

Dietary intake of PCDDs and PCDFs among the general population in Korea

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ABSTRACT

Objectives: The study was to evaluate the congeners of polychlorinated dibenzo-*p*-dioxins (PCDDs) and polychlorinated dibenzofurans (PCDFs) in Korean foods.

Design: The food items for total 24-hr as PCDD/Fs exposure source from previous reports were analyzed in four urban and rural survey sites in Korea.

Methods: The PCDD/Fs intakes were estimated in referred to the weight of each food item and the leading environmental health journals.

Results and Discussion: Food intake accounted for 87.1% of the total exposure to PCDD/PCDFs in Korea (Yang, 2002). Plant-based foods were major sources of lipid (72 %) in Korean women. The women took 28 % of lipid from animal sources, of which meats were leading sources of animal lipids (20%). Fish and shellfish were accounted for 8% in total lipid intake (C.-S. Moon et al., 1997). In various marine organisms from Korea, 2,3,4,7,8-pentachlorodibenzofuran and 1,2,3,7,8-pentachlorodibenzo-*p*-dioxin were the dominant contributors to the total TEQ concentration (H.-B. Moon et al. 2005). Based on food composite sampling for five large cities in Korea (Lee 2002), the levels of PCDD/PCDF exposure from dietary intake of PCDD were estimated to be 0.226 pg-TEQ/kg-day. Consumption of fish was the largest component of dietary intake (0.1067 pg TEQ/kg-day). Of the total from dietary intake, fish and cereals were the largest contributors, accounting for 29.3 and 20.8% of total daily intake. Therefore, the main food sources for PCDD/PCDFs appear to be fish, meats and grain. Furthermore, the concentration of PCDD/PCDFs in the meats, dairy products, and fish are lower in Korea than in Japan, the United States, and Germany. According to several reports, 2,3,4,7,8-pentachlorodibenzofuran, which was absorbed from food of terrestrial origin, appeared to significantly influence the TEQ of PCDD/PCDFs in serum in both Japanese and in Spanish populations (Gonzales et al. 1998; Kitamura et al. 2001; Aozasa et al. 2003).

The congeners that most contributed to the total toxic equivalent dose (total I-TEQ) in Korean human serum were 1,2,3,6,7,8-hexachlorodibenzofuran, 2,3,4,7,8-pentachlorodibenzofuran, 1,2,3,4,6,7,8-heptachlorodibenzofuran, octachlorodibenzo-p-dioxin and 1,2,3,7,8,9-hexachlorodibenzofuran (C.-S. Moon et al., 2005). The most influential congeners in human serum have also been identified in Japanese and Spanish populations (Gonzales et al. 1998; Kitamura et al. 2001; Aozasa et al. 2003). Aozasa et al. (2003) reported that, in the serum of residents living near an incineration facility in Japan, the major congeners of PCDD/PCDFs were PeCDD and 4-PeCDF. These two congeners were also detected in the study by Kitamura et al. (2001). Comparison of the Japanese reports and our study reveals that the common major congeners are 1,6-HxCDF, 4-PeCDF, and 1,6-HxCDD (Kitamura et al. 2001), and 4-PeCDF (Aozasa et al. 2003).

Conclusion: Given this available reports, studies of the food sources of PCDD/PCDFs in Korea are essential. PCDD/PCDF intake from animal origin was assumed to be lower than that of Europeans. Among the 17 PCDD/Fs congeners, 4-PeCDF assumed to the effective exposure marker for diet intake. Further studies of Korean foods are needed to clarify the exposure route for PCDD/PCDFs in the Korean population.

Keywords: Diet intake, PCDD/PCDFs, Serum, Korea