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Results of a 90-Day Toxicological Study in Rats Given Tetrabromobisphenol A in the Diet			
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Abstract
Tetrabromobisphenol A (TBBPA) was administered to male and female rats in their diet for 90 days to evaluate the possible toxicological effects associated with repeated ingestion of the compound. The concentrations of TBBPA in the diet were adjusted so that rats were administered 0, 0.3, 3, 30 or 100 mg/kg/day. The toxicologic parameters evaluated included: appearance, demeanor, body weights, food consumption, routine hematology measurements, clinical chemistry determinations (serum urea nitrogen, alkaline phosphatase activity and serum glutamic pyruvic transaminase activity), routine urinalyses, organ weights, organ-to-body weight ratios and gross and microscopic pathological examination of tissues. The only effects observed were not considered of toxicological significance, including a slight but statistically significant decrease in the packed cell volume of female rats at 100 mg/kg/day and a decrease in serum glutamic pyruvic transaminase activity in the same group. Thus, administration of TBBPA in the diet to rats at dose levels as high as 100 mg/kg/day for 90 days was not associated with toxicological effects. Evaluation of tissues for bromine from rats receiving 3 mg TBBPA/kg/day for 90 days did not reveal any difference in the bromine content from that in tissues of control rats.

RESULTS OF A 90-DAY TOXICOLOGICAL STUDY IN RATS GIVEN TETRABROMOBISPHENOL A IN THE DIET

by:

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checked by:

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July , 1975

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SUMMARY

Tetrabromobisphenol A (TBBPA) was administered to male and female rats in their diet for 90 days to evaluate the possible toxicological effects associated with repeated ingestion of the compound. The concentrations of TBBPA in the diet were adjusted so that rats were administered 0, 0.3, 3, 30 or 100 mg/kg/day. The toxicologic parameters evaluated included: appearance, demeanor, body weights, food consumption, routine hematology measurements, clinical chemistry determinations (serum urea nitrogen, alkaline phosphatase activity and serum glutamic pyruvic transaminase activity), routine urinalyses, organ weights, organ-to-body weight ratios and gross and microscopic pathological examination of tissues. The only effects observed were not considered of toxicological significance, including a slight but statistically significant decrease in the packed cell volume of female rats at 100 mg/kg/day and a decrease in serum glutamic pyruvic transaminase activity in the same group. Thus, administration of TBBPA in the diet to rats at dose levels as high as 100 mg/kg/day for 90 days was not associated with toxicological effects. Evaluation of tissues for bromine from rats receiving 3 mg TBBPA/kg/day for 90 days did not reveal any difference in the bromine content from that in tissues of control rats.

INTRODUCTION

Tetrabromobisphenol A (TBBPA) is used as a reactive fire retardant for epoxy resins and polycarbonate resins. Its identity is lost in the process of polymerization. Information regarding its toxicological properties is limited and indicates its acute oral lethality in rats is low. Gross pathological examinations revealed liver and kidney alterations at dose levels of 1 and 2 gm/kg. Previous studies indicated no skin or eye irritation from TBBPA per se, but solutions caused slight eye irritation and slight transient corneal injury. The objective of this 90-day dietary feeding study was to provide data relative to the systemic effects that may be associated with repeated exposures to low levels of the compound.

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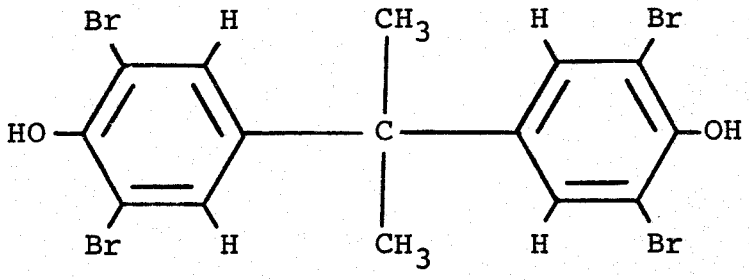
TEST SAMPLE

Chemical Name: Tetrabromobisphenol A
4,4'-Isopropylidenebis(2,6-DiBromophenol)

Formula: $C_{15}H_{12}Br_4O_2$



Molecular weight: 543.92

Melting point: 173 - 177°C

Composition: %C = 33.18

%H = 2.19

%Br = 58.9 ± 0.3

Lot number: 03293 449

Source: C. Gibbons, Halogen Research Laboratory, Midland, Michigan 48640

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EXPERIMENTAL DESIGN

Male and female Sprague-Dawley, specific pathogen free (SPF) derived rats, 6 to 7 weeks old, were randomly grouped for treatment as follows:

Dose Level (mg/kg/day)	Number of Rats Male	Female
0	21	21
100	7	7
30	7	7
3	21	21
0.3	7	7

The rats were housed in wire-bottom cages with food and water accessible at all times. Five rats/sex/dose level were maintained on the diet for 90 days to evaluate hematological parameters, urinalysis, clinical chemistry, organ weight determinations, and collection of tissues for histopathological examination. In addition, at termination of the experiment, tissue specimens of liver, kidney, skeletal muscle, fat and serum were collected and frozen from 2 rats/sex/group for bromine analysis. On days 10, 20, 30 and 60 of the experiment, 2 rats/sex from the control group and 3.0 mg/kg/day dose level were killed for collection of specimens for bromine analysis. Two more rats/sex from the control group and 3.0 mg/kg/day dose level were placed on a recovery diet of control feed and were killed on day 100, 111, or 132 for collection of specimens for determination of bromine levels. Organ weights of liver and kidney were measured on all rats killed for

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collection of specimens for bromine analysis. The bromine content of tissues was determined by neutron activation analysis.

DIET

A 1% premix of the test compound in control feed was used to formulate test diets. The test diets were prepared weekly and the concentration of test material was adjusted to maintain the designated dose levels on a mg/kg/day basis.

PARAMETERS EVALUATED

The rats were observed several times weekly for changes in appearance and demeanor. Body weights were recorded prior to initiating the experiment, twice the first week, and weekly thereafter. Food consumption was recorded twice the first week and weekly thereafter. On day 86, blood samples were collected from rats receiving 100 mg/kg/day of TBBPA and the controls for hematological determinations. The parameters evaluated were packed cell volume (PCV), hemoglobin (Hgb), red blood cell count (RBC), white blood cell count (WBC), and white cell differential. Samples of urine were collected from these rats at the same time for determination of specific gravity, pH, sugar, protein, ketones, occult blood, and bilirubin.

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On day 90, after being fasted overnight, all rats were weighed and killed by decapitation. Blood samples were collected from all rats, centrifuged, and the resulting serum samples were used for subsequent determinations of urea nitrogen content (BUN), alkaline phosphatase activity (AP), and glutamic pyruvic transaminase activity (SGPT) of the control and top dose level. A gross pathological examination was conducted on all rats killed at the various time intervals throughout the experiment. At termination of the experiment, the weights of brain, heart, liver, kidney, and testes were recorded. Specimens of the following tissues were taken from all rats and preserved in buffered 10% formalin: heart, liver, kidney, thyroid, trachea, parathyroid, lung, adrenal gland, spleen, pancreas, stomach, small intestine (three levels), large intestine, gonads, uterus (female), urinary bladder, accessory sex glands, skeletal muscle, spinal cord, brain, eye, pituitary gland, thymus, aorta, peripheral nerve, mesenteric and mediastinal lymph nodes. Routine histological procedures were used to prepare hematoxylin and eosin (H&E) stained sections of the tissues from 5 rats/sex from the top dose level and control groups. The tissues were examined for histopathological alterations.

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STATISTICAL EVALUATION

Body weights, food consumption, hematological and clinical chemistry determinations, final body weights, organ weights and organ to body weight ratios were evaluated statistically using an analysis of variance and Dunnett's test.[1]

RESULTS AND DISCUSSION

The rats showed no change in demeanor or physical appearance throughout the study.

Body weight data are presented in Table 1. At each weighing, there were no significant differences between the mean body weights of groups of rats receiving TBBPA and corresponding controls.

Food consumption data in Table 2 indicate sporadic variations in consumption with no apparent relationship to the amount of TBBPA provided via the diet or the duration of treatment.

Examination of hematological data in Table 3 reveals a significant difference in the packed cell volume (PCV) of female rats maintained on 100 mg/kg/day TBBPA. The slight decrease in packed cell volume (PCV) observed in the top

[1] Steel, R.G.D. and Torrie, H. H. (1960), Principles and Procedures of Statistics, McGraw-Hill Book Company, Inc., New York, pages 101-105 and 111-112.

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dose females was statistically significant but is still within the normal range for this strain of rat. All other hematological parameters at this dose level were not significantly different from control values.

The clinical chemistry values and urinalysis results for the male and female rats are shown in Tables 4 and 5, respectively. There was a statistically significant decrease in serum glutamic pyruvic transaminase (SGPT) activity in the female group receiving 100 mg/kg/day TBBPA. Decreases in SGPT activity are not considered to have physiological or toxicological significance.

Evaluation of serum and tissues collected on day 90 from 2 rats/sex/control and 3.0 mg/kg/day dose level for bromine content by neutron activation analysis did not reveal an apparent difference between the treated and control group, Table 6. Therefore, tissues collected at other times were not analyzed.

The final individual and mean body and organ weights of male and female rats maintained on diets containing TBBPA for 90 days are summarized in Table 7. Final individual weight and mean body and organ weights of liver and kidney of rats killed sequentially for collection of tissues for

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bromine analysis are presented in Table 8. There were no statistically significant differences between values of treated and control animals.

No treatment related gross pathological changes were observed, Tables 9 and 10. Histopathological examination of tissues from 5 rats/sex/control and top dose level revealed no lesions considered compound related. The morphologic alterations observed in control and treated rats were considered spontaneous in nature.

In summary, the only effects observed in this 90-day dietary feeding study were not considered to be of toxicological significance; they included a slight but statistically significant decrease in the packed cell volume of female rats at 100 mg/kg/day and a decrease in serum glutamic pyruvic transaminase activity in the same group. Thus, administration of TBBPA in the diet to rats at dose levels as high as 100 mg/kg/day for 90 days was not associated with toxicological effects. Evaluation of tissues for bromine from rats receiving 3 mg TBBPA/kg/day for 90 days did not reveal any difference in the bromine content from that in tissues of control rats.

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ACKNOWLEDGEMENT

The authors of this report are grateful to Gary Jewett of the Analytical Laboratories, The Dow Chemical Company, for analyzing the animal tissues for bromine content.

TABLE 1

MEAN BODY WEIGHTS OF MALE AND FEMALE RATS MAINTAINED ON DIETS CONTAINING TETRABROMOBISPHENOL A FOR 90 DAYS

Dose mg/kg/day	Days on Test 0	6	13	20	27	34	41	48	55	63	70	77	83	90
MALES														
0	252±19	297±20	349±25	367±31	386±31	399±40	423±42	448±48	455±48	457±45	474±49	480±49	483±52	486±55
0.3	252±24	300±7	345±10	370±11	390±14	392±18	416±21	445±23	449±24	456±25	479±26	479±27	480±30	485±37
3	255±12	299±17	341±21	365±21	391±21	400±25	423±26	451±28	455±29	476±24	491±28	495±28	501±27	509±26
30	248±14	290±23	334±20	365±16	390±18	394±7	416±19	447±21	456±28	454±24	470±21	476±23	483±24	490±24
100	251±12	294±21	336±27	359±31	381±35	384±40	402±42	432±45	439±46	443±48	463±48	472±50	475±52	479±52
FEMALES														
0	230±6	241±8	263±9	273±11	283±12	279±14	293±16	311±15	308±17	313±16	321±18	318±25	315±21	322±20
0.3	223±6	240±10	256±12	266±13	277±15	271±13	280±13	298±13	295±13	298±10	304±14	304±10	307±9	311±13
3	224±9	244±9	258±10	272±10	282±12	278±12	283±15	306±14	307±13	306±16	313±15	315±14	321±16	319±20
30	223±6	243±4	258±9	272±9	281±7	279±10	291±10	302±12	306±11	306±12	315±13	311±18	320±10	321±9
100	221±8	242±5	260±6	273±7	280±6	275±7	290±12	307±17	300±14	302±8	309±12	306±10	313±7	312±8

No values were significantly different from control by Dunnett's test, $p<0.05$.
See Table A-1 for data on individual animals.

TABLE 2

MEAN FOOD CONSUMPTION (GRAMS/RAT/DAY) OF RATS MAINTAINED ON DIETS CONTAINING TETRABROMOBISPHENOL A FOR 90 DAYS

Dose Level mg/kg/day	Days on Test 0-3	4-7	8-14	15-21	22-29	30-36	37-43	44-50	51-57	58-64	65-71	72-78	79-86	87-90
MALES														
0	28±5	28±3	30±3	28±3	24±9	28±3	28±3	28±3	27±3	29±3	28±3	31±2	27±2	29±4
0.3	26±1	29±1	28±2	28±2	27±2	27±2	28±2	29±5	27±4	29±2	26±3	31±3	27±2	28±4
3	26±6	27±6	28±3	29±3	28±9	29±2	29±2	28±2	28±2	29±1	29±2	31±1	28±1	28±1
30	23±7	29±2	29±1	31±4	28±1	27±1	27±2	28±1	27±2	28±2	27±1	30±2	27±1	27±1
100	25±3	28±2	28±3	26±6	23±8	28±4	27±3	27±4	26±3	28±4	28±3	30±3	27±2	26±4
FEMALES														
0	21±3	21±2	22±2	22±2	22±4	21±2	21±1	20±1	21±1	21±2	21±2	24±2	21±2	23±6
0.3	20±2	23±2	21±2	21±4	24±3	21±2	15±1*	20±1	20±2	20±2	19±2	20±2	21±2	22±2
3	22±5	22±2	21±2	21±2	23±2	23±3	21±4	22±3	23±12	21±2	21±2	22±2	22±2	23±2
30	20±2	22±1	20±2	22±2	22±3	21±2	21±2	21±2	19±1	20±2	20±2	21±1*	22±2	22±1
100	22±2	23±2	22±2	22±1	21±1	21±1	22±2	23±3	20±1	21±1	20±1	24±1	21±2	21±2

*Significantly different from control by Dunnett's test, $p<0.05$.
See Table A-2 for data from individual animals.

TABLE 3

INDIVIDUAL AND MEAN HEMATOLOGIC VALUES FOR MALE AND FEMALE RATS MAINTAINED ON DIETS CONTAINING TETRABROMOBISPHENOL A FOR 90 DAYS

Dose Level mg/kg/day	Animal Number	PCV Percent	RBC x 10^6/mm^3	Hgb g/100 ml	WBC x 10^3/mm^3	WBC Differential Count (%) Neut	Lymph	Mono	Eosin	Baso
MALES										
Control	73-3924	56	7.85	16.7	24.5	15	78	2	5	0
	73-3925	57	8.70	17.3	13.5	9	84	3	4	0
	73-3926	50	8.12	15.8	19.4	9	88	2	1	0
	73-3927	57	8.05	16.4	19.6	14	80	1	4	1
	73-3928	53	7.44	15.8	14.1	16	78	2	4	0
	MEAN±S.D.	55±3	8.03±0.46	16.4±0.6	18.2±4.5	13	82	2	4	0
100	73-3945	55	8.29	16.7	19.8	18	75	5	2	0
	73-3946	53	7.48	15.8	14.6	12	84	1	3	0
	73-3947	58	8.05	17.9	20.0	11	86	1	2	0
	73-3948	49	7.71	16.4	14.0	15	80	4	1	0
	73-3949	52	7.93	16.6	15.7	13	81	4	2	0
	MEAN±S.D.	53±3	7.89±0.31	16.7±0.8	16.8±2.9	14	81	3	2	0
FEMALES										
Control	73-3987	50	7.32	16.3	13.5	18	76	6	0	0
	73-3988	51	6.44	15.1	16.0	7	91	2	0	0
	73-3989	55	7.96	17.8	15.9	8	88	3	1	0
	73-3990	54	7.35	17.6	17.7	14	79	5	2	0
	73-3991	53	7.00	16.3	18.5	11	81	8	0	0
	MEAN±S.D.	53±2	7.21±0.55	16.6±1.1	16.3±1.9	12	83	5	1	0
100	73-4008	47	7.02	14.7	17.3	4	89	3	4	0
	73-4009	46	6.28	14.2	13.9	23	74	2	1	0
	73-4010	50	6.71	15.7	15.9	17	79	2	2	0
	73-4011	50	7.02	15.8	11.5	8	89	2	1	0
	73-4012	51	6.76	16.1	17.2	6	93	1	0	0
	MEAN±S.D.	49±2*	6.75±0.30	15.3±0.8	15.2±2.5	12	85	2	2	0

*Significant difference from controls by Dunnett's test, $p<0.05$.

TABLE 4

INDIVIDUAL AND MEAN CLINICAL CHEMISTRY[1] VALUES FOR RATS MAINTAINED ON DIETS CONTAINING TETRABROMOBISPHENOL A FOR 90 DAYS

Dose Level mg/kg/day	Males				Females			
	Animal Number	BUN mg%	AP KA[2]/100 ml	SGPT K Units[2]/ml	Animal Number	BUN mg%	AP KA/100 ml	SGPT K Units/ml
Control	73-3924	23.0	16.2	34.7	73-3987	30.0	21.0	36.6
	73-3925	21.5	22.5	41.4	73-3988	17.5	11.1	36.3
	73-3926	19.5	17.0	37.9	73-3989	29.0	13.3	38.8
	73-3927	23.0	18.1	42.0	73-3990	23.5	11.1	35.4
	73-3928	24.5	19.5	41.5	73-3991	25.0	13.6	31.4
	MEAN±S.D.	22.3±1.9	18.7±2.5	39.5±3.1		25.0±5.0	14.0±4.1	35.7±2.7
100	73-3945	19.5	20.7	38.2	73-4008	23.0	11.4	25.2
	73-3946	20.0	16.6	42.6	73-4009	21.5	13.6	26.3
	73-3947	29.0	18.8	41.2	73-4010	26.5	12.2	33.0
	73-3948	20.5	21.0	34.0	73-4011	25.0	10.0	33.0
	73-3949	22.5	24.0	46.7	73-4012	29.5	9.6	29.9
	MEAN±S.D.	22.3±3.9	20.2±2.7	40.5±4.8		25.1±3.1	11.4±1.7	29.5±3.7*

[1]BUN = Blood Urea Nitrogen, AP = Alkaline Phosphatase, SGPT = Serum Glutamic Pyruvic Transaminase.

[2]KA = King Armstrong Units/100 ml, K Units = Karmen Units/ml.

*Significant difference from controls by Dunnett's test, $p<0.05$.

TABLE 5

RESULTS OF URINALYSES OBTAINED FROM MALE AND FEMALE RATS MAINTAINED ON DIETS CONTAINING TETRABROMOBISPHENOL A FOR 90 DAYS

Dose mg/kg/day	Animal Number	Specific Gravity	pH	Sugar	Protein	Ketones	Occult Blood	Bilirubin
MALES								
Control	73-3924	1.038	6	-	2+	-	-	-
	73-3925	1.046	6	-	2+	-	-	-
	73-3926	1.049	6	-	2+	-	-	-
	73-3927	1.053	6	-	2+	-	-	-
	73-3928	1.038	6	-	2+	-	-	-
100	73-3945	1.050	6	-	1+	-	-	-
	73-3946	1.026	6	-	1+	-	-	-
	73-3947	1.041	6	-	2+	-	-	-
	73-3948	1.041	6	-	3+	-	-	-
	73-3949	1.040	6	-	1+	-	-	-
FEMALES								
Control	73-3987	1.043	6	-	2+	-	-	-
	73-3988	1.038	6	-	1+	-	-	-
	73-3989	1.035	6	-	2+	-	-	-
	73-3990	1.048	6	-	3+	-	-	-
	73-3991	1.048	6	-	2+	-	-	-
100	73-4008	1.040	6	-	trace	-	-	-
	73-4009	1.049	6	-	2+	-	-	-
	73-4010	1.036	6	-	2+	-	-	-
	73-4011	1.035	6	-	2+	-	-	-
	73-4012	1.032	6	-	trace	-	-	-

- (dash) indicates material not present in measurable quantities.

TABLE 6

TISSUE BROMINE LEVELS DETERMINED BY ACTIVATION ANALYSIS OF RATS MAINTAINED ON DIETS CONTAINING TETRABROMOBISPHENOL A FOR 90 DAYS

Animal Number	Sex	Dose Level TBBPA mg/kg/day		Liver ppm Bromine	Kidney ppm Bromine	Fat ppm Bromine	Serum ppm Bromine	Muscle ppm Bromine
73-3935	M	Control		3.1	5.8	2.8	8.6	2.2
73-3936	M	Control		3.1	5.3	1.1	7.7	1.5
			MEAN	3.1	5.5	1.9	8.1	1.8
73-3970	M	3.0		2.5	5.5	0.9	8.4	1.4
73-3971	M	3.0		2.7	5.8	0.8	8.0	1.5
			MEAN	2.6	5.6	0.8	8.2	1.4
73-3998	F	Control		3.0	6.8	1.1	8.8	2.0
73-3999	F	Control		3.4	6.5	1.2	9.0	1.9
			MEAN	3.2	6.6	1.1	8.9	1.9
73-4033	F	3.0		3.3	5.6	1.2	9.4	1.9
73-4034	f	3.0		3.1	6.2	1.1	8.2	1.7
			MEAN	3.2	5.9	1.1	8.8	1.7

TABLE 7

MEAN BODY WEIGHTS AND ORGAN/BODY WEIGHT RATIOS OF MALE AND FEMALE RATS MAINTAINED ON DIETS CONTAINING TETRABROMOBISPHENOL A FOR 90 DAYS

Dose Level	Starved Body wt.	Mean ± SD, g and g organ/100 g body weight									
		Brain		Heart		Liver		Kidney		Testes	
mg/kg/day	g	g	g/100 g	g	g/100 g	g	g/100 g	g	g/100 g	g	g/100 g
MALES											
0	469±51	1.82±0.08	0.39±0.03	1.32±0.08	0.29±0.02	13.84±2.44	2.94±0.19	3.38±0.56	0.72±0.05	3.69±0.15	0.80±0.08
0.3	448±28	1.81±0.05	0.41±0.02	1.38±0.08	0.31±0.03	12.93±0.91	2.88±0.06	3.23±0.21	0.72±0.04	4.07±0.70	0.91±0.12
3	485±32	1.86±0.07	0.39±0.03	1.44±0.06	0.30±0.01	13.99±1.38	2.88±0.15	3.40±0.23	0.70±0.05	3.82±0.15	0.79±0.04
30	445±17	1.81±0.04	0.41±0.02	1.32±0.09	0.29±0.02	13.31±1.04	2.99±0.17	3.27±0.14	0.73±0.02	3.88±0.15	0.87±0.03
100	459±49	1.77±0.09	0.39±0.03	1.29±0.11	0.28±0.03	12.82±1.77	2.79±0.15	3.35±0.30	0.73±0.01	3.82±0.29	0.84±0.10
FEMALES											
0	302±29	1.65±0.08	0.55±0.03	0.93±0.08	0.31±0.03	7.66±0.69	2.54±0.13	1.95±0.18	0.65±0.05		
0.3	290±10	1.73±0.09	0.60±0.04	0.99±0.02	0.34±0.02	7.27±0.41	2.51±0.10	1.95±0.09	0.67±0.01		
3	287±14	1.71±0.02	0.60±0.03	1.00±0.07	0.35±0.02	7.46±0.60	2.60±0.13	1.98±0.16	0.69±0.04		
30	300±13	1.74±0.04	0.58±0.03	0.99±0.07	0.33±0.01	7.68±0.50	2.56±0.09	2.09±0.13	0.70±0.03		
100	291±7	1.72±0.11	0.59±0.05	1.01±0.07	0.35±0.02	7.57±0.26	2.60±0.08	2.04±0.10	0.70±0.03		

No values were significantly different from control by Dunnett's test, $p<0.05$.
See Table A-3 for data from individual animals.

TABLE 8

FINAL INDIVIDUAL AND MEAN BODY AND ORGAN WEIGHTS OF MALE AND FEMALE RATS MAINTAINED ON DIETS CONTAINING TETRABROMOBISPHENOL A WHICH WERE KILLED SEQUENTIALLY FOR COLLECTION OF TISSUE FOR BROMINE ANALYSIS

Day, Dose Level, mg/kg/day		Males						Females					
		Animal Number	Starved Body wt. g	Liver g	Liver g/100 g	Kidney g	Kidney g/100 g	Animal Number	Starved Body wt. g	Liver g	Liver g/100 g	Kidney g	Kidney g/100 g
10	Control	73-3943	273	8.16	2.99	2.20	0.81	73-4006	217	5.78	2.66	1.57	0.72
		73-3944	284	8.81	3.10	2.15	0.76	73-4007	222	7.22	3.25	1.71	0.77
		MEAN	278	8.49	3.05	2.18	0.79	MEAN	220	6.50	2.96	1.64	0.75
	3.0	73-3978	296	9.41	3.18	2.41	0.81	73-4041	240	6.60	2.75	1.81	0.75
		73-3979	286	9.01	3.15	2.36	0.83	73-4042	231	6.50	2.81	1.71	0.74
		MEAN	291	9.21	3.17	2.39	0.82	MEAN	236	6.55	2.78	1.76	0.74
DAY 20	Control	73-3941	343	12.09	3.52	2.62	0.76	73-4004	236	7.34	3.11	1.70	0.72
		73-3942	329	10.30	3.13	2.49	0.76	73-4005	230	5.88	2.56	1.59	0.69
		MEAN	336	11.20	3.33	2.56	0.76	MEAN	234	6.61	2.84	1.65	0.71
	3.0	73-3976	300	9.10	3.03	2.38	0.79	73-4039	222	6.59	2.97	1.80	0.81
		73-3977	302	9.40	3.11	2.41	0.80	73-4040	240	6.52	2.72	1.72	0.72
		MEAN	301	9.25	3.07	2.40	0.80	MEAN	231	6.56	2.85	1.76	0.77
DAY 30	Control	73-3939	363	11.09	3.06	2.48	0.68	73-4002	252	7.42	2.94	1.86	0.73
		73-3940	343	10.52	3.07	2.50	0.73	73-4003	231	7.28	3.15	2.74	1.19
		MEAN	353	10.81	3.07	2.49	0.71	MEAN	242	7.35	3.05	2.30	0.96
	3.0	73-3974	346	10.00	2.89	2.62	0.76	73-4037	240	6.10	2.54	1.82	0.76
		73-3975	334	9.70	2.90	2.52	0.76	73-4038	264	7.60	2.88	2.00	0.76
		MEAN	340	9.85	2.90	2.65	0.76	MEAN	252	6.85	2.71	1.91	0.76
DAY 60	Control	73-3937	414	11.08	2.68	2.59	0.63	73-4000	260	6.44	2.48	1.83	0.70
		73-3938	513	16.21	3.16	3.60	0.70	73-4001	283	7.21	2.55	1.80	0.64
		MEAN	464	13.65	2.92	3.10	0.67	MEAN	272	6.83	2.52	1.82	0.67
	3.0	73-3972	391	10.80	2.76	2.92	0.75	73-4035	285	6.79	2.38	1.80	0.63
		73-3973	386	11.02	2.85	2.72	0.70	73-4036	276	6.80	2.46	1.80	0.65
		MEAN	388	10.91	2.81	2.82	0.73	MEAN	280	6.80	2.42	1.80	0.64
DAY 90	Control	73-3935	406	11.38	2.80	2.74	0.67	73-3998	285	7.21	2.53	1.91	0.67
		73-3936	451	12.20	2.71	2.98	0.66	73-3999	296	7.59	2.56	2.13	0.72
		MEAN	428	11.79	2.76	2.86	0.67	MEAN	290	7.40	2.55	2.02	0.70
	0.3	73-3985	453	12.90	2.85	3.21	0.71	73-4048	272	7.60	2.79	1.87	0.69
		73-3986	493	14.31	2.90	4.09	0.83	73-4049	304	7.11	2.34	1.91	0.63
		MEAN	473	13.61	2.87	3.65	0.77	MEAN	288	7.36	2.57	1.89	0.66
	3.0	73-3970	465	12.41	2.67	3.28	0.71	73-4033	281	7.13	2.54	2.00	0.71
		73-3971	481	16.45	3.42	3.49	0.73	73-4034	324	8.38	2.59	2.11	0.65
		MEAN	473	14.43	3.05	3.39	0.72	MEAN	302	7.76	2.56	2.06	0.68
	30	73-3957	499	16.40	3.29	3.79	0.76	73-4020	286	6.89	2.41	1.83	0.64
		73-3958	458	13.40	2.93	3.59	0.78	73-4021	298	7.81	2.62	2.03	0.68
		MEAN	479	14.90	3.11	3.69	0.77	MEAN	292	7.35	2.52	1.93	0.66
	100	73-3950	425	13.53	3.18	3.02	0.71	73-4013	290	7.89	2.72	2.00	0.69
		73-3951	386	9.51	2.46	2.41	0.62	73-4014	274	7.46	2.72	2.00	0.73
		MEAN	406	11.52	2.82	2.72	0.67	MEAN	282	7.68	2.72	2.00	0.71
DAY 100	Control	73-3933	393	11.51	2.93	3.08	0.78	73-3996	299	7.67	2.57	1.99	0.67
		73-3934	469	13.61	2.90	3.58	0.76	73-3997	286	6.83	2.39	2.09	0.73
		MEAN	431	12.56	2.92	3.33	0.77	MEAN	294	7.25	2.48	2.04	0.70
	3.0	73-3968	440	11.68	2.65	2.98	0.68	73-4031	309	7.40	2.39	1.99	0.64
		73-3969	479	13.99	2.92	3.39	0.71	73-4032	319	7.98	2.50	2.27	0.71
		MEAN	460	12.84	2.79	3.19	0.70	MEAN	314	7.69	2.45	2.13	0.68
DAY 111	Control	73-3931	457	10.89	2.38	4.09	0.90	73-3994	301	7.81	2.59	1.92	0.64
		73-3932	483	14.79	3.06	4.45	0.92	73-3995	324	8.21	2.53	2.30	0.71
		MEAN	470	12.84	2.72	4.27	0.91	MEAN	312	8.01	2.56	2.11	0.68
	3.0	73-3966	527	16.89	3.20	4.09	0.78	73-4029	315	8.02	2.55	1.95	0.62
		73-3967	475	18.40	3.87	4.45	0.94	73-4030	292	8.01	2.74	2.19	0.75
		MEAN	501	17.65	3.54	4.27	0.86	MEAN	304	8.02	2.65	2.07	0.69
DAY 132	Control	73-3929	416	11.09	2.67	2.81	0.68	73-3992	341	8.90	2.61	2.41	0.71
		73-3930	546	16.90	3.10	3.51	0.64	73-3993	310	7.70	2.48	2.00	0.65
		MEAN	481	14.00	2.89	3.16	0.66	MEAN	326	8.30	2.55	2.21	0.68
	3.0	73-3964	489	14.22	2.91	3.30	0.67	73-4027	335	7.95	2.37	2.12	0.63
		73-3965	504	15.10	3.00	3.30	0.65	73-4028	297	8.00	2.69	2.02	0.68
		MEAN	496	15.16	3.05	3.30	0.66	MEAN	316	7.98	2.53	2.07	0.66

TABLE 9

GROSS AND MICROSCOPIC FINDINGS IN MALE RATS MAINTAINED FOR 90 DAYS ON DIETS CONTAINING TETRABROMOBISPHENOL A

Pathologic Findings	Dosage Level (mg/kg/day) 0	100	30	3	0.3
Gross Examination					
Mineralized foci in the renal pelvis	0/5	1/5	2/5	1/5	0/5
Nematode parasites in the lumen of the large intestine	1/5	0/5	0/5	0/5	0/5
Orchititis and epididymitis - unilateral	0/5	0/5	0/5	0/5	1/5
Microscopic Examination					
Proteinaceous casts in dilated renal tubules	5/5	5/5	--	--	--
Focal renal tubular atrophy and glomerular thickening, minimal	3/5	3/5	--	--	--
Focal mineralization in the renal pelvis, minimal	1/5	1/5	--	--	--
Perivascular and peribronchiolar accumulations of mononuclear inflammatory cells in lungs, minimal	5/5	5/5	--	--	--
Intestinal nematodiasis	4/5	3/5	--	--	--
Subepithelial accumulation of mononuclear inflammatory cells in the tracheal wall	1/5	0/5	--	--	--
Focal myocarditis, minimal	1/5	0/5	--	--	--
Focal aggregates of mononuclear inflammatory cells in the liver, minimal	1/5	0/5	--	--	--
Focal subacute pancreatitis, minimal	0/5	1/5	--	--	--

Data listed as number of rats affected/number of rats examined.

Microscopic examination limited to tissues of 5 rats/sex of control and top dosage levels.

TABLE 10

GROSS AND MICROSCOPIC FINDINGS IN FEMALE RATS MAINTAINED FOR 90 DAYS ON DIETS CONTAINING TETRABROMOBISPHENOL A

Pathologic Findings	Dosage Level (mg/kg/day) 0	100	30	3	0.3
Gross Examination					
Mineralized foci in the renal pelvis	0/5	0/5	1/5	1/5	0/5
Nematode parasites in the lumen of the large intestine	0/5	1/5	0/5	0/5	0/5
Small tag of strangulated abdominal adipose tissue	1/5	1/5	0/5	0/5	0/5
Microscopic Examination					
Proteinaceous casts in dilated renal tubules	4/5	5/5	--	--	--
Focal renal tubular atrophy and glomerular thickening, minimal	3/5	2/5	--	--	--
Focal interstitial nephritis	2/5	2/5	--	--	--
Perivascular and peribronchiolar accumulations of mononuclear inflammatory cells in lungs, minimal	5/5	4/5	--	--	--
Intestinal nematodiasis	0/5	2/5	--	--	--
One focal accumulation of mononuclear inflammatory cells in adrenal cortex	0/5	1/5	--	--	--

Data listed as number of rats affected/number of rats examined.

Microscopic examination limited to tissues of 5 rats/sex of control and top dosage levels.

TABLE A-1

INDIVIDUAL AND MEAN BODY WEIGHTS IN GRAMS OF MALE AND FEMALE RATS MAINTAINED ON DIETS CONTAINING TETRABROMOBISPHENOL A FOR 90 DAYS

Dose mg/kg/day	Animal Number	Days on Test 0	6	13	20	27	34	41	48	55	63	70	77	83	90
MALES															
Control	73-3924	243	294	343	359	386	401	436	450	459	471	491	487	487	461
	73-3925	254	298	348	366	391	393	406	429	434	445	463	471	478	485
	73-3926	268	329	385	422	457	465	488	528	530	546	573	585	595	598
	73-3927	224	272	316	336	378	374	396	424	434	438	464	448	448	448
	73-3928	253	301	348	369	391	398	425	452	459	459	477	480	491	490
	73-3929	235	266	304	320	337	334	357	373	375	385	392	410	407	415
	73-3930	267	329	373	393	431	432	463	487	499	505	531	531	542	554
	73-3931	253	315	367	396	428	437	464	492	498	506	515	530	528	535
	73-3932	263	313	356	381	396	414	432	465	467	473	487	495	494	504
	73-3933	252	289	329	335	345	344	369	389	391	400	414	422	414	417
	73-3934	242	292	342	364	392	408	427	453	459	463	483	487	491	506
	73-3935	236	285	325	338	360	364	385	392	404	411	423	432	431	420
	73-3936	215	280	323	339	362	372	395	421	425	444	452	458	477	480
	73-3937	258	303	344	357	374	377	405	427	441	-	-	-	-	-
	73-3938	302	252	408	432	366	467	500	535	546	-	-	-	-	-
	73-3939	275	310	360	374	398	-	-	-	-	-	-	-	-	-
	73-3940	244	296	336	360	379	-	-	-	-	-	-	-	-	-
	73-3941	266	322	371	-	-	-	-	-	-	-	-	-	-	-
	73-3942	262	312	359	-	-	-	-	-	-	-	-	-	-	-
	73-3943	231	284	-	-	-	-	-	-	-	-	-	-	-	-
	73-3944	259	299	-	-	-	-	-	-	-	-	-	-	-	-
	MEAN±S.D.	252±19	297±20	349±25	367±31	386±31	399±40	423±42	448±48	455±48	457±45	474±49	480±49	483±52	486±55
0.3	73-3980	267	309	355	382	408	410	435	463	464	474	497	456	499	506
	73-3981	263	303	355	377	395	396	425	452	453	461	485	473	486	496
	73-3982	255	293	331	360	377	384	411	439	443	455	473	504	491	494
	73-3983	199	293	344	374	390	387	412	439	443	451	471	504	464	470
	73-3984	260	292	334	351	366	358	377	401	405	405	433	431	425	410
	73-3985	262	308	352	372	399	398	414	447	449	458	481	491	478	495
	73-3986	261	304	346	374	398	411	441	475	485	485	516	491	520	525
	MEAN±S.D.	252±24	300±7	345±10	370±11	390±14	392±18	416±21	445±23	449±24	456±25	479±26	479±27	480±30	485±37
3	73-3959	257	303	352	377	394	405	428	459	461	471	492	491	505	510
	73-3960	270	310	358	387	420	437	460	484	489	502	524	529	545	555
	73-3961	271	320	368	392	420	433	451	485	492	504	518	523	526	536
	73-3962	261	306	335	346	375	372	392	414	417	487	441	449	457	469
	73-3963	*	294	**	343	401	427	455	490	493	497	516	523	527	530
	73-3964	256	306	344	373	384	395	415	443	447	452	469	470	484	493
	73-3965	262	313	361	385	407	408	434	461	464	476	489	484	492	498
	73-3966	266	326	374	401	422	431	456	485	489	512	538	535	532	536
	73-3967	242	286	333	356	382	386	412	435	442	451	473	456	482	486
	73-3968	*	251	299	340	362	367	392	426	423	431	457	475	461	473
	73-3969	248	297	344	372	401	405	426	461	467	472	488	508	507	516
	73-3970	253	296	345	362	389	396	420	448	448	459	482	483	491	506
	73-3971	268	328	363	388	411	413	428	464	468	481	498	505	500	514
	73-3972	256	290	326	340	357	360	379	407	417	-	-	-	-	-
	73-3973	237	284	299	338	361	371	391	409	412	-	-	-	-	-
	73-3974	259	303	341	358	382	-	-	-	-	-	-	-	-	-
	73-3975	242	293	330	349	373	-	-	-	-	-	-	-	-	-
	73-3976	228	279	326	313	-	-	-	-	-	-	-	-	-	-
	73-3977	251	291	336	317	-	-	-	-	-	-	-	-	-	-
	73-3978	254	303	-	-	-	-	-	-	-	-	-	-	-	-
	73-3979	266	301	-	-	-	-	-	-	-	-	-	-	-	-
	MEAN±S.D.	255±12	299±17	341±21	365±21	391±21	400±25	423±26	451±28	455±29	476±24	491±28	495±28	501±27	509±26
30	73-3952	230	277	325	359	377	393	414	443	449	447	462	472	482	490
	73-3953	253	292	330	350	377	380	400	431	429	432	462	456	457	459
	73-3954	252	299	340	366	380	380	400	424	428	428	444	442	454	465
	73-3955	264	306	341	360	382	388	406	436	437	446	463	478	479	481
	73-3956	233	284	333	369	399	394	421	456	453	469	479	486	493	506
	73-3957	264	322	369	397	427	430	455	488	490	499	512	514	523	530
	73-3958	242	250	302	352	385	391	415	449	455	458	471	483	494	497
	MEAN±S.D.	248±14	290±23	334±20	365±16	390±18	394±7	416±19	447±21	456±28	454±24	470±21	476±23	483±24	490±24
100	73-3945	260	302	347	361	389	387	407	432	442	450	468	481	489	488
	73-3946	236	277	310	335	352	348	357	386	390	388	408	413	416	418
	73-3947	252	304	351	387	414	421	442	475	482	487	511	525	522	528
	73-3948	265	328	382	413	440	453	470	507	513	520	537	542	548	555
	73-3949	263	302	335	347	370	376	397	428	439	443	466	476	480	486
	73-3950	247	278	316	339	361	365	385	410	416	424	443	450	458	461
	73-3951	237	269	309	329	342	341	356	388	390	391	411	414	409	417
	MEAN±S.D.	251±12	294±21	336±27	359±31	381±35	384±40	402±42	432±45	439±46	443±48	463±48	472±50	475±52	479±52

No significant difference from controls by analysis of variance and Dunnett's test.

-(dash)- animals were sacrificed for collection of tissues for bromine analysis.

* Animals died on 5th and 6th day of test.

** Animal weight inadvertantly not recorded.

TABLE A-1 (Continued)

INDIVIDUAL AND MEAN BODY WEIGHTS IN GRAMS OF MALE AND FEMALE RATS MAINTAINED ON DIETS CONTAINING TETRABROMOBISPHENOL A FOR 90 DAYS

Dose mg/kg/day	Animal Number	Days on Test 0	6	13	20	27	34	41	48	55	63	70	77	83	90
FEMALES															
Control	73-3987	219	231	248	251	256	252	267	283	274	278	288	252	290	288
	73-3988	223	237	257	266	287	278	292	311	299	306	302	315	319	311
	73-3989	237	254	281	295	303	299	324	344	341	346	356	360	357	364
	73-3990	224	248	269	284	288	291	304	321	318	319	329	340	330	338
	73-3991	228	246	263	269	284	274	286	308	303	306	308	318	315	310
	73-3992	336	259	281	283	301	299	314	330	330	327	341	338	338	347
	73-3993	223	236	261	277	288	281	292	316	311	309	312	308	316	316
	73-3994	222	233	270	278	280	278	286	308	304	307	330	305	322	315
	73-3995	231	252	268	278	283	290	294	314	322	322	330	325	333	335
	73-3996	229	250	261	278	290	286	302	314	310	316	323	321	326	324
	73-3997	229	241	261	272	282	271	290	296	301	302	307	313	309	311
	73-3998	220	238	265	270	284	275	291	308	300	314	323	314	313	315
	73-3999	225	241	266	275	288	277	294	314	316	317	324	318	323	310
	73-4000	213	231	247	260	267	254	259	285	286	-	-	-	-	-
	73-4001	230	248	264	268	287	277	296	312	301	-	-	-	-	-
	73-4002	222	231	260	280	284	-	-	-	-	-	-	-	-	-
	73-4003	229	234	256	256	266	-	-	-	-	-	-	-	-	-
	73-4004	216	245	264	250	-	-	-	-	-	-	-	-	-	-
	73-4005	223	238	257	242	-	-	-	-	-	-	-	-	-	-
	73-4006	218	235	-	-	-	-	-	-	-	-	-	-	-	-
	73-4007	217	235	-	-	-	-	-	-	-	-	-	-	-	-
	MEAN±S.D.	230±6	241±8	263±9	273±11	283±12	279±14	293±16	311±15	308±17	313±16	321±18	318±25	315±21	322±20
0.3	73-4043	221	242	241	272	279	275	282	296	297	296	310	308	317	316
	73-4044	220	236	259	263	276	264	277	300	287	296	291	300	304	295
	73-4045	223	227	257	260	280	271	280	303	297	302	304	312	312	318
	73-4046	234	257	278	289	298	291	299	317	314	313	314	312	314	322
	73-4047	220	237	251	258	265	265	277	296	292	286	297	294	296	304
	73-4048	225	244	263	272	288	281	291	302	274	286	287	289	294	295
	73-4049	215	237	245	247	251	249	257	273	307	308	326	314	310	325
	MEAN±S.D	223±6	240±10	256±12	266±13	277±15	271±13	280±13	298±13	295±13	298±10	304±14	304±10	307±9	311±13
[redacted]	73-4022	214	231	244	254	262	260	264	287	288	285	290	301	302	280
	73-4023	223	254	264	271	283	275	246	321	323	310	309	307	326	315
	73-4024	230	245	260	273	285	280	288	309	310	311	315	327	329	322
	73-4025	231	244	258	273	280	277	288	300	300	301	304	303	317	308
	73-4026	217	238	250	263	273	265	279	288	294	287	300	295	304	305
	73-4027	225	252	263	276	293	292	297	317	316	317	321	317	337	336
	73-4028	209	231	253	262	275	266	280	301	295	294	299	298	304	310
	73-4029	233	248	266	278	295	292	298	318	313	323	324	332	331	332
	73-4030	218	241	251	264	270	274	272	304	299	299	307	309	312	350
	73-4031	221	238	253	273	281	285	290	315	319	319	330	326	328	306
	73-4032	234	251	267	278	289	286	298	316	325	318	333	331	329	350
	73-4033	208	235	242	258	265	261	272	281	293	284	300	316	300	-
	73-4034	236	258	282	296	303	299	302	326	327	331	339	336	351	-
	73-4035	226	246	265	276	289	283	287	306	309	-	-	-	-	-
	73-4036	223	240	251	272	276	272	283	296	300	-	-	-	-	-
	73-4037	216	238	254	268	275	-	-	-	-	-	-	-	-	-
	73-4038	215	234	274	286	298	-	-	-	-	-	-	-	-	-
	73-4039	232	254	250	234	-	-	-	-	-	-	-	-	-	-
	73-4040	227	242	264	245	-	-	-	-	-	-	-	-	-	-
	73-4041	236	265	-	-	-	-	-	-	-	-	-	-	-	-
	73-4042	230	250	-	-	-	-	-	-	-	-	-	-	-	-
	MEAN±S.D.	224±9	244±9	258±10	272±10	282±12	278±12	283±15	306±14	307±13	306±16	313±15	315±14	321±16	319±20
30	73-4015	220	243	255	269	287	279	293	297	299	306	316	305	320	315
	73-4016	228	246	267	283	289	290	310	323	317	324	324	332	331	333
	73-4017	225	244	246	273	278	274	284	295	306	306	313	319	318	320
	73-4018	233	248	271	282	286	293	292	312	320	317	334	324	333	333
	73-4019	213	237	251	256	269	266	282	291	294	290	292	297	307	308
	73-4020	222	240	255	266	276	272	280	291	294	294	308	281	308	316
	73-4021	221	241	260	272	285	278	293	307	311	308	321	318	320	320
	MEAN±S.D.	223±6	243±4	258±9	272±9	281±7	279±10	291±10	302±12	306±11	306±12	315±13	311±18	320±10	321±9
100	73-4008	228	243	267	279	286	275	286	311	304	305	312	313	320	323
	73-4009	222	241	260	277	281	279	279	303	291	296	304	300	313	310
	73-4010	231	247	257	276	283	272	293	300	298	300	313	310	317	320
	73-4011	223	239	258	267	278	277	284	297	301	301	304	290	304	308
	73-4012	206	237	258	269	271	274	289	305	299	304	306	304	312	310
	73-4013	223	250	268	279	287	283	316	343	327	316	331	320	323	315
[redacted]	73-4014	214	240	251	261	275	262	282	293	283	292	291	304	304	300
	MEAN±S.D.	221±8	242±5	260±6	273±7	280±6	275±7	290±12	307±17	300±14	302±8	309±12	306±10	313±7	312±8

No significant difference from controls by analysis of variance and Dunnett's test.

-(dash) - animals were sacrificed for collection of tissues for bromine analysis.

TABLE A-2

INDIVIDUAL AND MEAN FOOD CONSUMPTION (GRAMS/RAT/DAY) OF MALE AND FEMALE RATS MAINTAINED ON DIETS CONTAINING TETRABROMOBISPHENOL A FOR 90 DAYS

Dose mg/kg/day	Animal Number	Days on Test 0-3	4-7	8-14	15-21	22-29	30-36	37-43	44-50	51-57	58-64	65-71	72-78	79-86	87-90
MALES															
Control	73-3924	29	28	30	29	28	30	30	30	27	31	31	32	26	29
	73-3925	28	27	28	25	23	27	26	26	25	27	26	31	28	37
	73-3926	28	35	32	35	11	34	32	33	33	33	34	37	32	34
	73-3927	22	24	25	25	15	26	26	26	25	26	26	28	25	23
	73-3928	44	18	29	29	34	29	33	29	29	29	30	32	26	31
	73-3929	21	27	26	26	26	26	22	25	24	27	27	31	26	27
	73-3930	30	33	31	30	27	28	30	29	29	29	30	33	28	28
	73-3931	26	28	31	29	29	29	27	24	29	28	28	30	28	28
	73-3932	25	30	30	30	14	29	28	28	28	29	29	28	28	28
	73-3933	28	31	29	26	16	24	25	25	25	25	26	29	25	27
	73-3934	25	28	34	28	29	30	30	30	27	29	29	32	29	30
	73-3935	39	25	33	25	33	25	24	24	24	22	26	28	25	26
	73-3936	24	29	30	26	36	27	28	27	26	28	15	30	28	29
	73-3937	25	27	27	25	30	25	26	27	25	-	-	-	-	-
	73-3938	33	32	34	33	8	33	35	35	32	-	-	-	-	-
	73-3939	28	28	29	28	19	-	-	-	-	-	-	-	-	-
	73-3940	27	29	29	27	32	-	-	-	-	-	-	-	-	-
	73-3941	26	29	36	-	-	-	-	-	-	-	-	-	-	-
	73-3942	26	30	30	-	-	-	-	-	-	-	-	-	-	-
	73-3943	26	29	-	-	-	-	-	-	-	-	-	-	-	-
	73-3944	24	27	-	-	-	-	-	-	-	-	-	-	-	-
	MEAN±S.D.	28±5	28±3	30±3	28±3	24±9	28±3	28±3	28±3	27±3	29±3	28±4	31±2	27±2	29±4
0.3	73-3980	25	27	27	28	27	26	28	24	26	28	27	29	24	25
	73-3981	27	28	29	28	26	29	28	38	28	28	26	31	26	36
	73-3982	26	28	27	27	27	27	28	28	27	28	26	31	28	29
	73-3983	27	29	30	28	28	26	27	28	27	27	26	30	26	26
	73-3984	25	29	27	24	24	24	25	24	19	-	20	27	25	26
	73-3985	28	31	30	29	29	27	29	29	32	29	26	33	28	26
	73-3986	26	29	30	31	30	29	31	31	31	32	29	35	29	30
	MEAN±S.D.	26±1	29±1	28±2	28±2	27±2	27±2	28±2	29±5	27±4	29±2	26±3	31±3	27±2	28±4
	73-3959	25	28	30	25	28	26	26	26	26	29	27	30	28	28
	73-3960	25	28	28	31	28	31	32	27	28	29	35	34	28	31
	73-3961	28	32	31	28	29	29	30	29	29	30	28	32	28	28
	73-3962	28	28	28	25	27	27	28	26	26	27	28	31	28	29
	73-3963	7	11	17	38	-	35	31	31	29	30	30	30	28	27
	73-3964	28	30	29	30	51	27	27	28	27	27	29	30	27	26
	73-3965	31	30	31	34	18	33	32	31	30	29	29	30	28	28
	73-3966	28	31	32	30	25	29	30	30	31	31	31	34	27	29
	73-3967	26	27	27	29	27	27	27	25	27	28	27	31	28	28
	73-3968	38	9	28	27	36	26	27	28	28	27	28	31	27	28
	73-3969	27	26	29	29	17	28	29	28	29	29	29	31	28	28
	73-3970	25	28	29	28	34	28	27	24	28	26	30	31	28	28
	73-3971	29	29	32	31	34	29	29	30	30	30	30	32	29	30
	73-3972	29	28	29	26	32	26	27	27	26	-	-	-	-	-
	73-3973	25	28	25	30	14	28	28	28	27	-	-	-	-	-
	73-3974	24	28	27	28	27	-	-	-	-	-	-	-	-	-
	73-3975	24	27	27	26	25	-	-	-	-	-	-	-	-	-
	73-3976	24	26	29	-	-	-	-	-	-	-	-	-	-	-
	73-3977	29	28	29	-	-	-	-	-	-	-	-	-	-	-
	73-3978	29	30	-	-	-	-	-	-	-	-	-	-	-	-
	73-3979	25	28	-	-	-	-	-	-	-	-	-	-	-	-
	MEAN±S.D.	26±6	27±6	28±3	29±3	28±9	29±2	29±2	28±2	28±2	29±1	29±2	31±1	28±1	28±1
30	73-3952	24	27	29	36	27	28	27	27	27	27	26	30	28	28
	73-3953	25	30	30	28	27	26	24	27	26	28	29	27	27	28
	73-3954	27	28	29	29	26	26	25	25	24	25	26	29	26	26
	73-3955	26	32	29	28	28	27	26	28	26	29	27	32	28	27
	73-3956	27	28	28	38	27	28	27	28	26	28	27	28	25	26
	73-3957	27	30	32	29	29	29	28	30	29	30	29	32	28	29
	73-3958	7	26	28	30	29	29	30	29	28	29	29	31	28	28
	MEAN±S.D.	23±7	29±2	29±1	31±4	28±1	27±1	27±2	28±1	27±2	28±2	27±1	30±2	27±1	27±1
100	73-3945	24	28	27	24	27	25	25	27	26	27	28	31	28	26
	73-3946	21	26	26	16	23	24	23	21	21	24	25	27	26	21
	73-3947	25	30	30	29	29	30	29	29	29	29	29	33	30	28
	73-3948	30	31	32	33	4	37	33	34	29	36	33	35	30	32
	73-3949	29	29	27	25	27	26	27	27	27	27	28	31	29	28
	73-3950	23	26	26	26	26	26	26	25	25	26	26	29	26	27
	73-3951	24	24	26	28	24	25	24	25	23	25	24	26	23	23
	MEAN±S.D.	25±3	28±2	28±3	26±6	23±8	28±4	27±3	27±4	26±3	28±4	28±3	30±3	27±2	26±4

-(dash) - animals were sacrificed for collection of tissues for bromine analysis.

TABLE A-2 (Continued)

INDIVIDUAL AND MEAN FOOD CONSUMPTION (GRAMS/RAT/DAY) OF MALE AND FEMALE RATS MAINTAINED ON DIETS CONTAINING TETRABROMOBISPHENOL A FOR 90 DAYS

Dose mg/kg/day	Animal Number	Days on Test 0-3	4-7	8-14	15-21	22-29	30-36	37-43	44-50	51-57	58-64	65-71	72-78	79-86	87-90
FEMALES															
Control	73-3987	19	20	22	28	19	18	20	17	19	19	18	21	19	20
	73-3988	15	21	27	22	21	22	21	19	21	22	19	21	21	44
	73-3989	23	23	23	23	21	23	23	23	24	23	23	26	23	24
	73-3990	28	24	24	23	23	22	23	20	21	23	23	26	23	21
	73-3991	18	21	22	20	20	20	20	20	21	20	19	25	19	21
	73-3992	21	21	22	21	21	21	20	21	22	21	21	25	22	22
	73-3993	18	21	21	21	21	21	20	19	20	20	20	23	20	21
	73-3994	20	20	24	19	19	19	19	20	19	20	21	21	19	19
	73-3995	23	22	23	20	38	22	22	21	22	23	21	24	23	22
	73-3996	24	20	21	22	21	21	22	20	21	21	21	25	23	21
	73-3997	20	20	21	20	26	21	21	19	21	20	21	25	21	22
	73-3998	21	23	25	20	24	23	22	22	22	24	21	25	23	23
	73-3999	25	22	22	22	20	21	21	21	23	21	22	25	21	20
	73-4000	20	20	21	23	19	23	18	20	19	-	-	-	-	-
	73-4001	19	20	20	19	20	20	21	19	20	-	-	-	-	-
	73-4002	21	20	21	22	19	-	-	-	-	-	-	-	-	-
	73-4003	19	21	22	20	21	-	-	-	-	-	-	-	-	-
	73-4004	24	28	24	-	-	-	-	-	-	-	-	-	-	-
	73-4005	14	18	20	-	-	-	-	-	-	-	-	-	-	-
	73-4006	23	22	-	-	-	-	-	-	-	-	-	-	-	-
	73-4007	20	21	-	-	-	-	-	-	-	-	-	-	-	-
	MEAN±S.D.	21±3	21±2	22±2	22±2	22±4	21±2	21±1	20±1	21±1	21±2	21±2	24±2	21±2	23±6
0.3	73-4043	22	**	**	23	26	22	16	21	20	22	22	24	22	24
	73-4044	18	23	22	17	22	20	16	19	20	20	19	20	19	20
	73-4045	18	20	19	28	22	20	17	22	21	20	20	21	21	22
	73-4046	22	22	21	20	30	19	14	21	18	20	18	19	21	22
	73-4047	18	21	20	18	20	20	15	19	21	17	18	19	19	20
	73-4048	21	25	24	21	23	23	16	22	19	19	17	19	19	20
	73-4049	20	24	**	17	21	20	13	19	23	**	**	22	25	24
	MEAN±S.D.	20±2	23±2	21±2	21±4	24±3	21±2	15*±1	20±1	20±2	20±2	19±2	20±2	21±2	22±2
[redacted]	73-4022	19	20	20	19	21	23	29	21	22	22	21	22	23	18
	73-4023	20	24	21	19	26	22	10	30	24	19	20	24	22	23
	73-4024	22	23	22	20	21	24	21	22	19	22	21	22	21	24
	73-4025	19	22	20	19	21	22	21	20	20	21	21	20	21	22
	73-4026	20	22	20	22	24	20	20	19	28	20	19	20	20	20
	73-4027	23	17	22	22	24	23	22	21	20	21	20	22	23	25
	73-4028	20	22	21	21	21	34	22	20	18	20	20	21	20	23
	73-4029	20	20	19	21	23	20	21	21	42	19	19	20	19	21
	73-4030	24	24	21	20	27	22	20	22	18	20	21	21	21	21
	73-4031	18	20	20	21	22	22	22	23	3	21	23	22	23	24
	73-4032	40	26	27	22	26	25	27	25	32	23	23	29	27	26
	73-4033	19	22	19	21	22	21	20	20	18	19	22	21	22	20
	73-4034	29	23	23	25	20	24	23	23	2	23	24	22	23	26
	73-4035	22	22	22	23	25	23	21	19	24	-	-	-	-	-
	73-4036	20	21	20	22	22	21	20	21	41	-	-	-	-	-
	73-4037	21	22	21	20	22	-	-	-	-	-	-	-	-	-
	73-4038	19	19	21	23	27	-	-	-	-	-	-	-	-	-
	73-4039	23	24	23	-	-	-	-	-	-	-	-	-	-	-
	73-4040	20	21	22	-	-	-	-	-	-	-	-	-	-	-
	73-4041	23	24	-	-	-	-	-	-	-	-	-	-	-	-
	73-4042	22	21	-	-	-	-	-	-	-	-	-	-	-	-
	MEAN±S.D.	22±5	22±2	21±2	21±2	23±2	23±3	21±4	22±3	23±12	21±2	21±2	22±2	22±2	23±2
30	73-4015	19	21	19	20	16	02	20	19	19	19	20	18	19	20
	73-4016	17	22	22	24	22	17	19	23	18	17	16	20	20	22
	73-4017	25	23	19	23	24	23	21	23	19	22	22	22	24	23
	73-4018	20	22	21	21	21	21	21	23	19	21	20	21	22	22
	73-4019	19	20	18	19	20	21	23	19	20	19	20	22	22	22
	73-4020	20	22	19	22	23	21	18	20	19	20	20	19	21	21
	73-4021	19	22	22	22	26	22	22	22	22	22	22	22	23	24
	MEAN±S.D.	20±2	22±1	20±2	22±2	22±3	21±2	21±2	21±2	19±1	20±2	20±2	21*±1	22±2	22±1
100	73-4008	21	21	23	21	21	21	20	20	21	22	21	25	22	20
	73-4009	22	22	25	22	22	20	21	21	18	21	20	23	20	20
	73-4010	18	23	21	22	21	21	21	27	21	21	21	24	22	20
	73-4011	22	24	23	23	22	22	22	21	21	22	23	25	24	23
	73-4012	21	22	21	20	20	20	21	25	20	23	19	24	20	21
[redacted]	73-4013	23	26	21	21	22	21	26	26	18	18	21	25	19	18
	73-4014	23	23	20	23	19	21	22	21	20	21	19	25	20	23
	MEAN±S.D.	22±2	23±2	22±2	22±1	21±1	21±1	22±2	23±3	20±1	21±1	20±1	24±1	21±2	21±2

*Significantly different from controls by analysis of variance and Dunnett's test, $p<0.05$.

**Food consumption not calculable.

-(dash) - animals were sacrificed for collection of tissues for bromine analysis.

TABLE A-3

FINAL INDIVIDUAL AND MEAN BODY AND ORGAN WEIGHTS OF MALE AND FEMALE RATS MAINTAINED ON DIETS CONTAINING TETRABROMOBISPHENOL A FOR 90 DAYS

Dose mg/kg/day	Animal Number	Starved Body Weight, g	Organ Weights (g and g/100 g Body Weight)									
			Brain		Heart		Liver		Kidney		Testes	
			g	g/100 g	g	g/100 g	g	g/100 g	g	g/100 g	g	g/100 g
MALES												
Control	73-3924	451	1.80	0.40	1.29	0.29	12.26	2.72	2.94	0.65	3.69	0.82
	73-3925	456	1.89	0.41	1.30	0.29	13.35	2.93	3.53	0.77	3.81	0.84
	73-3926	558	1.88	0.34	1.39	0.25	18.06	3.24	4.30	0.77	3.61	0.65
	73-3927	425	1.70	0.40	1.22	0.29	12.05	2.84	3.02	0.71	3.47	0.82
	73-3928	454	1.83	0.40	1.40	0.31	13.48	2.97	3.09	0.68	3.85	0.85
	MEAN±S.D.	469±51	1.82±.08	0.39±.03	1.32±.08	0.29±.02	13.84±2.44	2.94±.19	3.38±.56	0.72±.05	3.69±.15	0.80±.08
0.3	73-3980	473	1.79	0.38	1.41	0.30	13.60	2.86	3.29	0.70	5.29	1.12
	73-3981	461	1.90	0.41	1.31	0.28	13.21	2.87	3.41	0.74	3.99	0.87
	73-3982	463	1.80	0.39	1.32	0.29	13.80	2.98	3.09	0.67	3.80	0.82
	73-3983	443	1.80	0.41	1.50	0.34	12.48	2.82	3.43	0.77	3.76	0.85
	73-3984	402	1.76	0.44	1.38	0.34	11.58	2.88	2.95	0.73	3.52	0.88
	MEAN±S.D.	448±28	1.81±.05	0.41±.02	1.38±.08	0.31±.03	12.93±.91	2.88±.06	3.23±.21	0.72±.04	4.07±.70	0.91±.12
3	73-3959	474	1.88	0.40	1.38	0.29	13.92	2.94	3.62	0.76	3.69	0.78
	73-3960	502	1.81	0.36	1.46	0.29	15.61	3.11	3.17	0.63	3.99	0.79
	73-3961	514	1.98	0.39	1.49	0.29	14.38	2.80	3.50	0.68	3.82	0.74
	73-3962	434	1.82	0.42	1.38	0.32	11.81	2.72	3.12	0.72	3.66	0.84
	73-3963	500	1.81	0.36	1.51	0.30	14.25	2.85	3.57	0.71	3.96	0.79
	MEAN±S.D.	485±32	1.86±.07	0.39±.03	1.44±.06	0.30±.01	13.99±1.38	2.88±.15	3.40±.23	0.70±.05	3.82±.15	0.79±.04
30	73-3952	455	1.76	0.39	1.25	0.27	13.51	2.97	3.20	0.70	3.82	0.84
	73-3953	428	1.80	0.42	1.41	0.33	11.89	2.78	3.22	0.75	3.70	0.86
	73-3954	426	1.88	0.44	1.21	0.28	12.80	3.00	3.10	0.73	3.87	0.91
	73-3955	451	1.81	0.40	1.31	0.29	14.69	3.26	3.39	0.75	3.91	0.87
	73-3956	465	1.79	0.38	1.40	0.30	13.65	2.94	3.45	0.74	4.12	0.89
	MEAN±S.D.	445±17	1.81±.04	0.41±.02	1.32±.09	0.29±.02	13.31±1.04	2.99±.17	3.27±.14	0.73±.02	3.88±.15	0.87±.03
100	73-3945	452	1.79	0.40	1.13	0.25	12.30	2.72	3.30	0.75	3.81	0.84
	73-3946	387	1.61	0.42	1.21	0.31	11.00	2.84	2.90	0.75	3.56	0.92
	73-3947	490	1.82	0.37	1.31	0.27	13.91	2.84	3.57	0.73	4.01	0.82
	73-3948	517	1.81	0.35	1.40	0.27	15.31	2.96	3.69	0.71	3.51	0.68
	73-3949	450	1.81	0.40	1.38	0.31	11.58	2.57	3.30	0.73	4.19	0.93
	MEAN±S.D.	459±49	1.77±.09	0.39±.03	1.29±.11	0.28±.03	12.82±1.77	2.79±.15	3.35±.30	0.73±.01	3.82±.29	0.84±.10

No significant difference from controls by analysis of variance and Dunnett's test, $P<0.05$.

TABLE A-3 (Continued)

FINAL INDIVIDUAL AND MEAN BODY AND ORGAN WEIGHTS OF MALE AND FEMALE RATS MAINTAINED ON DIETS CONTAINING TETRABROMOBISPHENOL A FOR 90 DAYS

Dose mg/kg/day	Animal Number	Starved Body Weight, g	Organ Weights (g and g/100 g Body Weight)							
			Brain		Heart		Liver		Kidney	
			g	g/100 g	g	g/100 g	g	g/100 g	g	g/100 g
FEMALES										
Control	73-3987	267	1.60	0.60	0.80	0.30	6.61	2.48	1.63	0.61
	73-3988	292	1.56	0.53	0.98	0.34	7.70	2.64	2.07	0.71
	73-3989	345	1.76	0.51	0.93	0.27	8.48	2.46	2.07	0.60
	73-3990	310	1.70	0.55	0.95	0.31	7.51	2.42	1.99	0.64
	73-3991	294	1.62	0.55	1.00	0.34	8.00	2.72	2.00	0.68
	MEAN±S.D.	302±29	1.65±.08	0.55±.03	0.93±.08	0.31±.03	7.66±.69	2.54±.13	1.95±.18	0.65±.05
0.3	73-4043	293	1.81	0.62	0.97	0.33	7.84	2.68	2.02	0.69
	73-4044	278	1.82	0.65	0.99	0.36	6.92	2.49	1.84	0.66
	73-4045	294	1.75	0.60	1.02	0.35	7.12	2.42	2.00	0.68
	73-4046	303	1.67	0.55	0.96	0.32	7.54	2.49	2.01	0.66
	73-4047	282	1.61	0.57	0.99	0.35	6.92	2.45	1.87	0.66
	MEAN±S.D.	290±10	1.73±.09	0.60±.04	0.99±.02	0.34±.02	7.27±.41	2.51±.10	1.95±.09	0.67±.01
3	73-4022	267	1.72	0.64	0.89	0.33	6.41	2.40	1.82	0.68
	73-4023	296	1.74	0.59	1.09	0.37	7.69	2.60	2.19	0.74
	73-4024	303	1.68	0.55	1.02	0.34	7.72	2.55	2.06	0.68
	73-4025	287	1.72	0.60	1.03	0.36	7.90	2.75	2.01	0.70
	73-4026	283	1.71	0.60	0.99	0.35	7.58	2.68	1.82	0.64
	MEAN±S.D.	287±14	1.71±.02	0.60±.03	1.00±.07	0.35±.02	7.46±.60	2.60±.13	1.98±.16	0.69±.04
30	73-4015	292	1.74	0.60	0.97	0.33	7.18	2.46	1.99	0.68
	73-4016	312	1.78	0.57	1.00	0.32	8.09	2.59	2.03	0.65
	73-4017	301	1.69	0.56	0.99	0.33	8.10	2.69	2.21	0.73
	73-4018	314	1.72	0.55	1.08	0.34	7.93	2.53	2.25	0.72
	73-4019	283	1.79	0.63	0.89	0.31	7.10	2.51	1.98	0.70
	MEAN±S.D.	300±13	1.74±.04	0.58±.03	0.99±.07	0.33±.01	7.68±.50	2.56±.09	2.09±.13	0.70±.03
100	73-4008	299	1.67	0.56	0.98	0.33	7.77	2.60	1.98	0.66
	73-4009	287	1.60	0.56	0.92	0.32	7.67	2.67	1.96	0.68
	73-4010	297	1.78	0.60	1.05	0.35	7.41	2.49	2.10	0.71
	73-4011	290	1.68	0.58	1.11	0.38	7.79	2.69	2.18	0.75
	73-4012	282	1.88	0.67	0.98	0.35	7.20	2.55	1.96	0.70
	MEAN±S.D.	291±7	1.72±.11	0.59±.05	1.01±.07	0.35±.02	7.57±.26	2.60±.08	2.04±.10	0.70±.03

No significant difference from controls by analysis of variance and Dunnett's test, $P<0.05$.