

POLLUTANTS OF “EMERGING ENVIRONMENTAL CONCERN”



BACKGROUND Pollutants of “emerging environmental concern” refer to man-made chemicals attracting scientific interest generally because of recent detection in the environment. Often the toxicity of these compounds is poorly understood and few or no regulations exist regarding discharge. Developing analytical methods for the detection of these compounds is often hampered by the lack of suitable control materials, primary standards, and isotopically labeled internal standards. Examples of pollutants of emerging environmental concern include brominated flame retardants, substituted perfluoro alkanes, and pharmaceutical and personal care products.

PURPOSE NIST is aiding the research community, industry, and environmental regulators by developing methods for analysis and control materials, conducting interlaboratory comparison exercises, and assessing temporal trends, if possible, in specimens archived in the National Biomonitoring Specimen Bank.

DESCRIPTION **Brominated Flame Retardants** are a class of compounds used for many years but their occurrence in the environment has only recently been discovered. The most studied of these are the polybrominated diphenyl ethers or so called “PBDEs.” PBDEs are found in people and in most wildlife species. The NIST Charleston laboratory has developed methods for the analysis of blood, tissues, sediment, and house dust for these compounds. Many Standard Reference Materials (SRMs) are value-assigned for the major PBDE compounds. The NIST Charleston Laboratory is also in the process of value-assigning selected SRMs for the hexabromocyclododecane flame retardants. Laboratories participating in selected NIST-organized interlaboratory comparison exercises are also requested to measure these compounds.

Pharmaceuticals and Personal Care Products (PPCPs) are a large and varied group of compounds including fragrances, antibiotics, antidepressants, and antimicrobials as well as many other types of compounds. The diverse nature of this chemical class requires that many different analytical techniques be used for analysis such as liquid chromatography tandem mass spectrometry and gas chromatography with mass spectrometry. The NIST Charleston Laboratory currently is involved in value-assigning selected sediment, tissue, house dust, and domestic sludge SRMs for fragrance compounds called “nitromusks.” Some PPCPs survive the waste-water treatment process and are present in surface waters. Consequently, work is underway developing methods for extraction and analysis from this matrix.

Fluorinated Alkyl compounds are a class of compounds used as stain treatments for fabrics and carpets, fire fighting foams, lubricants, paper coating, and in a variety of other applications. Many fluorinated alkyl compounds are very resistant to degradation and accumulate in the blood and liver of wildlife and people. Currently no reference materials are available for environmental matrices. The NIST Charleston laboratory is in the process of developing methodology for measuring these compounds and will apply the methods to the value assignment of fluorinated alkyl compound concentrations in selected blood or liver reference materials and selected wildlife species.

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