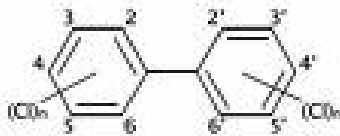




Proprietary Methodology for PCB Congener Analysis

- Accredited method for resolving specific congeners improves accuracy of PCB risk assessments
- Analytical method includes GC/MS-SIM analysis, large volume injection, and isotopic dilution procedures for water, soil, sediment, tissue, and air samples
- Current list of 100 congeners includes more than 95 percent of all of the congeners produced and marketed as Aroclors

Polychlorinated biphenyl congeners (PCBs) are a persistent organic pollutant of concern at many industrial sites due to their longtime use as a dielectric fluid in transformers.



PCBs were marketed and sold as various formulations of Aroclors. These formulations contained differing amounts of chlorination and were commonly referred to by names representing their amount of chlorination.

Each Aroclor is a mixture of different amounts of the 209 possible biphenyl congeners. Each congener contains between one and ten chlorines attached to the biphenyl structure. Some of these congeners, specifically the coplanar or dioxin-like congeners, have a greater health risk than other congeners, due to their ability to mimic biologically necessary chemicals.

PCB analysis is typically performed by the analysis for Aroclors. The common technique is to use GC/ECD and a second column to confirm the detection of an Aroclor. This approach has a number of drawbacks. The analysis is often complicated because it relies on the analyst's ability to interpret the resulting chromatogram by matching it to a known or reference chromatogram of a clean Aroclor. Many Aroclors share several peaks, and accurate interpretation can be extremely difficult. Sample weathering and background from the sample matrix can also increase the difficulty of determining a specific Aroclor. Using this approach, reporting limits are often quite high and only allow for a small number of congeners to be analyzed (typically 28). In addition, this type of Aroclor analysis provides no direct data about any of the specific congeners present in the sample.

The use of HRGC/HRMS was the next advancement in congener analysis. This approach allows for the analysis of all 209 congeners and provides a more accurate risk assessment. However, the technology needed is very expensive and is not widely available. Since all congeners share the biphenyl structure, it is impossible to completely separate all 209 in one analytical run. Through the careful selection of analytical columns and method parameters, it is possible to minimize the total number of coelutions.



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