

APPLICATION OF COMPREHENSIVE TWO-DIMENSIONAL GAS CHROMATOGRAPHY FOR THE ENHANCED ANALYSIS OF HALOGENATED ENVIRONMENTAL POLLUTANTS

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The current method for the analysis of polychlorinated biphenyls (PCBs), polychlorinated dibenzo-p-dioxins (PCDDs), polychlorinated dibenzofurans (PCDFs) and persistent pesticides most prevalent in human serum consists of a parallel automated sample cleanup procedure followed by gas chromatography-high resolution mass spectrometry (GC-HRMS). The sample cleanup produces three solvent fractions. The first fraction contains the ortho-substituted PCBs, the second fraction contains the persistent pesticides, and the third fraction contains the PCDDs, the PCDFs, and the co-planar PCBs. The fractionation of the sample is necessary because no analytical method currently has sufficient resolution power to separate, identify, and quantify all sample components in a single run. The development of a single method for the analysis of this set of organochlorines would drastically improve the throughput and thus substantially reduce the overall cost per analysis.

In this presentation we report the simultaneous separation of these compounds by comprehensive two-dimensional gas chromatography (GCxGC). With electron capture detection. A time-of-flight (TOF) mass spectrometer was also used to confirm the identity of the peaks in the GCxGC chromatogram.