LEVELS CHARACTERISTIC OF OCPS IN RIVER SEDIMENTS, SOUTH KOREA

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Introduction:

Organochlorine pesticides (OCPs) are widespread in the environmental matrixes and belong to the Persistent Organic Pollutants (POPs). There has been a great concern for OCPs because of their persistence, bioaccumulation potential and toxic potency in addition to their potential for long range transport. OCPs have been considered their adverse effects on human health and ecosystem. Although DDT was officially banned the use in Korea since 1971, however OCPs and their metabolites are still found as low level in various environmental samples, especially in the water, soil and sediment. These Pollutants may be deposited into the bottom sediments where contaminants accumulate as time. Sediments may act as long term storage of chemicals to the aquatic environment and as an important habitat of aquatic ecosystems.

These works studies the levels and distribution of OCPs in surficial sediments of South Korea and investigates their possible sources. Also it compares the measured values with those of other sites in the world.

Materials and methods:

A total of 60 surficial sediments were collected from the bottom (0~10cm) of 4 main rivers, the sampling periods in 2008 and 2009 (September- October 2008 and 2009, once a year) by using of grab sampler, 30 sites in 4 main rivers. The OCPs were selected for 9 chlorine pesticides (HCB, 3 Drins, Heptachlor, DDTs and metabolite etc).

The samples were placed in amber glass bottle (storage at 4 °C until analysis). Procedure of sediments analysis was treated, extracted, concentrated and analyzed by Korea POPs official testing method.

The average recoveries of OCPs in all sediments samples were satisfied with the Korean official method (70-120%) and EPA guideline. Field blank, method blank (one per batch) and glassware blank were not detected the target compounds. The below values of detection limit (0.5 pg/g) were noted as “ND” (not detected).

Results and discussion:

During the last 10 years, the environmental concentration and distribution of OCPs in 4 river sediments have decreased as these in other countries. Among the OCPs, DDTs were only detected in the average concentration 0.607 ng/g (2 of 30 sites).

In the sediment results of endocrine disrupting chemicals (in 1999-2005), the average concentration of DDT were investigated from ND to 0.156 ng/g. In the 4 Rivers sediments of POPs survey (in 2005-2008), the mean levels were detected from 0.377 to 3.270 ng/g. In 2009 Monitoring results, OCPs were showed less than average 1.424 ng/g in 2008, and were very similar to the existing research results.

It is estimated a dominating role of the river and drainage area as a possible source that the particle combined DDTs and washed-out from the top soil.

In addition, Drins (Aldrin, Dieldrin, Endrin) concentration of the River sediments were relatively low such as heptachlor and chlordane and these pesticides detected in a foreign country does not have many cases, the detected concentration levels significantly low showed a similar tendency in our country.

The levels of OCPs in the bed sediments of studied sites are located within the safety ranges which are compared to the permissible limits for Canadian sediment quality guidelines.

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