt K, Mayes AG (2017) A rapid-screening approach to detect and quantify microplastics based on fluorescent tagging with Nile Red. *Sci Rep* 7:44501. doi: 10.1038/srep44501.

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