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# Replicating success: sampling microplastics in environments of low pollution levels

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## Abstract

The microplastic pollution in surface waters is dynamic and dependent on a variety of factors, e.g. meteorological and hydrological conditions. Commonly applied research or monitoring approaches such as net trawling, single-point filtering systems and bulk sampling often employ a single-sample collection approach, which provides little assurance that obtained results are reliable and not only specific for the sampled water volume and particular time. In order to acquire a sample reflecting the existing pollution level with the highest rational precision and lowest variability, it is necessary to increase the sample size by either sampling larger amounts of water or performing several sample replicas.

Here, we tested the optimal number of sample replicas needed to acquire robust and reliable data on microplastic pollution in environments with low pollution levels – two Icelandic water bodies – by collecting 15 consecutive surface water microplastic samples via Manta net (300  $\mu\text{m}$ ) trawling, and evaluating the variance between determined microplastic concentrations.

Replicate sampling showed that measurement uncertainty decreases when more replicate samples are used. Considering microplastic sample collection, treatment and analysis costs, we recommend performing surface water microplastics sample collection in areas with low pollution by collecting at least three replicas to obtain reliable data. Also, we conclude that it is required to measure the sample volume rather than calculating it (Barone et al. Submitted).

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