

Insights into the fate of precursors and novel PFAS using organofluorine mass budgets across diverse media

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Per- and polyfluoroalkyl substances (PFAS) are a diverse family of highly fluorinated and persistent anthropogenic chemicals first synthesized in the 1940s that are not known to degrade under natural conditions. They are broadly used in modern commerce and are now detectable in the most remote environments on Earth. Manufacturing and industrial use of PFAS has shifted dramatically since the onset of their widespread production as concerns about human and ecological exposures to legacy PFAS have grown. The result has been abundant production of compounds in recent decades that are unknown/poorly identified because they lack available analytical standards needed to quantify their presence. Resulting major uncertainties about their fate include degradation in the environment and metabolism by organisms, propensity for bioaccumulation, and even their definition as part of the PFAS family of chemicals. This presentation will provide an overview of recent work toward developing total organofluorine mass budgets for U.S. human serum and liver samples and exposure media including freshwater fish, agricultural products, drinking water, and consumer products. Results will highlight major classes of compounds identified using targeted and non-targeted mass spectrometry in combination with combustion ion chromatography to characterize extractable organofluorine. Modeling techniques that help interpret these data and better identify and attribute sources of PFAS contamination will be reviewed. These data will be used to discuss the implications for future policy mechanisms and consumer interventions such as water filtration for mitigating future exposures.