

ENVIRONMENTAL LEVELS - POSTERS

DISTRIBUTION CHARACTERISTICS OF POLYCHLORINATED DIBENZO-P-DIOXINS AND POLYCHLORINATED DIBENZOFURANS IN SEDIMENTS FROM THE SOUTHEASTERN COASTAL AREAS OF KOREA

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Introduction

Polychlorinated dibenzo-p-dioxins(PCDDs) and polychlorinated dibenzofurans(PCDFs) constitute a class of ubiquitous pollutants with a tricyclic aromatic structure, high chemical stability, and extremely poor water solubility.¹⁻² The presence of PCDDs and PCDFs in sediments of waterways in industrialized and heavily populated areas is an environmental problem that has received considerable attention in recent years. Sediment is known as a deposition place of persistent organic pollutants(POPs). The aim of this study is to assess the level of contamination and contamination source characteristics of PCCDs/DFs in sediments from the southeastern coastal areas of Korea.

Experimental methods

Sampling sites

Sampling sites of sediments are illustrated in Fig. 1. Samples were collected in Pohang, Pusan, Ulsan and Chinhae Bay of Korea in February, 2000.

Analytical procedure

Samples were freeze-dried and sieved to <2 mm. Analytical methods were based on previously used methods.³⁻⁵ 20g of sediments were extracted in a soxhlet apparatus with 200 ml of toluene for 16 hours, then the volume was reduced to 1-2ml in a rotary evaporator. The extract was transferred to n-hexane and internal standard(EDF-8999, CIL Inc.) was spiked. The n-hexane layer was concentrated and subjected to multi-layer chromatography of silica gel and alumina columns clean up. Quantification of PCDDs/DFs were performed by HRGC(HP 6890)/HRMS(JMS 700).

ORGANOHALOGEN COMPOUNDS

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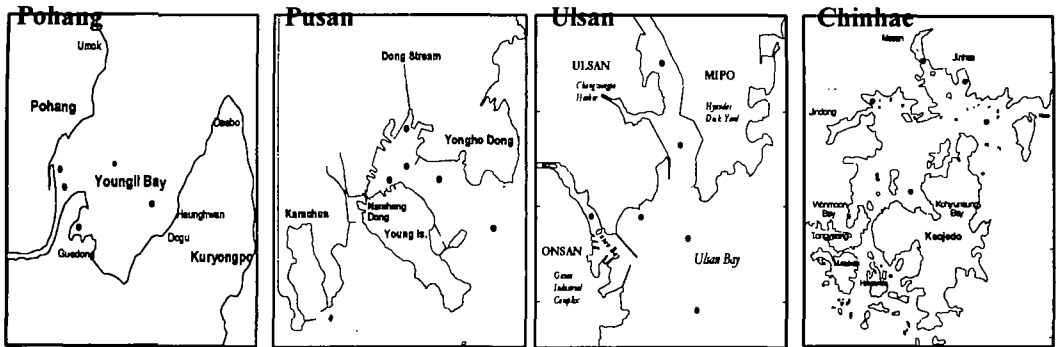


Fig. 1. Map showing sampling sites.

Results and discussion

Concentration

Fig. 2 shows the concentration of PCDDs/DFs in sediments from the southeastern coastal areas of Korea.

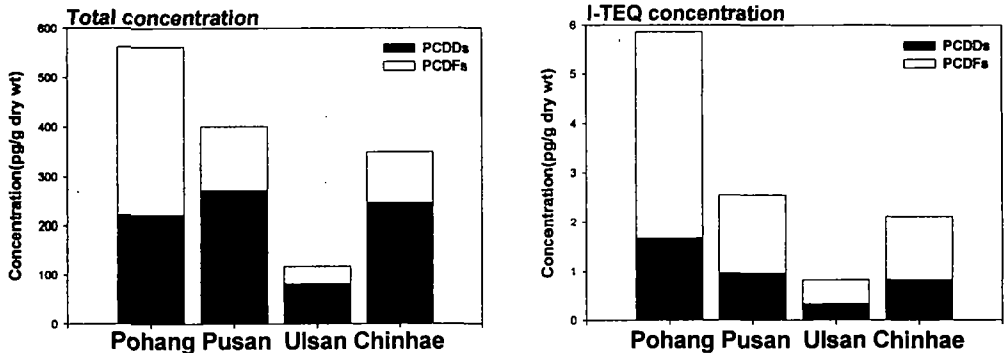


Fig. 2. Concentration of PCDDs/DFs in sediments from the southeastern coastal areas of Korea.

Total and I-TEQ concentration of PCDDs/DFs represented the highest value in Pohang coastal

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areas. Total concentration of PCDDs/DFs analyzed in Pohang site was 441.2~727.0pg/g with 4.4~8.6pg/g for I-TEQ. PCDDs/DFs concentration in sediments collected Pusan site was the range of 199.9~790.5pg/g with 1.2~5.9pg/g for I-TEQ. In Chinhae Bay, total concentration was 123.8~855.3pg/g with 0.5~3.2pg/g for I-TEQ. Ulsan Bay was the lowest level of PCDDs/DFs, ranging from 43.5 to 324.9pg/g with 0.5~1.2pg/g for I-TEQ.

Congener profiles

Congener profiles of PCDDs/DFs in sediments are summarized in Fig. 3. Pusan, Ulsan and Chinhae site represented a similar congener pattern for both total and I-TEQ. The predominant congeners for total concentration were OCDD and HpCDFs. However, in the Pohang site, the highest ratio of total PCDDs/DFs was PeCDFs and the concentration of PCDFs was high compared with that of PCDDs. It indicated that the contamination of these areas attributed to PCDDs/DFs generated from combustion process of stationary source.⁶

References

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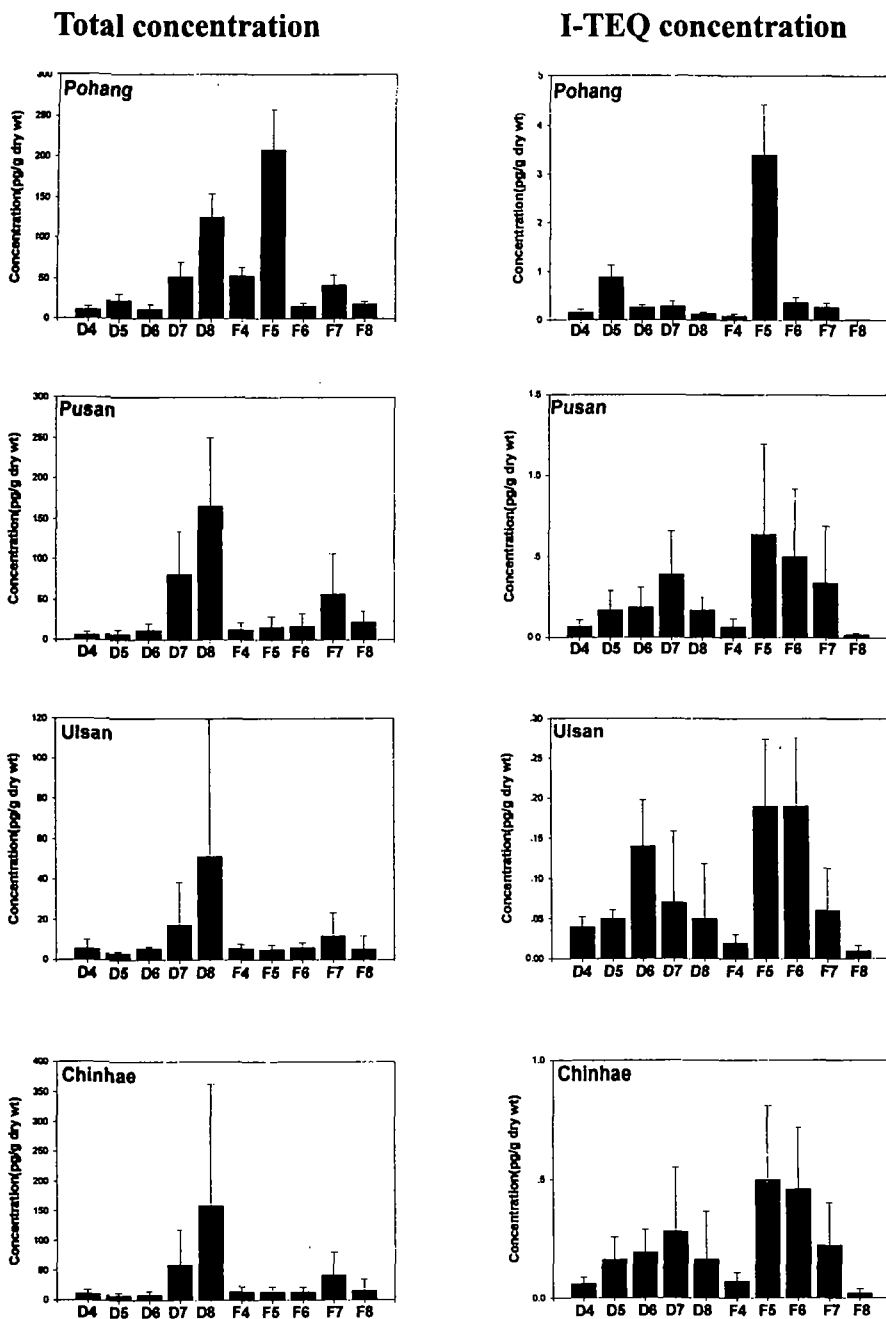


Fig. 3. Congener profiles of PCDDs/DFs in sediment from the southeastern coastal areas of Korea.