

Environmental Levels of PCDD/PCDF, in soils of Brandenburg, Germany

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1. Introduction

The concentration of PCDD's and PCDF's in soil samples from rural and semi-urban sites as well as from areas exposed to defined emitters have been reported repeatedly.^{1,2)}

The studies indicate that PCDD's and PCDF's are ubiquitous in all industrial countries. Reports on the level of PCDD/F from different parts of Germany have been published recently.^{3,4)}

But there is only poor knowledge about concentration in the „Five New Countries“.

The aim of the project was to analyse soils from a typical area of Brandenburg with mostly agricultural used soils, with spacious forests and only small factories.

2. Method

Soil samples were collected following the recommendation of the german „Bund-Länder-Arbeitsgruppe - Dioxine“ for 3 types of exposed areas:

1. Soils in rural areas as background values
2. Soils in diffus exposed territories and
3. Soils in region with known emission

The samples were taken from the A and O horizon (mostly > 10 cm) dried and sieved (2 mm).

Determination of Dioxin

The soil was mixed with ^{13}C -Dioxin standard and extracted with toluen for 24 h and after that cleaned at a Al_2O_3 -column. The second clean was carried out at a 3 layer column (Al_2O_3 , Na_2SO_4 , $\text{Al}_2\text{O}_3 + \text{H}_2\text{SO}_4$). After evaporation ^{13}C -Dioxin standard was added and injected split/splitless in a HP 5890 GC equipped with MSD-HP 5972.

Determination of PCB's and PAH

The air dried soil was mixed with Na_2SO_4 and extracted with Toluene for 6 h. The evaporated extract was cleaned at a SiO_2 -column. The eluate was divided. 18 PAH were determined by HPLC HP 1050 with fluorescence detector Jasco 920 and DAD HP 1090 on Baker RP 18 column.

The chlororganic compounds were confirmed by GC, HP 5890 with ECD on AP 5, temperature programmed.

3. Results

The result of the analysis of Brandenburg soil are summarized in the following table.

Dioxin Concentration in soils (ng TE q/kg)

soil typ	area	sample	min.value	max.value	mean value	median
rural (back ground)	forest					
	- litter	16	1	54	24	23
	- A-horizon	11	1	16	4	2
	- subsoil	4	1	1	1	1
	arable land	10	1	4	2	1
	green land	8	1	3	2	2
diffuse sources	green land	22	1	9	3	2
	residential district	6	2	5	2	2
defined emitters		25	2	14	5	3

4. Conclusions

Plenty of investigations for dioxins have been made in the past in the federal parts of Germany, but there is need for tests in the new countries. The dioxin sources from a typical area of Brandenburg are:

- a) for defined emitters - traffic, incinerators, landfills
- b) diffuse sources - green land, parks, play grounds
- c) back ground - forest soils, forest litter, green land

Compared with the compiled data from Germany the concentrations are lower.

	<u>New Countries</u>	<u>FRG</u>	(ng TE q/kg)
a	2 - 14	1 - 160	
b	1 - 9	0.8 - 1594	
c	1 - 54	0.01 - 140	

An explanation could be the lower data basis and the absence of industrial plants in that agricultural dominated area. Surprising is the fact, that the utilisation of brown coal countries as the only fuel has no influence on the dioxin concentration.

5. References

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