Determination of persistent cyclic organochlorine residues in sediment slurry by microporous membrane liquid-liquid extraction and gas chromatography-mass spectrometry

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Abstract

A method, using microporous membrane liquid-liquid extraction technique (MMLLE) and gas chromatography with an electron capture detector (GC-ECD) and gas chromatograph coupled to a mass spectrometer, was developed for the analysis of cyclic organochlorine pesticides (OCPs) and polychlorinated biphenyls (PCBs) in sediment slurry. The MMLLE extraction employed isooctane as the organic liquid that was immobilised in the hollow fibre pores and in the lumen, at optimal sample pH value of 2.0 for OCPs and 7 for PCBs. The effect of triton x-100, in enhancing the dissolution of the compounds from sediment, was found to be optimal at a value of 0.15%, while the ionic strength was optimal at a value of 0.01 M. Samples from coastlines along the Indian Ocean in the southern parts of South Africa were found to be contaminated with *cis* and *trans* chlordane at concentrations of up to 0.003 mg/kg, while samples from northern parts were contaminated with 2,2',4',4-tetrachloro-1,1'biphenyl at concentrations of up to 0.02 mg/kg.

Keywords: Organochlorine pesticides, polychlorinated biphenyls, hollow fibre liquid phase micro-extraction, high performance liquid chromatography, mass spectrometry