

# Environmental Levels (Air and Soil) of Other Organohalogenes and Dioxins P298

## NATIONAL ENVIRONMENTAL MONITORING IN JAPAN

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### Introduction

Japan Environment Agency has started national monitoring program for dioxins and furans in 1985. The target at that time was sediments (river, lake and marine) and aquatic organisms (fish and shellfish). Atmospheric monitoring started in 1989 at various sites. Although those activity have given information on the level and trend of PCDD/PCDF pollution, it was considered that further intensive monitoring program is necessary to understand the whole picture of the PCDD/PCDF contamination in Japan. With a strong social concern, Japan Environment Agency initiated a large scale monitoring program in 1998 after a one year pilot monitoring in 1997. A large number of samples of atmosphere, water, soil, fallout particle and aquatic organism are analyzed with an advanced analytical method to very low concentrations. Presented here is the program design and analytical results.

### Monitoring program design

Monitoring is programmed to understand the national contamination level. The program consists of two types, one being monitoring at the general environment and the other being detailed monitoring at the surrounding area of waste incinerators which is considered as the major emission source. Monitoring sites for the general environment includes 187 local areas. Those area includes 59 areas that incinerator locates, 59 big city areas, 59 middle to small city areas and 7 background areas. Numbers of sampling sites and media to be analyzed are shown in Figure 1. Sampling site was arranged to collect at the sample places as close as possible so that the observed PCDD/PCDF level between environmental media can be related to each other. For example, soil and fallout particulate sampling was collected at the same site of atmospheric sampling. Water, sediment and aquatic organisms are collected at the same place, possibly near the atmospheric sampling site.

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Analytical method is based on isotope dilution/high resolution mass spectrometry and operation is followed by the official analytical manuals prepared by JEA. Detection limit is designed to detect low concentration of PCDD/PCDFs, such as 0.1 pgTEQ/m<sup>3</sup> for atmosphere, 0.3 pgTEQ/l for water, for example.

Table 1. Type of Analyte and Number of Sampling sites

	Near Incinerator	Large Cities	Middle to Small Cities	Background Areas
Total Number of sites	59 areas	59 cities	59 cities	7 places
Atmosphere	2 sites	2 sites	2 sites	2 sites
Fallout Particulate	1	1	1	1
Soil	1	1	1	1
Ground water	2	1	1	1
River, Lake, Seawater	1	1	1	1
Sediment	1	1	1	1
Aquatic Organism	1	1	1	1

### Results and Discussion

A total of approximately 4,000 analytical data was collected and analysis is underway in terms of concentration, isomer and congener patterns, bioconcentration rate, geographical and meteorological distribution and so on, of PCDDs, PCDFs and planar PCBs. A part of result is shown in Table 2. PCDD/PCDF and planar PCBs in bio-indicators are also analyzed. Pine tree leaves shows magnified concentration of PCDD/PCDF (2.3 – 24 pgTEQ/g) and Co-PCBs (0.61 – 4.7 pgTEQ/g). Congener pattern shows peak at lower chlorinated PCDFs. Pigeon also accumulated PCDD/PCDF and co-PCBs. Observed level shows 0.52 – 5.3 pgTEQ/gram wet weight for PCDD/PCDFs and 0.0045 – 0.098 pgTEQ/gram wet weight for Co-PCBs, respectively. Congener pattern shows the dominance of highly chlorinated PCDDs.

Further details of the data will be presented.

### Acknowledgement

Authors express their thanks to analytical laboratories who collected and analyzed the samples.

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Table 2 PCDDs, PCDFs and Planar PCBs in the Environment, a Case of Saitama Prefectural Area

	A city	B city	C city	D city	E city
Atmosphere (1) (pg-TEQ/m <sup>3</sup> )					
PCDDs/PCDFs	2.6	1.5	1.2	0.34	0.24
Planar PCBs	0.12	0.07	0.05	0.02	0.02
Atmosphere (2) (pg-TEQ/m <sup>3</sup> )					
PCDDs/PCDFs	0.34	0.42	0.40	0.38	0.26
Planar PCBs	0.03	0.03	0.03	0.01	0.01
Deposition (1) (pg-TEQ/m <sup>3</sup> /day)					
PCDDs/PCDFs	340	390	160	150	160
Planar PCBs	5.2	7.9	17	4.7	3.5
Deposition (2) (pg-TEQ/m <sup>3</sup> /day)					
PCDDs/PCDFs	36	42	12	43	8.6
Planar PCBs	0.1	0.3	--	--	--
River Water (pg-TEQ/l)					
PCDDs/PCDFs	19	6.0	0.46	1.2	0.62
Planar PCBs	0.43	0.33	0.009	0.005	(0.003)
Sediment (pg-TEQ/g)					
PCDDs/PCDFs	150	15	3.6	1.8	1.1
Planar PCBs	3.3	1.1	0.6	(0.008)	(0.01)
Ground Water (pg-TEQ/l)					
PCDDs/PCDFs	(0.03)	0.3	(0.01)	(0.04)	(0.02)
Planar PCBs	(0.0001)	(0.004)	(0.002)	(0.001)	(0.001)

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