Development of alternative ion trap MS/MS method for organochlorine and organobromine compounds in food and environmental matrices.

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After several contamination cases that have occurred in the past few years, the European Commission decided to implement a strategy for the monitoring of dioxins and PCBs in food and feed. Maximum levels were set up in various matrices on July 2002 and monitoring programs are now in application inside the European market. The strategy involves the use of screening methods (GC/LRMS or bio-assays), characterized by a high sample throughput, in order to detect the presence of dioxins and dioxin-like PCBs at the level of interest with a level of false negative that should be below 1%. The HRGC/HRMS confirmatory method is then used to bear out their presence.

An other family of organohalogen compounds, the polybrominated compounds mainly used as flame retardant like polybrominated diphenyl ethers (PBDEs) are now of major concern since their level into the environment has dramatically increased over the past 20 years. Development of reliable analytical methods is therefore needed because monitoring programs are now launched.

The alternative method to HRGC/HRMS for the monitoring of those compounds was developed on a PTV injector connected to a GC column coupled to an ion trap mass spectrometer. Tandem in time mode (MS/MS) has been widely used for PCBs and dioxins analysis. Nevertheless, in order to achieve the sensitivity required for dioxins in food (low parts per trillion level), large volume injections using PTV were optimized. On the other hand, the levels of PCBs and PBDEs in food and marine fishes (parts per billion level) do not necessarily require large volume injections.

Before analysis, a good clean-up is needed. This one is performed on an automated multi columns Power-Prep System^{TM}. The clean-up strategy we developed is based on the purification and the fractionation of the PCDD/Fs, the dioxin-like PCBs, the 7 markers PCBs and the PBDEs in the same run. The different fractions are then analyzed by PTV-GC-MS/MS method. We present in this paper a comparison between the HRMS method and the alternative method described above for these compounds in various food and environmental matrices.