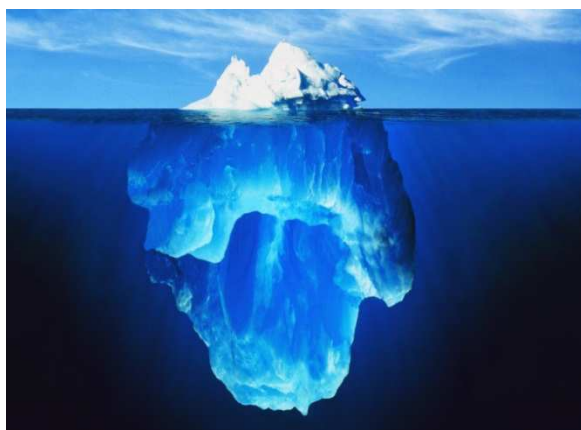


Are you on TOP of PFASs?

Traditional analytical techniques for measuring PFASs (Per- and Polyfluorinated Alkyl Substances) have used LC-MS/MS and target the 21 toxicological important compounds however there is widespread research indicating that this is just the tip of the iceberg when assessing the total loading of organic fluorine compounds in the environment that have been introduced by the widespread use of AFFF (Aqueous Film Forming Foams).



Perfluorooctane sulfonic acid (PFOS) and perfluorooctanoic acid (PFOA) have received the most attention from regulatory bodies but it is the formation of these and related fluorinated compounds in the environment through abiotic and biological transformation of precursors that is now seen as an important consideration for ecological and human health risk assessments.

In response Eurofins | mgt are using the technique of total organofluorine-combustion ion chromatography (TOF-CIC) to determine fluoride both organic and inorganic and characterise environmental samples to establish their potential for formation of the traditionally targeted PFASs from precursors that may be present.

Screening of samples using TOF-CIC enables a quick and cost effective assessment of the potential for AFFF contamination before more complex and expensive LC-MS/MS assays are undertaken.

Combustion Ion Chromatography (CIC) Analysis



Samples are contained in ceramic boats and are introduced into the furnace where pyrolysis occurs at 800–1100 °C. The samples are

oxidised by O₂ at high temperature and the vapours are sparged through the absorbing solution using Ar. The HF evolved from combustion of organic fluorine dissociates to H⁺ and F⁻ ions in the absorbing solution. The samples are transferred to the ion chromatograph (IC) system for analysis. Phosphate added to the absorbing solution acts as an internal standard to calibrate the analytical results. The method complies with ASTM D7359-08 and is NATA accredited using in-house method LTM-INO-4150 (Part A).



TOP (Total Oxidisable Precursor) Analysis

Samples are treated via hydroxyl radical oxidation using an activated agent with overnight heating which converts the masked fluorinated precursors to their equivalent detectable perfluoroalkyl carboxylic acids (PFCAs) and perfluoroalkyl sulfonates (PFASs). It has been demonstrated that existing end-point compounds in samples both PFOA and PFOS are not altered by this process. Once the oxidation is complete the PFCAs and PFASs are extracted in the normal fashion and identified isotope dilution LC-MS/MS. AFFF materials treated by the TOP assay have been shown to reveal additional PFASs that can comprise up to 70% of the fluorinated organics in the sample. The combination of the TOP analysis plus the standard suite of 21 PFASs gives a more complete characterisation the PFASs present in the sample. TOP analysis can be applied to soils, sediments, waters and biota.

Multi-discipline Investigations

To fully assess a site's potential to produce PFAS concentrations that may have an ecological or human health risk it is necessary to do all three assays viz total organofluorine-combustion ion chromatography (TOF-CIC) to assess firstly the total fluorine problem followed by Total Oxidisable Precursor (TOP) analysis to gain an understanding of the potential transformation by abiotic and biological processes and then lastly LC-MS/MS to quantify the individual PFASs. This approach enables investigators to fully assess the potential for future production of PFASs from the presence of AFFF fluorinated substances that are not directly analysed by current LC-MS/MS technologies.

Eurofins | mgt Expertise

If you would to discuss your PFAS project and how Total Oxidisable Precursor (TOP) or total organofluorine-combustion ion chromatography (TOF-CIC) analyses can assist then please contact Dr. Bob Symons otherwise contact your local Analytical Service Manager or one of our Business Development Team listed below for further details.

Results You Can Trust

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Eurofins

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