

APPLICATION OF HRGC-HRMS METHOD FOR TRACE ANALYSIS OF BROAD RANGE OF COMMON PESTICIDES IN SEDIMENTS

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Many of the known pesticides are typical persistent organic pollutants (POPs), which have received widespread attention because of their environmental persistence, trend for bioaccumulation and adverse effects on living organisms, including humans. The present study investigated the contamination and distribution of 29 pesticides in surface sediments from 12 locations in the Eastern Gulf of Finland. The samples were collected during 2012-2013 and analyzed by high resolution GC/MS method.

Dieldrin, endrin, δ -HCH, heptachlor, cis-heptachlor epoxide, oxychlordane, endosulfan I, endosulfan II and endosulfan sulphate were not detected (< LOQ) in studied samples. The concentration ranges of pesticides which are used in Russia (hexachlorobutadiene, hexachlorobenzene, methoxychlor, trifluralin and permethrin) were found to be <0.0001-8.45, 0.003-1.35, <0.002-2.33, 0.0001-0.05 and <0.002-1.44 ng g⁻¹ dw respectively. The concentrations of pesticides prohibited for usage in Russia (pentachlorobenzene, cis-chlordane, trans-chlordane, aldrin and mirex) ranged from <0.0001 to 1.65, <0.002-0.02, <0.002-0.02, <0.003-1.31 and <0.001-0.05 ng g⁻¹ dw respectively. The concentration of HCHs, calculated as the sum of α -HCH, β -HCH and γ -HCH ranged from 0.008 to 0.87 ng g⁻¹ dw. The sum of DDTs (six isomers) varied in range of 0.09-49.1 ng g⁻¹ dw. The higher DDD/DDE ratios found in all samples may reflect areas with higher organic inputs and reducing conditions. According to the international sediment quality guidelines, the pollution by total DDT of studied area sediments must have median toxic effects on the aquatic organisms.