

COMPARISON OF EFFECTIVE METHODS FOR QUANTIFICATION OF PLANKTON-SIZED MICROPLASTICS: THE CASE OF THE GULF OF BOTHNIA, SWEDEN.

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Abstract: In recent years, the concern about the concentration and impact of microplastics (< 5 mm) in the marine environment has increased globally. Recent studies show that more than 70% of the microplastics found in marine vertebrates are smaller than 2 mm. However, few studies have analysed the fraction of microplastics smaller than 300 microns, which overlaps in size with many planktonic prey organisms. This study aims to compare two sampling methods and devices for collection of microplastics down to 10 µm in marine waters. Water samples were collected from 5 stations along the Gulf of Bothnia off the coast of Sweden. Large volumes of surface water (1 m³) were filtered with a 10 µm steel mesh using two types of plastic-free pumps: UFO AAU (Aalborg University) and PUMP ÖRU (Örebro University) both at surface level and 3.5 m depth. These samples were processed according to a protocol developed at AAU, briefly: SDS incubation, enzymatic treatment, fenton reaction, density separation, and evaporation. In turn, microplastics larger than 300 µm were processed by microscopy and FTIR spectroscopy, while the fraction between 10-300 microns was processed by µFTIR-Imaging spectroscopy, followed by automatic PM detection. Our preliminary results show that most marine MPs are smaller than 300 µm, and can be potentially ingested by marine animals, entering in marine food webs. At the same time, it is expected that this characterization of microplastics at the water surface and the comparison between methods will allow establishing common protocols for the sampling of microplastics smaller than 300 microns in the marine environment, which is essential to better evaluate the levels of plastic pollution in the ocean.

Key words: Plankton-sized microplastics, microplastics collection; pump; Gulf of Bothnia.

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