
Heavy metals and microplastic in freshwater ponds

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Abstract

Marine waste is carried with the ocean and coastal currents. Coastal islands act as a filter, and large volumes of marine plastic strands, are blown ashore and are left in the terrain and in the freshwater ponds on the islands. Along the Norwegian coast this has been going on for several decades. There is a lack of documentation which environmental chemicals and toxic elements marine plastic waste in nature contains, and to which these can leach from the plastic and contaminate to the surrounding environment. In this study we analyzed the concentrations of microplastics and Arsen (As), Lead (Pb), Cadmium (Cd), Copper (Cu), Chromium (Cr), Mercury (Hg), Nickel (Ni), and Zinc (Zn) in water-samples from freshwater ponds on islands on the outer coast of Central Norway. We also analyzed the elemental concentrations in the marine plastic waste and in the freshwater pond sediments. The element concentrations were analyzed with ICP-MS, and the microplastic concentrations with GC-MS. The results were evaluated against environmental quality standards in freshwater and freshwater sediments, and show results above limit values for As, Cd, Pb, Ni and Zn in water, and Zn in sediments. The heavy metals which show particularly high values in the marine plastic waste in freshwater ponds were Pb, Cd, Cu, Cr, Ni and Zn. Microplastics in water consists of the polymers Polypropylene (PP), Polyethylene (PE) and Polystyrene (PS).

Keywords: freshwater ponds, marine plastic pollution, environmental pollutant, microplastic, toxic elements

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