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The Determination of PBDEs by GC-ICP-Q-MS

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Polybrominated diphenyl ethers (PBDE) are flame retardant chemicals used in everyday household items such as computer casings, televisions and household textiles. Leaching and migration of these chemicals from domestic products has been reported as the cause for the widespread presence of these compounds in our environment. Coupled with their persistent and accumulative nature, PBDEs tend to build up in the fat tissue of living organisms. Accumulation and toxicity issues of PBDEs have stimulated legislation where for example, the EU directive 2003/11/EC prohibits the use of penta-BDE and octa-BDE for the member states of the European community and sub-ppt annual average levels of penta-BDE is the recent policy for inland waters in the EU Water Framework Directive (WFD).

PBDEs are predominantly analysed by GC-NCI-MS, GC-HRMS or GC-ECD. This paper investigates the potential of GC-ICP-Q-MS for the determination of PBDEs. Several analytical considerations such as GC column and injector type are discussed and analytical figures of merit are presented and compared to some typical values from alternative instrumental approaches. The application of this methodology for the analysis of PBDEs in NIST SRM 2977 Mussel Tissue and NIST 1941b Marine Sediment is also presented.