**Qualitative and quantitative analysis of microplastic and pigment particles in freshwater**

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In the last decades plastic became a ubiquitous material with applications in many fields where it is widely valued for its properties like inertness, formability and low costs. With the subsequent increase in plastic production the amount of plastic waste also rose up to an alarming amount. Since plastic is degrading very slowly, an enrichment in not only marine systems but also in freshwater bodies has to be expected.

Recently the risks for humans and environment provoked especially by microplastics (MP) attracted notice in the scientific community as well as the public media. There is currently no standardized definition for MP, but it is generally used for particles and fibers from 1 µm to 5 mm [1, 2]. MP is either produced directly for the use in products e.g. in the cosmetic industry (primary microplastic) or derives from the breakup of larger plastic particles (secondary microplastic).

In a recent study we analyzed microplastic particles from sediment samples in the subalpine Lake Garda, Italy [3]. We separated and identified about 450 microplastic particles with a diameter down to 9 µm by means of the Munich Plastic Sediment Separator (MPSS) [4] and Raman microspectroscopy. The most prevalent plastic types were polystyrene, polyethylene and polypropylene. However we found that the plastic types strongly correlate with the particle size. For very small microplastics (defined as 1 µm - 50 µm) [5] mostly polyamides were found. Particles in this size which can be ingested by organisms easily and accumulate in the food chain are expected to have severe consequences on human health and have been overlooked so far. Additionally to plastic particles we found a high number of pigmented (non)plastic particles, which appear to be presently an ignored issue. We show with ICP-MS analysis that pigmented particles can contain high levels of heavy metals. The size distribution of these particles shows an increase with decreasing size, which suggest that even smaller pigment particles might be present (down to the nanometer-range).

Moreover the contamination of the samples with fibers during filtration and analysis was studied. We found a high number of fibers, which manly settle on the wet filter during filtration. Most of the fibers could be identified as cellulose fibers deriving from cloths but also contamination with synthetic fibers cannot be excluded. This suggests that the use of blanks is essential to avoid false positive results.

**Literature**

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