

OCCURANCE OF PCDD/PCDF AND PAH IN DIFFERENT ENVIRONMENTAL MATRICES IN A NORTHERN-EASTERN REGION OF ITALY

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INTRODUCTION

The distribution of PCDD/F and PAH in different areas of the world have been reported by several authors. But only few data are available for dioxins in some environmental matrices viz. the dry dust deposited from the atmosphere. PCDD/F and PAH in soil mainly originate from atmospheric deposition of combustion products. Major sources of industrial processes contributing to PCDD/F and PAH production are the combustion of fossil fuels, metallurgical processes, waste incineration and vehicular traffic. The atmospheric transport should be a major pathway for the input of PCDD/F and PAH in the soil. Recent investigations have shown that PCDD/F and PAH can also bioaccumulate to high concentration in crops and reach human organism via the food chain. This research was included in a more general study of the environmental impact assessment of a rural area in the Northern-Eastern region of Italy, before the starting of a new incinerator plant for the thermal combustion of urban solid wastes.

MATERIALS AND METHODS

The sampling and the analyses have been performed by the laboratory Lecher Ricerche e Analisi Srl of Venice, together with MPU GmbH of Berlin in a period between July 1997 and may 1998.

The area considered for soil samples has been defined by drawing three concentric circles centered on the emission source of the future incineration plant. In the circular crowns individuated by these circles 12 points were selected, from which 12 samples of soil were taken at about 30÷40 cm deepness (4 in each circular crowns).

For the collection of the dry atmospheric depositions, two static collecting vessels, suitably protected in case of rain, have been exposed for a first period of 94 days (summer-autumn 1997) and for a second period of 104 days (winter-springs 1998).

The analysis of PAH have been performed by HRGC/FID, following CNR-IRSA standard methods (Quaderni 64, 1985) and confirmed by HRGC/MS. The analyses of PCDD/Fs were carried out by HRGC/HRMS, according to US-EPA Method 1613.

RISULTS AND DISCUSSION

Figures 1-8 summarise the PCDD/PCDF levels and the PAH concentrations detected in soil and dry dust deposition samples.

The concentration levels of PCDD/F and PAH on the soil samples show very low level of these organic micropollutants in comparison with the values found in the dry atmospheric depositions. On the basis of the mean values of dry deposition flow (about $0,05 \text{ g}\cdot\text{m}^{-2}\cdot\text{d}^{-1}$), first results seems to confirm that a major contribution to PCDD/F and PAH pollution of soil could be due to the dry atmospheric depositions.

Owing to the lack of data in the scientific literature, this work is proposed as a first contribution to the knowledge of transport mechanisms and enrichment of organic pollutants PCDD/F and PAH from dry atmospheric depositions to the soil.

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