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PFOS / PFOA AND BEYOND

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ABSTRACT: Organic fluorochemicals (PFCs) are known as one of the 20th century marvels of modern chemistry. In 2001 more than 3000 tons were produced in the U.S. PFCs have many applications including lubricants, paints, food packaging, fire retarding foams, and carpets. The PFCs groups of compounds are characterized by chains of carbon atoms of various lengths, to which fluorine atoms are strongly bonded, making some of the indestructible chemicals that until recent years were thought to be biologically inert. However, based on the new studies, on Jan. 30, 2007 EPA posted its outside expert panel's draft report calling PFOA a "likely" human carcinogen, an elevation from the prior "suggested" human carcinogen classification. Initially, researchers focused on PFOA and PFOS only, but more recently interest has increased into other groups of PFCs, which might also be ubiquitous contaminants. There is much published literature discussing analytical methods for PFOS/PFOA in clinical samples, but almost none cover all of the C4 through C14 PFCs in the same method. PFCs have become emerging contaminants due to possible severe health effects. EPA's Office of Ground water and Drinking water is finalizing a robust method for 17 PFCs to be used in potential future collection of nationwide occurrence data. The method uses solid phase extraction (SPE) for concentrating samples and analysis using high-performance liquid chromatography-tandem mass spectrometry. In lieu of EPA's draft method, MWH laboratories has developed a cost effective, selective and sensitive method which can measure down to low ppt levels using an on-line enrichment preparation technique followed by LC-MS-MS for analyzing water matrices. This method eliminates some of the sources of contamination that are ubiquitous in the lab when doing conventional SPE. This presentation will discuss the Lowest Concentration Minimum Reporting Limit (LCMRL) achievable using on-line enrichment and further evaluates the precision and accuracy of analyzing various types of water samples. The target list comprises C4 through C14 perfluoroalkane carboxylic and sulfonic acids and three of the perfluorooctanesulfonamides PFCs. This presentation will also discuss the effect of chlorine and various dechlorinating agents on the precision and accuracy of the PFCs in the water matrices.

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