

PCDD/PCDF - LEVELS IN SOILS AND PLANTS OF NORTHRHINE-WESTFALIA

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PCDD/PCDF - levels in soils and plants from different locations in NRW - a highly industrialized region in the FRG - have been analysed. These areas receive their PCDD/PCDF - load from different sources such as immission, application of sewage sludge and flooding.

A comparative study of agricultural land to which sewage sludges had been applied and of land to which they are not applied [1] did not reveal significant differences (Fig. 1).

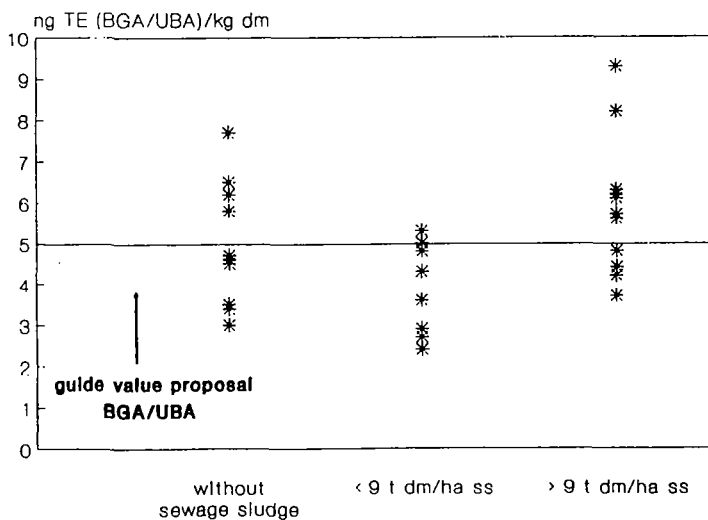


Fig. 1: PCDD/PCDF - levels in soils of sewage sludge areas of the "Lippe Association" and untreated control areas

Some untreated soils show concentrations higher than the presently discussed guide value proposal of 5 ng TE/kg.

Considerable amounts, however, are found in the Rhine flood zone (up to 73 ng TE/kg, Fig. 2) and in forest soils (up to 75 ng TE/kg, Fig. 3). The investigated soils of two beech-forests show highest PCDD/PCDF- contents in the upper layers (Of/Oh - and Ah - horizon).

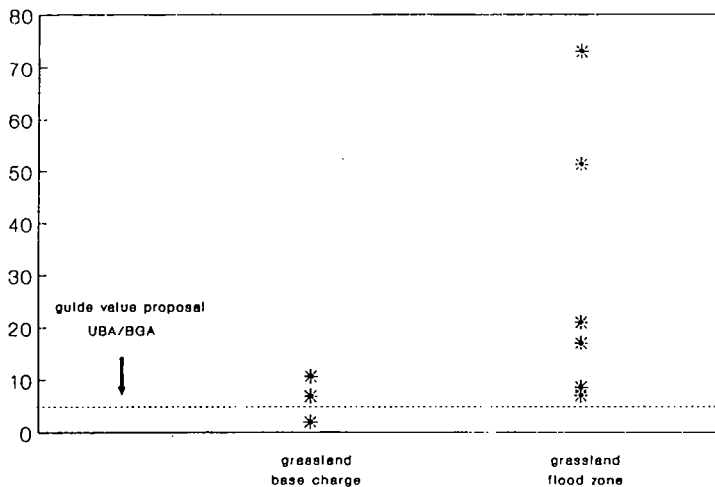


Fig. 2: PCDD/PCDF - levels in soils of grassland
[ng TE (RGA/UBA 1984)/kg dm]

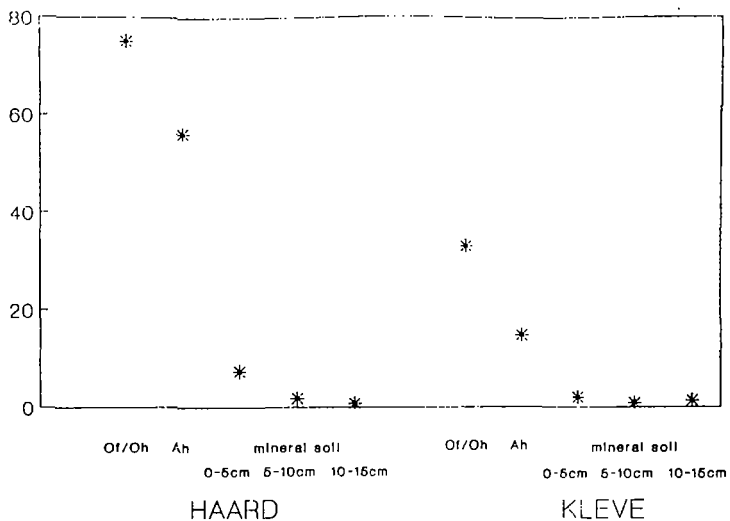


Fig. 3: PCDD/PCDF - levels in forest soils
[ng TE (BGA/UBA)/kg dm³]

The transfer of PCDD/PCDF from soil into plants seems to be relatively low. Comparing the concentrations in soil and maize (Fig. 4) and also in soil and grass (Fig. 5) there is little correlation. Contamination through immission and air - plant transfer predominates [2]

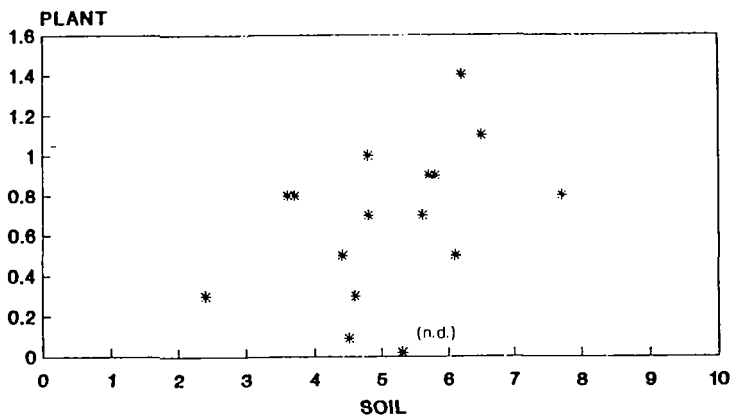


Fig. 4: PCDD/PCDF - contents in maize depending on
contents in soil [ng TE (BGA/UBA)/kg dm³]

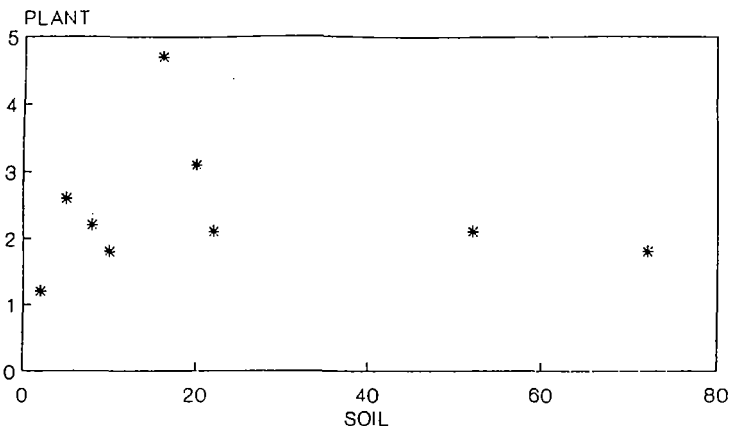


Fig. 5: PCDD/PCDF - contents in grass depending on contents in soil [ng TE (BGA/UBA)/kg dm]

The frequency distribution of the congeners in soils are mostly quite different from that in plants and there are also differences in PCDD/PCDF - congener patterns comparing vegetative and generative parts of plants. The reasons are yet unknown.

Grassland soil samples were taken from 0-10 cm, those of arable sites from 0-30 cm depth. Sampling in forest sites was differentiated by horizons Of/Oh, Ah and the mineral soil layer below.

PCDD/PCDF were analysed by GC/MS after Soxhlet - extraction with a mixture of toluol/methoxyethanol. For analysis of plant material the highly sensitive mass spectrometer VC-AutoSpec was used. In the course of sample preparation ^{13}C -standards were added to control extraction efficiency.

REFERENCES

- [1] H. Friege, H.P. Buysch, W. Leuchs, A. Hembrock, W. König, Korrespondenz Abwasser, 5, 601-608 (1989)
- [2] W. König, A. Hembrock, VDI - Berichte Nr. 745, 423-439 (1989)