

A Temporal Trend of Dioxins Levels in Environmental Media

Kyunghee Choi, Daeil Kang, Junheon Youn, Choong Lee, Sunghwan Jeon, Jingyun Na,
Department of Environmental Risk Research
National Institute of Environmental Research, Republic of Korea

This study is to investigate the environmental levels and trend of dioxins, which was the 3rd year of environmental monitoring research for endocrine disrupting chemicals since 1999. Total 282 samples were analyzed from 115 sites including 26 sites of airs, 43 sites of waters, 11 sites of sediments and 35 sites of soil, which were the same as those of investigated sites in 2000. Sampling period was from June 2001 to June 2002. Target chemicals were seventeen species of 2,3,7,8-chlorine-substituted PCDD and PCDF congeners and were analyzed by the standard methods, established by National Institute Environmental Research (NIER). The average concentration of dioxins in air decreased from 0.324 pg-TEQ/Nm³ in 2000 to 0.287 pg-TEQ/Nm³ in 2001, and those in water and soil were 0.073pg-TEQ/L and 1.703pg-TEQ/dry g, respectively, which was the less values detected in 2000. In sediment, however, the value was 0.086pg-TEQ/dry g, which was the increase from the value of the year 2000. The concentration range of dioxins in air for 26 sites in 17 regions detected were 0.013~1.664pg-TEQ/Nm³, 4 sites from those were exceeded the Air Quality Standards of Dioxin in Japan (0.6 pg-TEQ/Nm³). The tolerable daily intake of dioxins was calculated at the highest level (1.664) in air, with referring the soil and food data from Japan, was calculated to be 2.85pg-TEQ/kg/day, which was below the level of 4 pg-TEQ/kg/day suggested in KFDA(Korea). While the average concentration of dioxins in 15 big cities was 0.190 pg-TEQ/Nm³, that in 8 medium/small cities constituting an industrial complex was 0.558 pg-TEQ/Nm³. In water, the concentration range detected were 0~0.946pg-TEQ/L and the trend of the average concentrations shows an increase from those of 1999 but decreased from those of 2000, any sites however were not exceeded the Water Quality Standards of Dioxin in Japan (1 pg- TEQ/L). In soil, the detected range were 0~43.333 pg-TEQ/dry g and the average concentration decreased, compared with the results of 2000. According to the monitoring results by land utilization, the detected range were 0~43.333pg-TEQ/dry g in farmland, 0.017~0.601 pg-TEQ/dry g in the industrial area, 0.005~0.049pg-TEQ/dry g in the park and 0.008~1.825 pg-TEQ/dry g in the rest. In sediment, the detected range increased from 0~0.244 pg-TEQ/dry g to 0~0.537 pg-TEQ/dry g, based on the results of 2000. For the proper control of dioxins, continuous monitoring needs to be performed and in addition, the dioxin inventory should be prepared for major sources through the dioxin emission survey. These results would provide sound and solid basis for proper decision making of dioxins management like establishment of environmental quality standards in Korea.