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CHARACTERISTICS OF ISOMERIC PATTERN FOR ORGANIC CHLORINATED COMPOUNDS IN ENVIRONMENT

Nakano, T., Tsuji, M. and Okuno, T.

The Environmental Sci. Inst. of Hyogo Prefecture, 3-1-27, Yukihira-cho, Suma-ku, Kobe-shi, Hyogo 654, Japan

ABSTRACT

PCB and relevant chlorinated organic compounds in environmental samples were analyzed by high-resolution GC/ECD and GC/MS-SIM. The sea-sediments were investigated in the lateral and vertical direction, and individual PCB congeners were evaluated. The distribution of chemical substances was expressed by three-dimensional graph. The distribution of these compounds in the Harimanada Inland Sea are investigated. The levels of these compounds in the sea-water, sea-sediment, plankton and atmosphere were monitored isomer-specifically, and compared with commercial PCB and industrial chlordane. Residual isomeric pattern of these compounds in the sediment and plankton reflects the general abundance of isomer component of their commercial products.

KEYWORDS

PCB; PCT; Chlordane; atmosphere; water; sediment; plankton; GC/MS; isomer specific analysis;

EXPERIMENTAL

Sample collection

Water, sediment and biological samples were collected from the monitoring area in the Harimanada Inland Sea. Water samples were collected with a pail, sediment with a Smith-McIntyre dredge and biological sample with a plankton-net. Air samples were collected at urban area in Kobe with a high volume air sampler.

Sample preparation

Pesticide-grade solvents were used in all extractions and cleanup steps. Water samples were extracted with n-hexane, and sediment and plankton were first saponificated, then extracted with n-hexane. Air sample which collected by high volume air sampler were extracted with acetone/n-hexane(1/1) by Soxhlet extractor. The extract was concentrated to 1-ml by using Kuderna-Danish (KD) evaporator.

Cleanup

Two grams of silica gel were filled in a 50cm x 1cm ϕ glass column with n-hexane. One ml condensed extract was put on the silica gel column and eluted with n-hexane. The first 200 ml of eluate was collected, and shaken with copper powder to remove sulfur. The eluate was concentrated to 1 ml for GC/MS analysis.