



PlasticTrace Project:
Metrological traceability of measurement data from **nano-** to small **microplastics** for a greener environment and food safety.



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TOPIC / ABSTRACT

Plastic pollution is one of today's most pressing environmental and health concerns. While larger microplastics have been studied for years, small **microplastics** (SMPs, $<100\ \mu\text{m}$) and **nanoplastics** (NPs, $<1\ \mu\text{m}$) remained largely overlooked due to the lack of reliable and harmonised measurement methods.

The PlasticTrace project addressed this critical gap by developing validated reference materials, robust sample preparation protocols, and advanced analytical techniques for the detection and quantification of SMPs and NPs in drinking water, food, and environmental samples. The project pioneered the production of realistic, SI-traceable reference materials for polyethylene terephthalate (**PET**), polyethylene (**PE**), and polypropylene (**PP**). These included water-soluble tablets containing microplastics of known size distributions, as well as nanoplastic suspensions. Each material underwent extensive homogeneity and stability testing, ensuring suitability for method validation across laboratories.

In parallel, **PlasticTrace advanced sample preparation methods that preserved particle integrity while removing complex organic and inorganic backgrounds in matrices** such as drinking water, surface water, and infant milk powder. Digestion and fractionation strategies were optimised and harmonised into robust SOPs. Complementary analytical approaches were developed and benchmarked, from established techniques (μFTIR , μRaman , TED-GC/MS, Py-GC/MS) to innovative hyphenated methods combining fractionation, spectroscopy, and chemometrics. A novel AF4-DEP-Raman-DLS workflow demonstrated the ability to identify nanoplastics down to 65 nm. To ensure international comparability, PlasticTrace worked closely with ISO, CEN, VAMAS, and EURAMET, coordinating inter-laboratory comparison studies with over 50 global participants. The project contributed reference materials and trial management to the validation of ISO 16094-2, a new water quality standard for microplastics, and supported the first VAMAS TWA45 ILC study on representative nanoplastic materials using multiple orthogonal techniques. Through training modules, stakeholder workshops, and active engagement with regulators, PlasticTrace laid the foundation for harmonised, traceable, and standardised methods to support EU directives such as the Drinking Water Directive, the Urban Waste Water Treatment Directive, and the Circular Economy Action Plan. By filling critical measurement gaps, PlasticTrace enabled reliable monitoring of plastic pollution across food and environmental sectors, ultimately strengthening risk assessment, regulatory action, and the protection of public health and ecosystems.



PlasticTrace

Tracing Micro and NanoPlastics
in Food and Environment



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