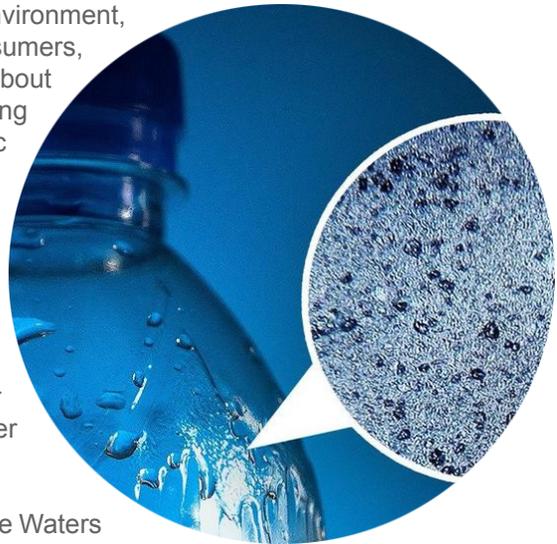




Microplastics Analysis in Water

With the growing concern of microplastics in our environment, the discussion continues to reach water utilities, consumers, regulators and researchers. What we know now about microplastics is that they are particles or fibers ranging from 1 μm to 1000 μm , consisting of synthetic polymer material. Industries that use microplastics are agricultural, cosmetic, personal care, clothing, marine, recreational and commercial fishing. Microplastics are also believed to be leached/ degraded into the environment from macroplastics that were once larger plastic items. It is believed that microplastics are also released in our environment by failed tank containments, accidental release or pollution runoff from biological degradation of larger plastic items.



In 2015, the US congress passed the Microbead-Free Waters Act that prohibited manufacturing of microbeads by personal care cosmetic companies that exclusively designed the beads for “gentle friction” in their products. Unfortunately, the Act did not establish regulated requirements for sampling, analyzing and/or removal treatment of the beads. Today there continues to be heightened awareness, but limited understanding of particles found in fresh water sources because there is no standardized method for sampling and analysis.

Toxicity

While research is ongoing, there is limited toxicity information on microplastics and their effects on the environment. Current studies, conducted mostly on aquatic organisms, suggest that microplastics may absorb other harmful chemicals such as polycyclic aromatic hydrocarbons and polychlorinated biphenyls that can leach after ingestion, suggesting there is a concentration and release of other types of contaminants. Other studies suggest that the size and shape of the particles can have acutely toxic effects if the particles are of a particular size distribution. Unfortunately, there is still no conclusive toxicity or public health effects data related to microplastics.

Field Contamination

Special care must be taken into consideration when minimizing contamination of microplastics into the sample container. Field and method blanks will be used to monitor all possible sources of environment contamination when sampling and while sample bottles are traveling through the lab. Once the samples arrive at the lab, the bottles will remain unopened until ready to analyze, there will be strict adherence to clean lab equipment and any rinsing will include the use of high purity water. A laminar flow hood will maintain clean working environment of all reagents, supplies and during microscopy imaging work.

Analytical Techniques

There are several methods that can be used to identify individual microplastic polymers, each with their own capabilities and advantages. Eurofins has been applying the two following methods using FTIR spectroscopy and microscopy:

Dye Imaging Method ¹State University of New York at Fredonia

- Type of Water and Particle Size: Bottled water/drinking water (size <1000µm)
- Analysis: Dyeing, filtration, microscopic/spectroscopic investigation

NOAA Method ²Analysis of Microplastics in Marine Environment – National Oceanic and Atmospheric Administration, July 2015

- Type of Water and Particle Size: Environmental water (300 µm < Size < 5 mm)
- Analysis: Chemical treatment, density separation, mass determination, possible spectroscopic investigation

Results will be reported as number of particles/volume in two size ranges - <100 and >100 microns. The lab will be able to determine the plastic type by using spectral data and can help to determine the source of the contamination.

How Eurofins can help you

- Eurofins Eaton Analytical has built a partnership with sister lab Eurofins SF Analytical to offer you the expertise you expect from a leaders in the drinking water industry.
- Eurofins can assist with date interpretations and system design considerations
- Eurofins can analyze drinking water and recycled or reprocessed water streams. We can also analyze surface water from lakes and ponds.
- Eurofins will provide all necessary bottles and coolers for sampling and shipping back to the laboratory. It is recommended that the samples be collected and returned back to the lab, stored at 6°C, within 5 business days.

Have questions about microplastics or ready to start testing?

We are happy to answer your questions regarding microplastics analysis and to ensure your next project runs smoothly.

Contact Eurofins at US20_Sales@EurofinsUS.com

Sources:

-Microplastics in Freshwater Resources, 5/22/18, White Paper – Corona Environmental Consulting, LLC

¹Synthetic Polymer Contamination in Bottled Water, Sherri A. Mason, Victoria Welch, Joseph Neratko State University of New York at Fredonia, Department of Geology & Environmental Sciences

²National Oceanic and Atmospheric Administration (NOAA), Global Water Research Coalition, US EPA and Water Environmental & Reuse Foundation



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