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Gas chromatography-mass spectrometry screening persistent organic pollutant in environmental monitoring of vital activity objects

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Abstract

There are the results of the developed way of organochlorine pesticides (OCP) screening (OCP was classified by the Stockholm Convention (2001) as persistent organic pollutants (POP) by the gas chromatography–mass spectrometry (GC-MS)-detecting method for its simultaneous detection in vital activity objects (food, food raw material, food product, pathological animal material tissues, natural surface of waters) in this article. Preparation of the samples using solid-phase extraction (SPE) on cartridges «Diapak C18 Plus» or using the solid-phase extraction dispersion QuEChERS («quick», «easy», «affordable», «effective», «reliable», «safe») way (which contribute to high degree of detecting compound extraction) is preceding the GC/MS-detecting stage.

Among the detecting ones in conditions of GCMS screening OCP are explored compounds that are included in POP «dirty» dozen: α-, β-, γ-isomers of hexachlorocyclohexane (HCH) and its biotransformation product – pentachlorocyclohexene, hexachlorobenzene (HCB), heptachlor, aldrine (HHDN), 2,2-bis(4-chlorophenyl)-1-chloroethylene (p,p'-DDMU), 1,1-dichloro-2,2-Bis(p-chlorophenyl)ethylene (4,4'-DDE), 1,1-dichloro-2,2-bis(4-chlorophenyl)ethane (4,4'-DDD), 1,1-bis(4-chlorophenyl)-2,2,2-trichloroethane (4,4'-DDT). The necessity of controlling the content of CO_3 (caused by its bioaccumulation in vital activity objects) takes part in trophic paths and caused by them violation of the normal microbiota of the human, agricultural animals and plants, connected with practical methods of realization chemical and biological risks monitoring are one of priority directions of the government policy in chemical and biological safety area.

The developed way of GC-MS-detecting range OCP is applied for monitoring in food, food raw material, food product, pathological animal material tissues, natural surface of waters. Quantitative detecting the OCP range on a level of GC-MS method sensitivity spend in selective ions (basic and confirmatory ions respectively) registration mode. This method characterizes by limit of detection that don't exceed maximum permissible level (MPL) content OCP in objects of environmental monitoring with a standard deviation 3-4%.

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