

Appendix XIV

Estimate of BPA Background Ingestion from Diet

Appendix XIV: Estimate of BPA Background Ingestion from Diet

The attached sheets show calculations of background BPA ingested from the study diet in NCTR E-2190.01. The Chemistry Support Report (Appendix VII, Table 18) indicated levels of BPA above the analytical blank in the lots of diet used in the study ranging from 0 to 3.03 ppb ($\mu\text{g}/\text{kg}$ diet) with a mean of 1.28 ppb. The criterion set in the protocol for rejection of the diet for use in the study was 5 ppb. Estimates of the amount of BPA consumed at the mean measured level (1.28 ppb), the maximum measured level (3.03 ppb), and the protocol-specified limit (5 ppb) were made. These calculations are shown on the following pages. Food consumption values used are taken from the summary statistics in Appendix XIIIa for interim sacrifice animals and Appendix XIIIb for terminal sacrifice animals. Mean body weights from vehicle controls, found in Appendix XXIV for interim sacrifice animals and Appendix XXV for terminal sacrifice animals, were used to calculate the BPA background dose ($\mu\text{g}/\text{kg}$ body weight/day) ingested. Specific locations of the data used for each of the attached sheets are given below.

Attached sheets:

For sheets 1-8, the top table includes mean food consumption data for all dose groups (from Appendices XIIIa and b) and the calculated values for ng BPA consumed at the mean measured background BPA concentration, the maximum measured BPA concentration, and the protocol-specified limit (cutoff) BPA concentration. The lower table on each of the sheets shows the mean body weights for each postweaning week and the calculated ingested dose in $\mu\text{g}/\text{kg}$ body weight/day for the mean, maximum, and limit BPA concentrations. The calculated ingested doses are then expressed as a percentage of the low dose used in the study ($2.5 \mu\text{g}$ BPA /kg body weight/day).

Sheet 1, one year females, stop dose: food consumption data from Appendix XIIIa, Table 1; body weight data from Appendix XXIV, Table 1.

Sheet 2, one year males, stop dose: food consumption data from Appendix XIIIa, Table 2; body weight data from Appendix XXIV, Table 2.

Sheet 3, one year females, continuous dose: food consumption data from Appendix XIIIa, Table 3; body weight data from Appendix XXIV, Table 7.

Sheet 4, one year males, continuous dose: food consumption data from Appendix XIIIa, Table 4; body weight data from Appendix XXIV, Table 8.

Sheet 5, two year females, stop dose: food consumption data from Appendix XIIIb, Table 1; body weight data from Appendix XXV, Table 1.

Sheet 6, two year males, stop dose: food consumption data from Appendix XIIIb, Table 2; body weight data from Appendix XXV, Table 2.

Sheet 7, two year females, continuous dose: food consumption data from Appendix XIIIb, Table 3; body weight data from Appendix XXV, Table 7.

Sheet 8, two year males, continuous dose: food consumption data from Appendix XIIIb, Table 4; body weight data from Appendix XXV, Table 8.

Sheet 9 shows the mean ingested background BPA doses and the percentage of the low dose ingested from each of the previous sheets (last row on each sheet) and the average values for females and males across all study phases.

The estimates of background BPA consumption are given in the study report as percent of the low dose used in the study (2.5 µg BPA/kg body weight/day) in the section entitled “Diet Assessment: Nutrients and contaminants, including BPA”.

K. Barry Delclos, Study Director, E-2190.01

Date

1 Year Males Continuous Dose

Week	Veh Mean	2.5 Mean	25 Mean	250 Mean	2500 Mean	25000 Mean	0.05 Mean	0.5 Mean	All Mean	Mean BPA ng/g	Max BPA ng/g	Cutoff BPA ng/g	Mean ng consumed	Max ng consumed	Limit ng consumption
4	8.3	7.6	8	8.2	8.8	7.9	8.3	9.2	8.3	1.3	3	5	10.8	24.9	41.4
#5-8	19.1	19.8	19.5	19.7	19.4	19.2	19.6	20.2	19.6	1.3	3	5	25.4	58.7	97.8
#9-12	24.7	24.9	25.2	25.1	24.4	24.4	24.6	24.9	24.7	1.3	3	5	32.1	74.0	123.4
13-16	24.5	25.1	25	25.5	24.4	23.6	24.9	24.4	24.7	1.3	3	5	32.1	74.0	123.4
17-20	24.2	25.4	24.7	24.9	24.2	24.3	24.8	24.9	24.7	1.3	3	5	32.1	74.0	123.4
21-24	23.9	24.8	24.4	24.4	24.1	23.8	24.5	24.7	24.3	1.3	3	5	31.6	73.0	121.6
25-28	23.7	23	22.9	18.9	24.2	22	23.4	23.2	22.7	1.3	3	5	29.5	68.0	113.3
29-32	21.2	21.9	23.1	21.8	21.7	21.4	20.9	22.5	21.8	1.3	3	5	28.4	65.4	109.1
33-36	21.6	23.8	22.2	22.5	20.4	23.8	21.5	21.5	22.2	1.3	3	5	28.8	66.5	110.8
37-40	21.7	23.3	22.5	21	20.7	22.2	19.9	19.4	21.3	1.3	3	5	27.7	64.0	106.7
41-44	23.9	20.4	18.5	15.6	22	18.4	18.9	20.7	19.8	1.3	3	5	25.7	59.4	99.0
45-48	16.6	17.7	19.5	16.7	21.5	19.3	22.8	21.7	19.5	1.3	3	5	25.3	58.4	97.4
Week	M Cont Veh BW	Mean BPA µg/kg/d	Max BPA µg/kg/d	Limit BPA µg/kg/d	Mean % Low Dose	Max % Low Dose	Limit % Low Dose								
4	84.5	0.13	0.29	0.49	5.1	11.8	19.6								
8	297.8	0.09	0.20	0.33	3.4	7.9	13.1								
12	424.2	0.08	0.17	0.29	3.0	7.0	11.6								
16	494.4	0.06	0.15	0.25	2.6	6.0	10.0								
20	540.1	0.06	0.14	0.23	2.4	5.5	9.1								
24	578.1	0.05	0.13	0.21	2.2	5.0	8.4								
28	604.4	0.05	0.11	0.19	1.9	4.5	7.5								
32	627.1	0.05	0.10	0.17	1.8	4.2	7.0								
36	645.1	0.04	0.10	0.17	1.8	4.1	6.9								
40	664.2	0.04	0.10	0.16	1.7	3.9	6.4								
44	688	0.04	0.09	0.14	1.5	3.5	5.8								
48	701.6	0.04	0.08	0.14	1.4	3.3	5.6								
52	720.2	0.04	0.08	0.14	1.4	3.2	5.4								
	Overall Mean	0.06	0.13	0.22	2.33	5.37	8.95								

2 Year Females Stop Dose

Week	Veh Mean	2.5 Mean	25 Mean	250 Mean	2500 Mean	25000 Mean	All Mean	Mean BPA ng/g	Max BPA ng/g	Cutoff BPA ng/g	Mean ng consumed	Max ng consumed	Limit ng consumption
4	7.8	7.4	7.8	7.9	7.8	7.9	7.8	1.3	3	5	10.1	23.3	38.8
#5-8	16.1	15.9	16.1	16.5	16	16.3	16.2	1.3	3	5	21.0	48.5	80.8
#9-12	18.3	19.3	19.1	19.5	19	19.3	19.1	1.3	3	5	24.8	57.3	95.4
13-16	18.3	19.2	18.8	19	18.3	19	18.8	1.3	3	5	24.4	56.3	93.8
17-20	18.1	17.8	18	17.5	17.7	18.1	17.9	1.3	3	5	23.2	53.6	89.3
21-24	17	18	16.2	15.1	16.6	17.5	16.7	1.3	3	5	21.8	50.2	83.7
25-28	17.6	17.3	16.1	17.2	15.3	18.2	17.0	1.3	3	5	22.0	50.9	84.8
29-32	18.3	17	16.8	14.1	13.5	19.1	16.5	1.3	3	5	21.4	49.4	82.3
33-36	16.3	14.6	16.1	16	16.9	15.4	15.9	1.3	3	5	20.6	47.7	79.4
37-40	16	18.2	16.4	17.5	18	17.9	17.3	1.3	3	5	22.5	52.0	86.7
41-44	12	13.6	16.3	15.3	17.3	15.9	15.1	1.3	3	5	19.6	45.2	75.3
45-48	13.3	16.8	17.6	15.4	17.9	15.2	16.0	1.3	3	5	20.8	48.1	80.2
49-52	18.1	17.8	18	18.6	16.1	18.3	17.8	1.3	3	5	23.2	53.5	89.1
53-56	16.5	18.3	15.7	14.8	16	15.6	16.2	1.3	3	5	21.0	48.5	80.8
57-60	18	16.7	15.1	17	16.7	12.7	16.0	1.3	3	5	20.8	48.1	80.2
61-64	12.7	15.1	15.2	15	15.2	13.8	14.5	1.3	3	5	18.9	43.5	72.5
65-68	12.8	14.3	19.3	19.8	17.6	21.6	17.6	1.3	3	5	22.8	52.7	87.8
69-72	18.3	16.8	16.6	21	18.2	18.2	18.2	1.3	3	5	23.6	54.6	90.9
73-76	18.9	20.7	19.6	19.8	19.4	20.3	19.8	1.3	3	5	25.7	59.4	98.9
77-80	19.3	20.1	19.6	20.1	20.2	18.7	19.7	1.3	3	5	25.6	59.0	98.3
81-84	18.1	25.1	18.6	21.1	17.5	18.7	19.9	1.3	3	5	25.8	59.6	99.3
85-88	20.4	19.3	20.2	21	16.8	18.8	19.4	1.3	3	5	25.2	58.3	97.1
89-92	20.3	24.1	23.1	21.4	22.8	22.5	22.4	1.3	3	5	29.1	67.1	111.8
93-96	20	21.3	22.2	24.8	19.1	23.2	21.8	1.3	3	5	28.3	65.3	108.8
97-100	20	21.4	20	22.4	24.7	25.1	22.3	1.3	3	5	28.9	66.8	111.3
Week	F Stop Veh BW	Mean BPA µg/kg/d	Max BPA µg/kg/d	Limit BPA µg/kg/d	Mean % Low Dose	Max % Low Dose	Limit % Low Dose						
4	56.8	0.18	0.41	0.68	7.1	16.4	27.3						
8	189.5	0.11	0.26	0.43	4.4	10.2	17.0						
12	269.5	0.09	0.21	0.35	3.7	8.5	14.2						
16	311.5	0.08	0.18	0.30	3.1	7.2	12.0						
20	338.5	0.07	0.16	0.26	2.7	6.3	10.6						
24	359.4	0.06	0.14	0.23	2.4	5.6	9.3						
28	378.6	0.06	0.13	0.22	2.3	5.4	9.0						
32	393.1	0.05	0.13	0.21	2.2	5.0	8.4						
36	409.4	0.05	0.12	0.19	2.0	4.7	7.8						
40	420.3	0.05	0.12	0.21	2.1	4.9	8.2						
44	436.4	0.04	0.10	0.17	1.8	4.1	6.9						
48	457.1	0.05	0.11	0.18	1.8	4.2	7.0						
52	479.4	0.05	0.11	0.19	1.9	4.5	7.4						
56	496.9	0.04	0.10	0.16	1.7	3.9	6.5						
60	516	0.04	0.09	0.16	1.6	3.7	6.2						
64	536.4	0.04	0.08	0.14	1.4	3.2	5.4						
68	557.5	0.04	0.09	0.16	1.6	3.8	6.3						
72	570.6	0.04	0.10	0.16	1.7	3.8	6.4						
76	569.7	0.05	0.10	0.17	1.8	4.2	6.9						
80	575.8	0.04	0.10	0.17	1.8	4.1	6.8						
84	588.5	0.04	0.10	0.17	1.8	4.0	6.7						
88	594.6	0.04	0.10	0.16	1.7	3.9	6.5						
92	590.8	0.05	0.11	0.19	2.0	4.5	7.6						
96	599.9	0.05	0.11	0.18	1.9	4.4	7.3						
100	600.2	0.05	0.11	0.19	1.9	4.5	7.4						
104	607.6	0.05	0.11	0.18	1.9	4.4	7.3						
	Overall Mean	0.06	0.13	0.22	2.33	5.37	8.95						

2 Year Females Continuous Dose

Week	Veh Mean	2.5 Mean	25 Mean	250 Mean	2500 Mean	25000 Mean	0.05 Mean	0.5 Mean	All Mean	Mean BPA ng/g	Max BPA ng/g	Cutoff BPA ng/g	Mean ng consumed	Max ng consumed	Limit ng consumption
4	7.4	7.2	7.3	7.5	7.3	8.2	6.8	7.9	7.5	1.3	3	5	9.7	22.4	37.3
#5-8	15.1	15.2	15.7	15.4	14.9	15.4	15.1	15.9	15.3	1.3	3	5	19.9	46.0	76.7
#9-12	18.6	18.3	18.1	18.3	17.6	18.3	17.8	17.7	18.1	1.3	3	5	23.5	54.3	90.4
13-16	18.2	18.2	18	17.9	18.6	17.7	16.9	18.1	18.0	1.3	3	5	23.3	53.9	89.8
17-20	17.6	16.8	16.5	16.8	17	16.2	16.5	18.3	17.0	1.3	3	5	22.1	50.9	84.8
21-24	16.7	17	16.6	16.5	16.7	16.7	16	18.2	16.8	1.3	3	5	21.8	50.4	84.0
25-28	17	15.3	16.1	16.9	17.8	16.8	16.4	18.6	16.9	1.3	3	5	21.9	50.6	84.3
29-32	17.4	17.5	16	16	15.9	15.3	13.7	17.8	16.2	1.3	3	5	21.1	48.6	81.0
33-36	15	13.5	16.6	14.5	15.7	14.5	12.1	16.8	14.8	1.3	3	5	19.3	44.5	74.2
37-40	14.8	17.7	17.3	17.5	17.2	16.3	15	14.2	16.3	1.3	3	5	21.1	48.8	81.3
41-44	16.5	16.8	14.3	14.6	15.5	15	10.5	19.1	15.3	1.3	3	5	19.9	45.9	76.4
45-48	14.3	13.5	15.4	10.6	15.7	16.3	16.8	16.5	14.9	1.3	3	5	19.4	44.7	74.4
49-52	13.6	14.5	14	14.5	15.9	17.3	16.4	16.4	15.3	1.3	3	5	19.9	46.0	76.6
53-56	13.9	16.9	17.3	17	16.6	15.9	15.6	14.6	16.0	1.3	3	5	20.8	47.9	79.9
57-60	13.8	16.1	16.7	15.4	14.8	14.6	12.3	18.8	15.3	1.3	3	5	19.9	45.9	76.6
61-64	15.5	15.1	15.9	13.3	16.1	11	16.3	13.7	14.6	1.3	3	5	19.0	43.8	73.1
65-68	14.5	13.3	20.5	18.6	16.7	17.1	16.1	17.2	16.8	1.3	3	5	21.8	50.3	83.8
69-72	16.7	16.6	20.1	22.6	17.2	13.2	15	16.9	17.3	1.3	3	5	22.5	51.9	86.4
73-76	18.4	20.1	23.9	19.5	17.8	18	18.6	20.6	19.6	1.3	3	5	25.5	58.8	98.1
77-80	19.3	17.1	18.5	16.9	16.8	15.9	19.1	21.2	18.1	1.3	3	5	23.5	54.3	90.5
81-84	15.6	18	18	19.2	15.2	17.3	15.4	22.3	17.6	1.3	3	5	22.9	52.9	88.1
85-88	17.7	18.4	17.6	21.1	15.6	19	18.3	19	18.3	1.3	3	5	23.8	55.0	91.7
89-92	20.4	20.3	20.2	21.5	19.5	19.6	16	22.9	20.1	1.3	3	5	26.1	60.2	100.3
93-96	19.7	18.5	19.4	21	21.1	19.3	17.9	22.4	19.9	1.3	3	5	25.9	59.7	99.6
97-100	16.4	21.1	20.4	20.1	18.4	18.6	21.6	21.6	19.8	1.3	3	5	25.7	59.3	98.9
Week	F Cont Veh BW	Mean BPA µg/kg/d	Max BPA µg/kg/d	Limit BPA µg/kg/d	Mean % Low Dose	Max % Low Dose	Limit % Low Dose								
4	75.4	0.13	0.30	0.49	5.1	11.9	19.8								
8	196	0.10	0.23	0.39	4.1	9.4	15.7								
12	266.1	0.09	0.20	0.34	3.5	8.2	13.6								
16	302.5	0.08	0.18	0.30	3.1	7.1	11.9								
20	324.4	0.07	0.16	0.26	2.7	6.3	10.5								
24	342.3	0.06	0.15	0.25	2.6	5.9	9.8								
28	358.8	0.06	0.14	0.23	2.4	5.6	9.4								
32	372.4	0.06	0.13	0.22	2.3	5.2	8.7								
36	387.2	0.05	0.11	0.19	2.0	4.6	7.7								
40	401.7	0.05	0.12	0.20	2.1	4.9	8.1								
44	417.3	0.05	0.11	0.18	1.9	4.4	7.3								
48	430.9	0.04	0.10	0.17	1.8	4.1	6.9								
52	447.2	0.04	0.10	0.17	1.8	4.1	6.9								
56	463	0.04	0.10	0.17	1.8	4.1	6.9								
60	478.4	0.04	0.10	0.16	1.7	3.8	6.4								
64	495.1	0.04	0.09	0.15	1.5	3.5	5.9								
68	506.4	0.04	0.10	0.17	1.7	4.0	6.6								
72	519.7	0.04	0.10	0.17	1.7	4.0	6.7								
76	530.9	0.05	0.11	0.18	1.9	4.4	7.4								
80	542.5	0.04	0.10	0.17	1.7	4.0	6.7								
84	533	0.04	0.10	0.17	1.7	4.0	6.6								
88	534	0.04	0.10	0.17	1.8	4.1	6.9								
92	530.1	0.05	0.11	0.19	2.0	4.5	7.6								
96	531.3	0.05	0.11	0.19	1.9	4.5	7.5								
100	536.6	0.05	0.11	0.18	1.9	4.4	7.4								
104	534.1	0.05	0.11	0.19	1.9	4.4	7.4								
	Overall Mean	0.06	0.13	0.22	2.26	5.21	8.69								

Mean Background BPA Consumed as % of Low Dose

	µg/kg bw/day	µg/kg bw/day	µg/kg bw/day	% Low Dose	% Low Dose	% Low Dose
	Mean BPA	Max BPA	Limit BPA	Mean	Maximum	Limit
1 Yr Female Stop	0.1	0.2	0.3	2.9	6.7	11.2
1 Yr Female Cont	0.07	0.16	0.27	2.8	6.4	10.7
2 Yr Female Stop	0.06	0.13	0.22	2.3	5.4	9
2 Year Female Cont	0.06	0.13	0.22	2.3	5.2	8.7
Overall Mean	0.07	0.16	0.25	2.58	5.93	9.90
1 Yr Male Stop	0.07	0.15	0.25	2.6	6	10
1 Yr Male Cont	0.06	0.13	0.22	2.3	5.4	9
2 Year Male Stop	0.05	0.12	0.19	2	4.6	7.7
2 Year Male Cont	0.05	0.11	0.19	1.9	4.4	7.4
Overall Mean	0.06	0.13	0.21	2.20	5.10	8.53