

Concentration Levels and Characteristics of PCDDs/DFs
in Sediment of Korea

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Introduction

Polychlorinated dibenzo-p-dioxins(PCDDs) and polychlorinated dibenzofurans(PCDFs) emitted from sources are widely distributed in the environment via air, water, soil, sediment and so on. Sediment is a deposition place of Persistent Organic Pollutants(POPs) exists in the environment, and is known as an indicator well-illustrated a past and local contaminant level.¹ In this study, we investigated concentration level and characteristics of PCDDs/DFs in marine sediments of the coast sea in Korea.

Experimental Methods

Sampling

Sampling points of sediment samples were illustrated in Fig. 1. Sample was collected at 14 points of East sea, 4 points of Yellow sea, and 4 sites of the southern sea.

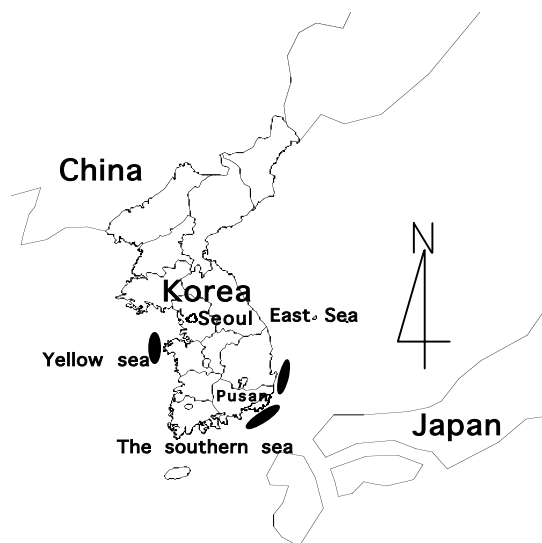


Fig. 1. Map showing sampling sites(●)

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After collection, sample dried at a room, was extracted with 200ml of toluene for 6 hours under reflux and then filtered. After addition of keeping solvent(n-Nonane 0.5ml), the extract was transferred to n-Hexane and then adjusted to a volume of 10ml. After spiking of internal standards(EDF-8999, CIL Inc.), purified using multi-layer silica gel chromatography and alumina column(Neutral, Activate I, Merck) chromatography and analyzed with HRGC(HP5970)/HRMS(JMS 700, Jeol). Analytical methods and conditions were similar with several papers described previously.²⁻³

Results and Discussion

Concentration levels

Table 1 shows concentration levels of PCDDs/DFs in marine sediment. As shown in Table 1, PCDDs/DFs concentration represented the highest value at East sea, it shows influence by stationary sources exists in the vicinity of the coast sea. Concentration level of PCDDs/DFs at Yellow sea was the lowest as compared with other sites.

Table 1. The total and I-TEQ concentration of PCDDs/PCDFs in sediment.

Site	<u>Total concentration(pg/g)</u>			<u>I-TEQ concentration(pg/g)</u>		
	Range	Median	Mean	Range	Median	Mean
Yellow sea(n=4)	114.1~174.1	137.46	129.44	1.8~4.98	2.81	2.58
The southern sea(n=4)	188.3~3661.2	2350.9	645.2	3.77~31.8	21.24	6.63
East sea(n=14)	1086.1~75246	12372.7	21744.3	39.8~2482.7	282.01	616.89

Congener profile

Congener profile of PCDDs/DFs in sediment samples was summarized in Fig. 3. Considering profile at East sea, TCDF occupied 26.7% and HxCDF was 15.34% for total concentration. HxCDF and HxCDD were investigated as predominant congener for I-TEQ concentration. Ratio of PCDFs was higher than PCDDs at this point, it means a pattern of stationary source attributed to combustion processes at contamination area.⁴ And ratio of PCDDs was higher than PCDFs at

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Yellow sea and Southern sea that contamination level was low relatively. Especially, the southern sea showed that OCDD occupied 50% by origin of pentachlorophenol used at agricultural area.

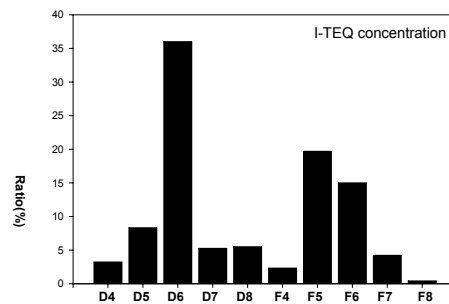
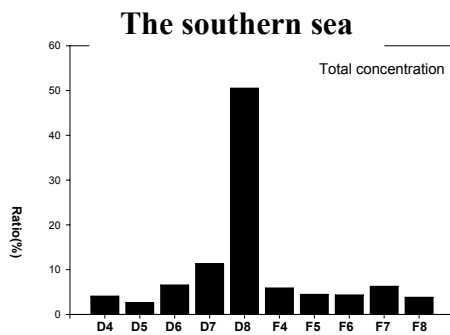
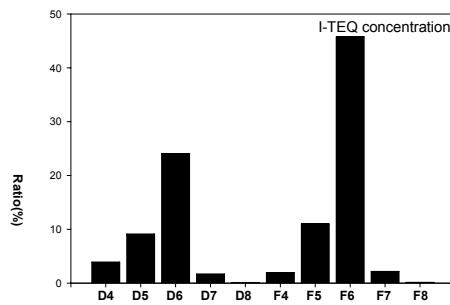
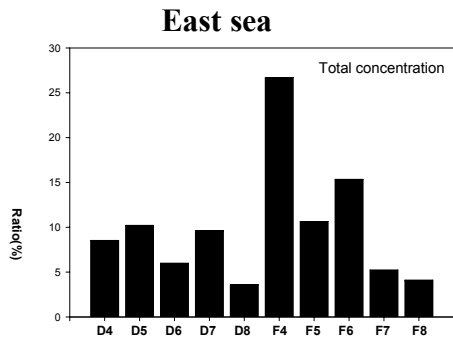
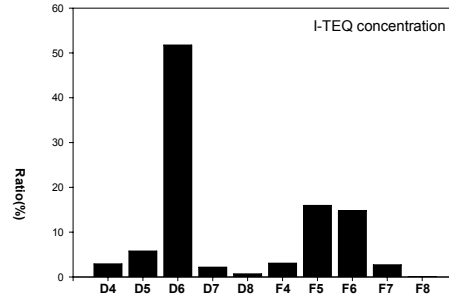
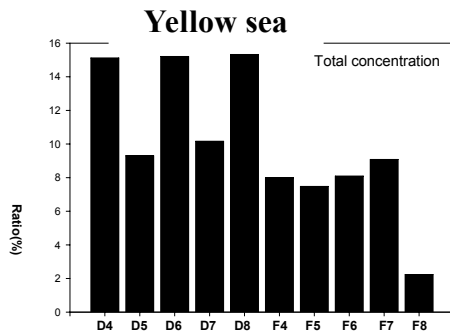


Fig. 3. Average congener profile at each site.

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