

Dioxins and Dibenzofurans in American Sanitary Products: Tampons, Sanitary Napkins, Disposable and Cloth Diapers, and Incontinence Pads

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Introduction

Polychlorinated dibenzo-*p*-dioxins (PCDDs) and polychlorinated dibenzofurans (PCDFs) have been detected in sanitary products in Sweden (1). In order to estimate the current levels of dioxin exposure of people in the US using particular sanitary products, dioxin analysis of commonly used products is required as a first step, with congener-specific levels in a range of brands that are commonly purchased. We report here a preliminary study of dioxins and dibenzofurans in sanitary products sold in the United States.

In 1997, representatives of the environmental organization Mothers & Others for a Livable Planet purchased five types of tampons, including two types of one brand and one type of three other brands, two brands of sanitary pads, four brands of disposable diapers, conventional cotton diapers, and one brand of incontinence pads. These products were purchased in San Francisco and shipped in their commercial containers to ERGO laboratory in Germany for dioxin analysis.

Materials and Methods

Tampon brands A and B, two popular brands of sanitary pads, two well known brands of disposable diapers, and one brand of incontinence pads were purchased at the same large department store. Brand C tampons and Brand G disposable diapers were purchased at a health food store belonging to a chain through which they are marketed. All boxes purchased of a given product were of the same lot number. Brand D tampons were ordered from a specialty company. According to the labels, one type of brand A tampons is rayon

and the other type cotton. Samples from each container were combined with like products and a pooled sample analysis was performed for each product and brand. Twelve dioxin analyses were performed.

Analytic methods are similar to those described elsewhere and will not be repeated here (2).

Results and Discussion

Measured levels of PCDDs and PCDFs, and their dioxin toxic equivalents (TEQs) are presented in Table 1 in parts per trillion (3). Graphical representation of the measured levels is given in Figure 1 for tampons, sanitary pads, and diapers. There is considerable variation in both dioxin and dibenzofuran levels among brands and among the types of sanitary products. It is of interest that the lowest dioxin TEQ level is for conventional cotton diapers. The higher PCDD levels for brand B tampons and brand E sanitary pads are accounted for mostly by elevated levels of OCDD, 20.7 and 20.6 ppt, respectively. Brand D tampons' TEQ is mostly attributable to tetra-, penta-, and hexa-chlorinated dibenzofurans. Brand E disposable diapers have most of the TEQ attributable also to tetra-, penta-, and hexa-chlorinated dibenzofurans.

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References

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Table 1. Dioxins and Dibenzofurans in U.S. Sanitary Products

	Measured Level ppt			Dioxin TEQ ppt		
	PCDDs	PCDFs	Sum	PCDDs	PCDFs	Sum
Tampons						
Brand A rayon	1.2	0.4	1.6	0.003	0.011	0.014
Brand A cotton	2.7	0.5	3.2	0.006	0.011	0.017
Brand B	23.3	1.0	24.3	0.042	0.012	0.054
Brand C	8.6	0.5	9.1	0.015	0.012	0.027
Brand D	5.4	6.0	11.4	0.011	0.235	0.246
Sanitary Pads						
Brand E	22.2	1.1	23.3	0.026	0.016	0.042
Brand F	1.1	0.1	1.2	0.003	0.010	0.013
Incontinence Pads						
Brand E	3.8	1.1	4.9	0.006	0.002	0.008
Diapers						
Brand E disposable	3.9	1.8	5.6	0.005	0.064	0.069
Brand F disposable	2.2	0.5	2.7	0.005	0.010	0.015
Brand G disposable	1.8	0.5	2.3	0.004	0.010	0.014
Conventional cotton	2.6	0.2	2.7	0.005	0.001	0.006

Figure 1. Measured Levels of Dioxins and Dibenzofurans in Sanitary Products, pg/g (ppt)

