

Water quality — Analysis of ~~microplastics~~microplastic in water —

Part 2:
**Vibrational spectroscopy methods for waters with low content of
suspended solids including drinking water**

*Qualité de l'eau — Analyse des microplastiques dans l'eau — ~~Partie 2: Méthodes utilisant la spectroscopie
vibrationnelle pour les eaux à faible teneur en matières en suspension incluant les eaux potables~~*

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Introduction

Pollution linked to microplastics is recognized as a global phenomenon. The standardization of the sampling, quantification and identification protocols is required to ensure reliability and comparability of the data produced for health and environmental risk assessments.

Microplastics in water can be identified and quantified using various methodological approaches. Depending on the measurement objectives, several complementary approaches shall be used to cover the full spectrum of microplastics (size and chemical nature). [Table 1](#) ~~Table 1~~ resumes the characteristics and the information obtained with spectroscopic techniques.

Table 1 — Characteristics of the various analytical techniques and information obtained.

Characteristics and information obtained	Raman micro spectroscopy	Infrared micro spectroscopy
Type of sample	Water filtrate residues	
Chemical nature of the polymer	Yes	
Information provided by analytical technique	Functional groups	
Results expression	Polymer type, number of particles, size of particles	
Minimum measurable size range of particles	1 µm to 5 µm	20 µm
Minimum mass subject to measurement after preparation	Undefined	
Consequences for the test sample after measurement	Non-destructive	
Main interferences	Mineral mineral particles, coloured particles, pigments, fluorescence, fatty acids, fatty amides, proteins, surface alterations by biofilms or weathering, carbohydrates, generated by microbes	Mineral mineral particles, proteins, surface alterations by biofilms or weathering, particles loaded with carbon black, presence of water, carbohydrates generated by microbes

Water quality — Analysis of ~~microplastics~~microplastic in water — ~~—~~ —

Part 2:

Vibrational spectroscopy methods for waters with low content of ~~natural~~-suspended solids including drinking water

WARNING — Persons using this document should be familiar with normal laboratory practice. This document does not purport to address all of the safety problems, if any, associated with its use. It is the responsibility of the user to establish appropriate safety and health practices.

IMPORTANT — It is absolutely essential that tests conducted in accordance with this document be carried out by suitably qualified staff.

1 Scope

This document ~~sets out~~establishes key principles for the investigation of microplastics in drinking water and water with low content of natural suspended solids using a microscopy technique coupled with vibrational spectroscopy.

This method is applicable to:

- ~~—~~determine the size of microplastics [which range from 1 µm to 5 000 µm], count them and classify them by size range;
- ~~—~~identify the chemical composition of microplastics, the main ones (most used in industry and most abundant in the environment) being: polyethylene (PE), polypropylene (PP), polyethylene terephthalate (PET), polycarbonate (PC), polystyrene (PS), polytetrafluoroethylene (PTFE), polyvinyl chloride (PVC), polyamide (PA), polymethyl methacrylate (PMMA) and polyurethane (PU);

~~The~~This method is applicable to water with a low content of organic matter and other suspended matter as defined in ISO 6107 ~~[(1) definition (1 mg mg/l to 100 mg/l or lower when interfering with the determination),~~ i.e.,

- ~~—~~ultrapure water;
- ~~—~~water intended for human consumption;
- ~~—~~raw groundwaters.

Given the very low concentrations of microplastics usually present in these waters, special attention ~~shall~~needs to be paid to potential sources of contamination during sample preparation.