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Water quality — Sampling —

Part 27: Guidance on sampling for microplastics in water

Qualité de l'eau — Échantillonnage —

Partie 27: Recommandations pour l'échantillonnage des microplastiques dans l'eau

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Microplastic occurrence in the environment is a prominent concern both to the public and to the scientific community. Determining the amount and distribution of microplastics in water bodies and domestic water is therefore a critical task.[1]-[6] However, the methodology for sampling microplastics in water samples is still lacking in precision. Consistent methodology is only starting to emerge, but still no universal protocol exists for the sampling of these contaminants in water.

The presence of small plastic fragments in the ocean was first reported in 1972,[7] but it was in 2004 that the term “microplastics” was proposed for the first time to describe plastic particles of a few micrometres in diameter.[8] Since then, a wealth of information became available on the abundance and type of microplastics in the marine environment, freshwater and estuarine systems. However, the different studies have used diverse techniques to sample, extract, treat and detect microplastic present in water.

There are many reasons why different studies investigating microplastic occurrence in water and wastewater show different results. The disparity between some of the findings (for microplastic type and abundance) can be partially explained by the fact that differing sampling techniques have been used. Variables pertaining to both time of year and time of day, flow rate and volume of water sampled, grab sampling or sieving the water over an extended period, the use of plastic containers or tubing, selection of a few parts of the sample for analysis, or dissimilar devices to capture the microplastic fragments, can be the causes of variation in study results.

While several standards for water sampling and water quality already exist (e.g. ISO 5667 series and, in particular, ISO 5667-17), microplastics as particular determinands pose a specific challenge which requires a more specific approach. For example, microplastics sampling requires the use of very specific materials for collecting, handling and storing to avoid cross-contamination. Also, microplastic buoyancy can vary depending on their composition, size, shape or colonization by microorganisms, and microplastics are not homogeneously distributed in the water column. Therefore, a more targeted and detailed set of sampling protocols is required to account for these differences. To better understand the fate and impact of microplastics in the environment, a more specific standardized sampling approach should be adopted and applied.