DEPARTMENT OF HEALTH AND HUMAN SERVICES

Public Health Service
Food and Drug Administration

Memorandum

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From Katie Egan, R.D. KE
Chemical Hazard Assessment Team, Office of Food Safety
Center for Food Safety and Applied Nutrition

Subject Estimated Dietary Exposure to PCBs based on Total Diet Study Results

To: Geniece M. Lehmann, Ph.D.
National Center for Environmental Assessment
US Environmental Protection Agency

Through: Dan D. Levy
Acting Team Leader, Chemical Hazard Assessment Team, OFS (HFS-301) DL

As requested, FDA has estimated dietary exposure to PCBs by women 25-30 years of age (F 25-30 yrs) based on FDA's Total Diet Study (TDS) results from 1993-94 and 2003.

In the TDS, samples of about 280 foods and beverages are typically collected and analyzed for total PCBs four times each year. Total PCBs are analyzed using a multi-residue method that determines a total PCB concentration based on a comparison to Aroclor 1254. The Limit of Quantitation (LOQ) for this method in the early to mid-1990s was 50 ng/g (ppb); the current LOQ is 14 ng/g (ppb). The Limit of Detection (LOD) for the TDS PCB method is estimated by the analytical laboratory to be about 1/3 the LOQ. For samples in which PCBs are detected (i.e., above the LOD) but below the LOQ, the laboratory reports a PCB concentration and identifies the result as a trace value. Samples that have no detected levels of PCBs (i.e., non-detects) are assumed to have concentrations of zero. When calculating mean PCB levels in TDS foods, both trace values and zeros for non-detects are included in the calculation.

Mean PCB levels in TDS foods were calculated separately for results from 1993-94 and from 2003. PCBs concentrations were reported for 11 samples collected over 7 market baskets in 1993-94 and in 5 samples collected over 4 market baskets in 2003 (Table 1). For the periods 1993-94 and 2003, mean PCB levels were calculated for each of TDS food assuming zero for non-detects and using the total number of market baskets for the period as the denominator.

Dietary exposures were calculated for each time period by multiplying the mean PCB levels in the TDS foods that contained PCBs times the consumption amounts of those foods based on the 2003 TDS Diets. The 2003 TDS Diets were derived from results of USDA's 1994-98 Continuing Survey of Food Intakes by Individuals (94-98 CSFII), during which dietary data were collected for 2 non-consecutive days for most survey participants. The TDS Diets include 2-day average per-capita (i.e., based on dietary records for all individuals in a specific age/gender group) consumption amounts of each TDS food for 14 age/gender subgroups, including F 25-30 yrs. The methodology for compiling the TDS Diets is described by Egan *et al.* (2007).

The exposure estimates were calculated on a per-person basis and then converted to a body weight basis assuming an average body weight of 63 kg as reported in the 1994-98 CSFII. Dietary exposure to PCBs for F 25-30 yrs was estimated to be 3 ng/kg body weight per day in 1993-94 and 1 ng/kg body weight per day in 2003 (Table 2).

Table 1: TDS PCB results for 1993-94 and 2003

Year	Market Basket (MB)	TDS food	Total PCB level (ng/g)		Mean used in estimating exposure (ng/g)
			LOQ = 50 ng/g		Mean of 7 MBs:
1993	1	Cornbread, homemade	11	Trace	2
1993	2	Corn grits, regular, cooked	16	Trace	2
1993	2	Caramel candy	6	Trace	1
1994	1	Beef chuck roast, baked	10	Trace	1
1994	1	Beef steak, loin, pan-cooked	22	Trace	3
1994	1	Lamb chop, pan-cooked	18	Trace	3
1994	1	Chicken, fried (breast, leg, and thigh)	9	Trace	1
1994	1	Veal cutlet, pan-cooked	13	Trace	2
1994	1	Chicken breast, roasted	30	Trace	9
1994	2	Chicken breast, roasted	33	Trace	
			LOQ – 14 ng/g		Mean of 4 MBs:
2003	1	Salmon, baked [1]	38		30
2003	2	Salmon, baked	16		
2003	3	Salmon, baked	22		
2003	4	Salmon, baked	45		
2003	2	Catfish, pan cooked with oil	17		4

[1] Salmon was added to the TDS in the last MB of 1997.

Table 2: TDS exposure estimates for F 25-30 yrs

Time period	Total PCB exposure – 2-day average, per capita (eaters and non-eaters)	
	ng/ person/day	ng/ kg body weight/day
1993-94	182	3
2003	76	1

Reference

Egan, S.K., P.M. Bolger and C.D. Carrington (2007). "Update of US FDA's Total Diet Study food list and diets." *JESEE* (6):573-582.