Correlation of PCDD/F and PCB Concentrations in Soil Samples from the Swiss Soil Monitoring Network (NABO) to Specific Parameters of the Observation Sites

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Abstract

Concentrations of polychlorinated dibenzo-p-dioxins and dibenzofurans (PCDD/F) and polychlorinated biphenyls (PCB) were determined in 23 soil samples collected at reference sites of the Swiss national soil monitoring network (NABO). Total PCDD/F and PCB concentrations are well correlated and proportional (R2 = 0.720). The total PCDD/F levels were between 72 and 703 ng/kg corresponding to 1.1 to 11 ng I-TEQ/kg, total PCB concentrations (sum of 7 congeners IUPAC no. 28, 52, 101, 118, 138, 153, and 180) were from 1.1 to 12 µg/kg. In all samples, the PCDD/F and PCB concentrations were in the range of background levels for these contaminants in Central Europe. 19 samples revealed PCDD/F levels below the guide value of 5 ng I-TEQ/kg set by the Swiss ordinance relating to impacts on the soil (OIS); concentrations for the remaining 4 samples were below the trigger value (20 ng I-TEQ/kg). All PCB concentrations were below the guide value of 100 µg/kg. The elevated PCDD/F and PCB levels in some of the samples originating from forested sites could be attributed to the scavenging effect of forest canopies for semivolatile organic compounds. This interpretation could be substantiated by the observed distortion of the congener and homolog patterns of PCDD/F and PCB which is characteristic for forested sites.