ANALYTICAL METHOD FOR THE DETERMINATION OF TRICHLOROBENZENES IN MARINE BIOTA

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Trichlorobenzenes (TCBs) were intensively used in the last decades as essential components of dielectric fluids, intermediates in chemical synthesis, solvents, coolants, lubricants, heat-transfer medium; insecticide, additive in polyester dyeing and components of termite-control preparations (1, 2). Due to their widespread occurrence in the various environmental compartments they have been classified by OSPARCOM (Oslo and Paris Commissions) (3) as chemicals for priority action and have been proposed by the Marine Chemistry Working Group (MCWG) as chemical parameters in the Water Framework Directive (4).

Based on their octanol-water partitioning coefficients (log K_{ow} = 4.02-4.49) (5) and bioconcentration factors in fish (ranging from 182 to 3200, depending on the lipid content) (6), these chemicals are expected to bioaccumulate in aquatic organisms.

Against their potential significance in the marine environment there is relatively little information available concerning the actual concentration levels and distribution of trichlorobenzenes in marine organisms (7, 8).

The aim of this work was to develop an analytical method appropriate for the determination of TCBs in marine biota.

The analytical method consists of saponification of the fish tissue with methanolic potassium hydroxide, liquid-liquid extraction of the solution with pentane, clean up of the concentrated extract on alumina column and analysis of the extract with gas chromatograph equipped with electron capture detector (ECD). The method proved to be appropriate for the detection of concentration levels typical of the organic contaminants in biota (7) (~1 ng /g wet weight of tissue). The relative standard deviation of the analysis of 1,3,5-, 1,2,4- and 1,2,3-trichlorobenzene was 8, 6 and 18% (n=4) respectively. Higher recoveries of the analytes were obtained with spiked fish samples than with standard solutions (88, 96 and 78 instead of 53, 50 and 32% of 1,3,5-, 1,2,4- and 1,2,3-trichlorobenzene respectively). One plausible explanation of the difference is that the proteins and glycerides of the fish tissue compete effectively with trichlorobenzenes for the base and their presence decrease their decomposition rate.

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