

QUANTITATION OF POLYCHLORINATED BIPHENYLS IN FISH FOR HUMAN CANCER  
RISK ASSESSMENT: A COMPARATIVE CASE STUDY

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**Abstract** — A range of analytical options is available for the quantification of environmental polychlorinated biphenyls (PCBs). The PCBs can be quantified as Aroclort mixtures, as individual PCB congeners, or as PCB homologues. The methodological choice is driven by many considerations, including cost, but it is important to note that the risk assessment methods recommended by the U.S. Environmental Protection Agency (U.S. EPA) have specific and varying requirements for these analytical endpoints. The toxic equivalency approach is recommended for settings where the original Aroclor mixtures have been heavily degraded or weathered. Because this method only addresses the dioxin-like fraction of the PCB mass, the remaining PCB congeners need to be quantified and assessed separately, in a manner that is consistent with current U.S. EPA guidance. In this present analysis, we examined various methods for estimating a total nondioxin-like PCB mass in fish tissue samples from a New Jersey waterway using congener and homologue data: The National Oceanic and Atmospheric Administration estimate of the PCB total based on 18 congeners 2 Sdioxin-like congeners, an estimate of the PCB total from 38 analyzed congeners 2 Sdioxin-like congeners, and the total of nine homologue groups 2 Sdioxin-like congeners. These three approaches yielded similar estimates of the total nondioxin-like PCBs for a variety of fish species, whereas the totals quantified as Aroclor 1248, 1254, or 1260 were typically more than fivefold lower. Based on these results, the selection of the PCB analytical endpoints obtained from field investigations of fish and shellfish should be guided by the appropriate risk assessment methodology and by the analytical limitations.

**Keywords**—Polychlorinated biphenyls Toxic equivalency Analytical chemistry Risk assessment Fish