

EnviroNote 1133 - November 2023

NATA Accreditation for the Analysis of Microplastics in Potable Water



What are Microplastics and how do we Analyse them?

Plastics are incredibly versatile materials, and it's challenging to envision our daily lives without them. Unfortunately, the management of disposal and recycling has often been given insufficient attention, leading to a substantial portion of plastic waste being released into the environment, where it ultimately breaks down into microplastics. These microplastics can be categorised as either secondary microplastics, resulting from the degradation of larger plastic items, or primary microplastics, which are polymeric particles intentionally designed for commercial use, such as those found in cosmetics such as facial scrubs or toothpaste.

Microplastics pose significant ecological and health concerns due to their environmental persistence. They are known to impact wildlife, water quality, and even human health by accumulating toxic chemicals and transporting pathogens.

Only in 2021, Microplastics in Drinking water has been defined for the first time by the State Water Resources Control Board for potable water as *“solid polymeric materials to which chemical additives or other substances may have been added, which are particles which have at least three dimensions that are greater than 1 nm and less than 5,000 micrometres (µm). Polymers that are derived in nature that have not been chemically modified (other than by hydrolysis) are excluded.”*

The analysis of Microplastics is particularly challenging. One reason is that no automated method currently covers the entire size range with the information needed, such as particle enumeration, size, morphology, colour, and polymer type.

Presently, there are three major analytical techniques that are being deployed: Microscopy (various types as optical, Scanning Electron Microscope etc.), Spectroscopic (RAMAN/µFTIR/LDIR), and Thermal Analysis (Pyrolysis or Thermal Desorption GC-MS), each with their own advantages and disadvantages.



Eurofins Technical Specialist Dr. Julia Jaeger prepares samples for microplastic analysis



Analysis of microplastics can be carried out on a range of environmental, food & beverage and consumer product samples. R&D is ongoing and is based on market requirements.

Australia's First NATA Accredited Commercial Microplastics Laboratory

In 2019, Eurofins Environment Testing Australia opened Australia's first commercial Microplastic laboratory in Melbourne. Laser Direct Infrared (LDIR) Chemical Imaging System is utilised to enumerate, size and chemically analyse Microplastic particles between 20 µm and 5000 µm.

Since its inception, the laboratory has participated in three global interlaboratory comparison studies (JRC, SWRRP, and EUROqCHARM). It has been awarded the ALGA Industry Excellence Award in 2022 for Innovation that has Advanced the Practice of Contaminated Site Assessment, Management and Remediation. Recently, Eurofins was the first facility awarded NATA ISO/IEC17025 accreditation in Australia for Microplastics analysis in Potable Water.

Our Capabilities

Currently, we have developed methods to detect the nine most common polymers as Polyethylene (PE), Polypropylene (PP), Polystyrene (PS), Polyvinylchloride (PVC), Polyethylene Terephthalate (PET), Polycarbonate (PC), Polymethylmethacrylate (PMMA), Polyamide (PA) and Polyurethane (PU) in sample types as:

- Potable Water (NATA Accredited),
- Environmental Samples (surface water, groundwater, and wastewater),
- Sand and sediment,
- Soil and biosolids,
- Biota Samples (oysters, mussels, fish tissue),
- Food & beverage samples (tea bags, salt, bottled water, infant formula, zip lock bags),
- Cosmetics and consumer product samples (cream, face and body wash, eye drops, contact lenses),
- Dust and air.

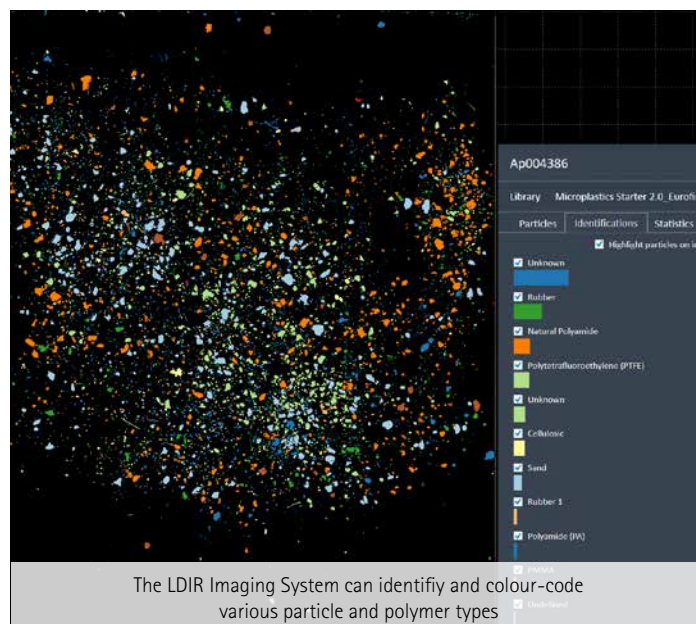
Research and method development is ongoing within our laboratory and is based on market requirements.

Within the Eurofins network, we can also provide Microplastic analysis by Pyrolysis GC-MS, and Thermal Desorption GC-MS.

Our Instrument - The LDIR Chemical Imaging System

The Agilent 8700 LDIR provides a fast and automated analysis of microplastics. It combines a tuneable quantum cascade laser (QCL) as the IR source with rapidly scanning optics. This technology allows for the collection of essential information concerning the number, size, and polymer type of microplastics. Additionally, it's capable of assessing parameters like morphology and colour, though these require manual input. To ascertain the polymer type, data extracted from the sample is compared to a verified library of existing polymer profiles.

Each Certificate of Analysis issued includes the particle enumeration categorised by polymer composition and colour-coded graphs outlining polymer particle size distribution for each sample.



Contact our Microplastics Team Today - MicroplasticsAUS@eurofins.com

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Our laboratories are proudly accredited for a wide range of organic and inorganic chemistry analyses and microbiological testing.