

IS ZOOPLANKTON AN ENTRY POINT OF MICROPLASTICS IN THE MARINE FOOD WEB? A CASE STUDY IN THE KATTEGAT SEA.

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Abstract: Microplastics (MPs) are ubiquitous contaminants of emerging concern in the ocean. MPs overlap in size with phytoplankton, and they can be ingested by zooplankton and transferred to higher trophic levels. Copepods are the most abundant organisms in the ocean, where they link the marine foodweb between autotrophs and upper trophic levels. However, we still know little about the role of copepods in the entry of MPs into the marine foodweb and the occurrence of MPs in the zooplankton communities. This study, we collected zooplankton samples at fourteen stations using MOCNESS at Kattegat strait (Denmark) during the research cruise R/V DANA in October 2020. We analyzed MPs' concentration, polymer type composition, and size in natural zooplankton assemblages (community-level approach) and sorted copepod species. Individual copepods were thoroughly rinsed to remove the external MPs attachments before being stored in 5% SDS; then, they were pooled and treated following an enzymatic-oxidative approach for MP analysis. All the samples were scanned and MPs were detected using FPA- μ FTIR-Imaging in combination with siMPle software for automated polymer identification down to 11 μ m. The concentration of MPs in water ranged between 8 to 102 MPs m⁻³. Considering the volume of water filtered with the multi-net, the concentration of MPs in the natural zooplankton samples ranged from 0 to 1.77 MPs m⁻³ with an average of 0.02 MPs per individual. The MP concentration in sorted copepod samples ranged between 0.00-0.04 MPs per individual. The results indicate a low occurrence of MPs in natural zooplankton communities and copepods in the Kattegat and non-bioaccumulation of MPs in zooplankton. These results suggest that zooplankton are not expected to be a major entry route of MPs in marine food webs.

Key words: Microplastics, zooplankton, Copepods, Ingestion, Kattegat Sea

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