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Abstract

Toxicities of PCBs to Fish and Environmental Residues in Fish

PCB residues were examined by GC and GC-MS in fish taken from selected river systems. Silicic acid column chromatography and gel permeation chromatography were used for sample cleanup. Four fish samples from the Ohio River contained an average of 80 µg/g total PCBs (1232, 1248, 1254, and 1260). The highest PCB residues occurred in a sample from the Hudson River (213 µg/g total). DDT/PCB ratios in the twelve highest of 40 fish samples ranged from 1.3 to 211. High ratios were associated with heavily industrialized river systems.

The acute toxicities (96-hr LC_{50}) of PCBs to fish range from 278 to 50,000 µg/l while that for aquatic invertebrates is 3.2 to 2,400 µg/l. The LC_{50} values for fish exposed for 10 to 30 days in continuous flow diluters varied from 8 to 151 µg/l and 5 to 10 day exposures to invertebrates resulted in LC_{50} values of 0.6 to 80 µg/l. The toxicity of Aroclors 1242-1260 were inversely related to percent chlorination. The acute oral toxicity of Aroclors 1242-1260 to fish was greater than 1500 mg/kg. Biological magnification of Aroclors 1248 and 1254 in fish were 6,300 to 71,400 times the exposure levels after 60 days and 1254 was magnified 12,600 to 45,000 times in aquatic invertebrates.