

Table 8

Two generation reproductive toxicity study of BBP by oral administration in rats
 Food consumption of F₀ females during lactation period; Mean±S.D. (N)

Compound	Butyl benzyl phthalate			
	0 ^a	20	100	500
Days of lactation				
3-4	37.3 ± 6.3 (22)	38.2 ± 5.4 (20)	39.3 ± 5.1 (23)	36.6 ± 5.5 (24)
6-7	43.1 ± 5.2 (22)	44.7 ± 5.0 (20)	43.3 ± 3.8 (23)	41.7 ± 5.7 (24)
9-10	50.4 ± 6.2 (22)	50.1 ± 6.6 (20)	50.4 ± 4.6 (23)	47.7 ± 5.7 (24)

a: vehicle control, corn oil (2 mL/kg)

Table 9

Two generation reproductive toxicity study of BBP by oral administration in rats

Estrous cycle of F₀ females

Compound	Butyl benzyl phthalate			
	0 ^a	20	100	500
Dose (mg/kg)	0 ^a	20	100	500
Number of females examined	25	25	25	25
Mean length of estrous cycle in days				
Pre-treatment period; MeanS.D.	4.0 ± 0.0	4.0 ± 0.2	4.0 ± 0.2	4.0 ± 0.0
Treatment period; MeanS.D.	4.0 ± 0.1	4.1 ± 0.3	4.0 ± 0.1	4.1 ± 0.2
Number of animals showing each type of cycle during pre-treatment period				
4-day cycle	25	24	24	25
5-day cycle	0	1	1	0
Changes of estrous cycle after treatment				
Number of animals whose estrous cycle was not changed	24	24	24	23
Number of animals whose estrous cycle was changed	1	1	1	2
[Pre-treatment] → [Treatment]				
4-day → 5-day	0	0	0	1
4-day → 4/5-day	1	0	0	1
4-day → irregular	0	1	0	0
5-day → 4/5-day	0	0	1	0
Number of vaginal estrus during mating period; MeanS.D.	1.0 ± 0.0	1.0 ± 0.0	1.0 ± 0.2	1.1 ± 0.3

a: vehicle control, corn oil (2 mL/kg)

Table 10

Two generation reproductive toxicity study of BBP by oral administration in rats

Reproductive performance of F₀ animals

Compound	Butyl benzyl phthalate			
	0 ^a	20	100	500
Dose (mg/kg)				
Number of pairs examined (A)	25	25	25	25
Number of pairs successful copulation (B)	24	24	24	25
Copulation index [(B/A)×100,%]	96.0	96.0	96.0	100.0
Number of pregnant females (C)	22	20	23	24
Fertility index [(B/A)×100,%]	91.7	83.3	95.8	96.0
Pairing days until copulation	2.5 ± 1.2 (24)	3.2 ± 2.6 (24)	2.6 ± 1.4 (24)	3.2 ± 1.4 (25)
Mean±S.D.				

a: vehicle control, corn oil (2 mL/kg)

Table 11
Two generation reproductive toxicity study of BBP by oral administration in rats
Summary of macroscopic findings in F0 males

Group Grade	0 mg/kg		20 mg/kg		100 mg/kg		500 mg/kg	
	-	+	-	+	-	+	-	+
(Liver)	[25]		[25]		[25]		[25]	
Yellowish Area, dark	23	2	25	0	24	1	25	0
(Testis)	25	0	25	0	24	1	25	0
Small (Epididymis)	[25]		[25]		[25]		[25]	
Small Nodule, white, fat tissue (Kidney)	24	1	24	1	25	0	25	0
Cyst, right side Recessed area, cortex (Lung)	24	1	25	0	25	0	25	0
Spot, gray Area, dark, right lobe (Thymus)	25	0	24	1	25	0	25	0
Small (Thyroid gland)	[25]		[25]		[25]		[25]	
Enlargement	25	0	25	0	23	2	24	1
					25	0	24	1

- , Negative; +, Positive
[]. Number of animals examined

Table 12
Two generation reproductive toxicity study of BBP by oral administration in rats
Summary of macroscopic findings in F0 females

Group	0 mg/kg	20 mg/kg	100 mg/kg	500 mg/kg
Grade	-	-	-	-
	+	+	+	+
(Liver)	[25]	[25]	[25]	[25]
Enlargement	25	25	25	24
Diaphragmatic nodule	24	25	25	25
Area, pale	24	25	25	25
(Thymus)	[25]	[25]	[25]	[25]
Small	23	24	23	22
(Ovary)	[25]	[25]	[25]	[25]
Small	25	24	25	25
(Uterus)	[25]	[25]	[25]	[25]
Dilatation, lumen	25	25	25	23
(Pituitary gland)	[25]	[25]	[25]	[25]
Enlargement	25	24	25	25
(Kidney)	[25]	[25]	[25]	[25]
Recessed area, left side	25	24	25	25
Area, pale, cortex	25	25	24	25
(Lung)	[25]	[25]	[25]	[25]
Area, dark	25	25	24	25
(Skin)	[25]	[25]	[25]	[25]
Alopecia	25	25	24	25
(Stomach)	[25]	[25]	[25]	[25]
Area/spot, dark, mucosa,	25	25	24	25
glandular stomach	[25]	[25]	[25]	[25]
(Mammary gland)	25	25	25	24
Mass	[25]	[25]	[25]	[25]

- , Negative; +, Positive
[], Number of animals examined

Table 13

Two generation reproductive toxicity study of BBP by oral administration in rats
Organ weight of F₀ males; Mean±S.D. (N)

Compound	Butyl benzyl phthalate				
	Dose (mg/kg)	0 ^a	20	100	500
Terminal body weight (g)	593.2 ± 55.8 (25)	594.0 ± 52.6 (25)	593.2 ± 52.6 (25)	550.3 ± 50.0 * (25)	
Brain (g)	2.07 ± 0.08 ^b (25) 0.35 ± 0.03 ^c	2.07 ± 0.09 (25) 0.36 ± 0.03	2.08 ± 0.08 (25) 0.35 ± 0.03	2.09 ± 0.10 (25) 0.38 ± 0.04 **	
Heart (g)	1.50 ± 0.11 (25) 0.25 ± 0.03	1.46 ± 0.10 (25) 0.25 ± 0.02	1.49 ± 0.14 (25) 0.25 ± 0.02	1.43 ± 0.13 (25) 0.26 ± 0.02	
Lung (g)	1.41 ± 0.11 (25) 0.24 ± 0.02	1.44 ± 0.11 (25) 0.25 ± 0.02	1.43 ± 0.08 (25) 0.24 ± 0.01	1.40 ± 0.13 (25) 0.26 ± 0.02 *	
Liver (g)	19.08 ± 2.52 (25) 3.22 ± 0.30	18.58 ± 1.97 (25) 3.19 ± 0.24	19.27 ± 1.93 (25) 3.25 ± 0.19	21.21 ± 2.52 ** (25) 3.85 ± 0.27 **	
Spleen (g)	0.85 ± 0.12 (25) 0.14 ± 0.02	0.92 ± 0.13 (25) 0.16 ± 0.02	0.88 ± 0.12 (25) 0.15 ± 0.02	0.84 ± 0.10 (25) 0.15 ± 0.02	
Kidneys (g)	3.35 ± 0.40 (25) 0.57 ± 0.07	3.26 ± 0.29 (25) 0.56 ± 0.05	3.43 ± 0.33 (25) 0.58 ± 0.05	3.58 ± 0.29 * (25) 0.65 ± 0.06 **	
Adrenal glands (mg)	47.1 ± 6.1 (25) 8.0 ± 1.1	48.4 ± 6.1 (25) 8.3 ± 1.1	49.0 ± 5.7 (25) 8.3 ± 1.3	48.1 ± 7.0 (24) 8.8 ± 1.0	
Thymus (mg)	251.9 ± 60.9 (25) 42.5 ± 10.0	222.4 ± 65.2 (25) 38.5 ± 12.2	214.0 ± 35.3 (24) 36.5 ± 7.2	226.1 ± 68.5 (25) 41.2 ± 11.8	
Testes (g)	3.23 ± 0.58 (25) 0.55 ± 0.10	3.19 ± 0.55 (25) 0.55 ± 0.10	3.33 ± 0.34 (25) 0.56 ± 0.05	3.15 ± 0.28 (25) 0.58 ± 0.09	
Epididymides (g)	1.31 ± 0.21 (25) 0.22 ± 0.04	1.28 ± 0.15 (25) 0.22 ± 0.03	1.32 ± 0.09 (25) 0.22 ± 0.02	1.27 ± 0.10 (25) 0.23 ± 0.03	
Ventral prostate (g)	0.68 ± 0.17 (25) 0.12 ± 0.03	0.70 ± 0.17 (25) 0.12 ± 0.03	0.73 ± 0.16 (25) 0.12 ± 0.03	0.69 ± 0.19 (25) 0.13 ± 0.04	
Seminal vesicle (g)	2.10 ± 0.25 (25) 0.36 ± 0.06	2.06 ± 0.33 (25) 0.36 ± 0.07	2.06 ± 0.33 (24) 0.35 ± 0.07	2.03 ± 0.28 (25) 0.37 ± 0.06	
Prostate and seminal vesicle (g)	3.29 ± 0.31 (25) 0.56 ± 0.09	3.33 ± 0.44 (25) 0.57 ± 0.09	3.23 ± 0.36 (24) 0.55 ± 0.09	3.14 ± 0.44 (25) 0.58 ± 0.10	
Thyroid glands (mg)	20.5 ± 4.8 (25) 3.5 ± 0.9	21.0 ± 5.3 (25) 3.6 ± 1.0	22.0 ± 4.3 (25) 3.7 ± 0.8	20.5 ± 4.0 (25) 3.8 ± 1.0	
Pituitary gland (mg)	11.6 ± 1.6 (25) 2.0 ± 0.3	11.9 ± 1.7 (25) 2.0 ± 0.3	11.4 ± 1.4 (25) 1.9 ± 0.3	11.3 ± 1.5 (25) 2.1 ± 0.3	

a: vehicle control, corn oil (2 mL/kg)

b: absolute weight

c: relative weight (mg per 100g body weight)

*: significant difference from control, p<0.05

** : significant difference from control. n<0.01

Table 14

Two generation reproductive toxicity study of BBP by oral administration in rats
Organ weight of F₀ females on day 22 of lactation; Mean±S.D. (N)

Compound	Butyl benzyl phthalate			
	0 ^a	20	100	500
Dose (mg/kg)				
Terminal body weight (g)	353.9 ± 25.3 (22)	348.0 ± 18.2 (20)	352.0 ± 15.6 (23)	356.8 ± 21.3 (24)
Brain (g)	1.89 ± 0.06 ^b (22) 0.54 ± 0.04 ^c	1.87 ± 0.06 (20) 0.54 ± 0.03	1.86 ± 0.08 (23) 0.53 ± 0.03	1.88 ± 0.08 (24) 0.53 ± 0.04
Heart (g)	1.13 ± 0.11 (22) 0.32 ± 0.02	1.12 ± 0.09 (20) 0.32 ± 0.02	1.12 ± 0.08 (23) 0.32 ± 0.02	1.12 ± 0.07 (24) 0.32 ± 0.02
Lung (g)	1.18 ± 0.09 (22) 0.33 ± 0.02	1.16 ± 0.10 (20) 0.34 ± 0.03	1.15 ± 0.08 (23) 0.33 ± 0.02	1.14 ± 0.08 (24) 0.32 ± 0.02
Liver (g)	14.91 ± 1.14 (22) 4.22 ± 0.31	15.04 ± 1.46 (20) 4.32 ± 0.29	15.14 ± 1.48 (23) 4.30 ± 0.37	15.74 ± 1.29 (24) 4.41 ± 0.29
Spleen (g)	0.68 ± 0.08 (22) 0.19 ± 0.02	0.67 ± 0.09 (20) 0.19 ± 0.02	0.69 ± 0.10 (23) 0.20 ± 0.03	0.67 ± 0.10 (24) 0.19 ± 0.03
Kidneys (g)	2.21 ± 0.23 (22) 0.62 ± 0.05	2.28 ± 0.25 (20) 0.65 ± 0.06	2.36 ± 0.15* (23) 0.67 ± 0.03**	2.37 ± 0.19* (24) 0.66 ± 0.04*
Adrenal glands (mg)	65.8 ± 7.0 (22) 18.6 ± 1.8	65.5 ± 6.9 (20) 18.9 ± 2.3	69.1 ± 7.8 (23) 19.7 ± 2.5	66.7 ± 7.8 (24) 18.7 ± 2.3
Thymus (mg)	212.9 ± 59.3 (22) 60.3 ± 16.9	190.6 ± 55.0 (20) 54.9 ± 16.3	216.7 ± 66.2 (23) 61.4 ± 17.9	199.2 ± 63.9 (24) 56.1 ± 19.4
Ovary (mg)	103.0 ± 9.2 (22) 29.2 ± 3.1	103.2 ± 10.9 (20) 29.7 ± 3.3	99.1 ± 15.4 (23) 28.2 ± 4.7	92.1 ± 13.0* (24) 25.9 ± 3.9*
Uterus (g)	0.40 ± 0.11 (22) 0.11 ± 0.03	0.37 ± 0.13 (20) 0.11 ± 0.04	0.44 ± 0.09 (23) 0.13 ± 0.03	0.47 ± 0.19 (24) 0.13 ± 0.05
Thyroid glands (mg)	15.5 ± 3.4 (22) 4.4 ± 1.0	17.4 ± 2.5 (20) 5.0 ± 0.6	15.6 ± 3.3 (23) 4.4 ± 0.9	16.8 ± 3.0 (24) 4.7 ± 1.0
Pituitary gland (mg)	15.3 ± 2.1 (22) 4.4 ± 0.7	15.1 ± 2.1 (20) 4.4 ± 0.6	15.4 ± 2.2 (23) 4.4 ± 0.6	14.8 ± 2.0 (24) 4.2 ± 0.7

a: vehicle control, corn oil (2 mL/kg)

b: absolute weight

c: relative weight (mg per 100g body weight)

*: significant difference from control, p<0.05

**: significant difference from control, p<0.01

Table 15
Two generation reproductive toxicity study of BBP by oral administration in rats
Summary of histopathological findings in F0 male

Group Grade	0 mg/kg				20 mg/kg				100 mg/kg				500 mg/kg			
	-	±	+	Pos.	-	±	+	Pos.	-	±	+	Pos.	-	±	+	Pos.
(Testis)	[10]				[0]				[0]				[10]			
Atrophy, seminiferous tubule, bilateral	9	1	0	0	1								10	0	0	0
(Epididymis)	[10]				[0]				[0]				[10]			
Cell debris, lumen, bilateral	9	1	0	0	1								10	0	0	0
(Prostate)	[10]				[0]				[0]				[10]			
Cellular infiltration, lymphocyte, interstitium	6	3	1	0	0	4							6	3	1	0
Cellular infiltration, lymphocyte/neutrophil, epithelium	9	1	0	0	0	1							9	1	0	0
(Seminal vesicle & coagulating gland)	[10]				[0]				[0]				[10]			
No remarkable change																
(Liver)	[10]				[0]				[0]				[10]			
Fatty change, periportal	7	0	1	2	0	3							10	0	0	0
(Kidney)	[10]				[0]				[0]				[10]			
Eosinophilic body	3	3	3	1	0	7							5	2	2	1
Basophilic tubule, cortex	2	7	1	0	0	8							2	7	1	0
Cast, cortex/medulla	8	1	1	0	0	2							6	4	0	0
Cyst, medulla	9	1	0	0	0	1							10	0	0	0
Degeneration, vacuolar, with hyalin droplet, proximal tubular epithelium	9	0	1	0	0	1							10	0	0	0
Mineralization (Mammary gland)	7	3	0	0	0	3							10	0	0	0
No remarkable change	[8]				[0]				[0]				[9]			
(Thyroid gland)	[10]				[0]				[0]				[10]			
No remarkable change																
(Parathyroid gland)	[8]				[0]				[0]				[10]			
No remarkable change																
(Pituitary gland)	[10]				[0]				[0]				[10]			
No remarkable change																
(Adrenal gland)	[10]				[0]				[0]				[10]			
No remarkable change																
(Lung)	[1]				[0]				[0]				[0]			
Mineralization, artery	0	1	0	0	0	1							[0]			

-, Negative; ±, Very slight; +, Slight; ++, Moderate; +++, Severe; Pos., Total of positive grade
[], Number of animals examined

Table 16
Two generation reproductive toxicity study of BBP by oral administration in rats
Summary of histopathological findings in F0 female

Group Grade	0 mg/kg				20 mg/kg				100 mg/kg				500 mg/kg			
	-	±	+	Pos.	-	±	+	Pos.	-	±	+	Pos.	-	±	+	Pos.
(Ovary)	[10]				[0]				[0]				[10]			
Increase, atresia, follicle	9	0	1	0	1								9	0	1	0
Follicular cyst	10	0	0	0	0								9	0	1	0
(Uterus)	[10]				[0]				[0]				[10]			
No remarkable change	[10]				[0]				[0]				[10]			
No remarkable change	[10]				[0]				[0]				[10]			
(Liver)	[10]				[0]				[0]				[10]			
Fibrosis, capsule & subcapsule, diaphragmatic nodule	9	0	1	0	0	1							10	0	0	0
Granulation, subcapsule, focal	9	0	1	0	0	1							10	0	0	0
(Kidney)	[10]				[0]				[0]				[10]			
Basophilic tubule, cortex	8	2	0	0	0	2							5	4	1	0
Fibrosis, focal, subcapsule	9	1	0	0	0	1							10	0	0	0
(Mammary gland)	[10]				[0]				[0]				[10]			
Adenoma																
Atrophy, with cell debris, lumen, focal	9	0	1	0	0	1							10	0	0	0
Cellular infiltration, neutrophil	9	1	0	0	0	1							9	0	0	1
(Thyroid gland)	[10]				[0]				[0]				[10]			
Ectopic thymus	10	0	0	0	0	0							9	0	1	0
(Parathyroid gland)	[9]				[0]				[0]				[9]			
No remarkable change	[10]				[0]				[0]				[10]			
(Pituitary gland)	[10]				[0]				[0]				[10]			
No remarkable change	[10]				[0]				[0]				[10]			
(Adrenal gland)	[10]				[0]				[0]				[10]			
No remarkable change	[2]				[0]				[0]				[0]			
(Thymus)	[2]				[0]				[0]				[0]			
No remarkable change	[2]				[0]				[0]				[0]			

-, Negative; ±, Very slight; +, Slight; ++, Moderate; +++, Severe; Pos., Total of positive grade
[], Number of animals examined

Table 17
 Two generation reproductive toxicity study of BBP by oral administration in rats
 Epididymal sperm findings in F₀ males at 23 weeks of age; Mean±S.D. (N)

Compound	Butyl benzyl phthalate				
	0 ^a	20	100	500	
% of motile	96 ± 5 (24)	94 ± 5 (24)	94 ± 6 (25)	95 ± 4 (25)	
% of progressive	83 ± 7 (24)	80 ± 10 (24)	78 ± 11 (25)	81 ± 6 (25)	
Sperm counts ^b	1790.2 ± 505.3 (24)	1790.2 ± 467.3 (24)	1700.3 ± 328.5 (24)	1758.8 ± 476.2 (25)	

a: vehicle control, corn oil (2 mL/kg)

b: number of sperm per caudal epididymis weight (x10⁶/g)

Table 18

Two generation reproductive toxicity study of BBP by oral administration in rats

Serum concentrations of testosterone, luteinizing hormone (LH), follicle-stimulating hormone (FSH), thyroid-stimulating hormone (TSH), triiodothyronine (T3), thyroxine (T4) in F₀ males; Mean±S.D. (N)

Compound	Butyl benzyl phthalate			
	0 ^a	20	100	500
Testosterone (ng/mL)	3.5 ± 1.6 (25)	3.6 ± 1.9 (25)	2.7 ± 1.3 (25)	1.9 ± 1.1 ** (25)
LH (ng/mL)	11.5 ± 5.1 (25)	8.3 ± 2.2 * (25)	8.8 ± 2.1 (25)	10.7 ± 3.9 (25)
FSH (ng/mL)	161 ± 50 (25)	167 ± 37 (25)	197 ± 55 ** (25)	192 ± 33 ** (25)
TSH (ng/mL)	14.8 ± 3.1 (25)	13.4 ± 2.3 (25)	13.0 ± 2.3 * (25)	13.3 ± 2.0 (25)
T3 (ng/mL)	0.9 ± 0.2 (25)	0.9 ± 0.2 (25)	0.9 ± 0.2 (25)	0.8 ± 0.1 ** (24)
T4 (ng/mL)	71 ± 10 (25)	71 ± 11 (25)	68 ± 12 (25)	56 ± 9 ** (25)

a: vehicle control, corn oil (2 mL/kg)

*: significant difference from control, p<0.05

**: significant difference from control, p<0.01

Table 19

Two generation reproductive toxicity study of BBP by oral administration in rats

Serum concentrations of prolactin (PRL), luteinizing hormone (LH), follicle-stimulating hormone (FSH), thyroid-stimulating hormone (TSH), triiodothyronine (T3), thyroxine (T4), estradiol in F₀ females; Mean±S.D. (N)

Compound	Butyl benzyl phthalate			
	0 ^a	20	100	500
PRL (ng/mL)	47.0 ± 30.0 (22)	90.0 ± 126.9 (20)	64.7 ± 97.5 (24)	82.6 ± 79.8 * (24)
LH (ng/mL)	9.2 ± 2.0 (22)	9.0 ± 3.3 (20)	9.6 ± 3.2 (24)	16.4 ± 31.4 (24)
FSH (ng/mL)	287 ± 81 (22)	275 ± 83 (20)	252 ± 91 (24)	290 ± 98 (24)
TSH (ng/mL)	17.4 ± 2.8 (22)	19.5 ± 2.3 * (20)	17.5 ± 5.8 (24)	18.5 ± 3.6 (24)
T3 (ng/mL)	0.8 ± 0.1 (22)	0.9 ± 0.2 (20)	0.9 ± 0.2 (24)	0.9 ± 0.2 (24)
T4 (ng/mL)	56 ± 13 (22)	53 ± 8 (20)	47 ± 7 (24)	44 ± 10 ** (24)
Estradiol (pg/mL)	17.4 ± 10.9 (8)	11.7 ± 7.8 (5)	10.5 ± 5.5 (8)	22.5 ± 13.1 (9)

a: vehicle control, corn oil (2 mL/kg)

*: significant difference from control, p<0.05

**: significant difference from control, p<0.01

Table 20

Two generation reproductive toxicity study of BBP by oral administration in rats
Development F1 offspring up to weaning; Mean±S.D. (N)

Compound	Butyl benzyl phthalate							
	0 ^a		20		100		500	
Gestation period; days	21.9 ± 0.3 (22)	22.0 ± 0.0 (20)	21.7 ± 0.4 (23)	22.0 ± 0.2 (24)				
Implantations	14.3 ± 3.1 (22)	15.1 ± 2.1 (20)	15.9 ± 1.6 (23)	15.2 ± 2.5 (24)				
Delivery index; dam A)	100.0	100.0	100.0	100.0				
Day 0								
Fetuses delivered	13.3 ± 3.3 (22)	14.0 ± 2.4 (20)	15.1 ± 1.6 (23)	14.3 ± 2.6 (24)				
Delivery index; fetuses B)	93.0 ± 8.9 (22)	92.8 ± 9.6 (20)	95.4 ± 5.7 (23)	94.0 ± 6.7 (24)				
Live newborns	13.1 ± 3.3 (22)	13.9 ± 2.6 (20)	14.9 ± 1.7 (23)	14.0 ± 2.5 (24)				
Birth index C)	91.3 ± 9.4 (22)	91.9 ± 10.0 (20)	93.8 ± 7.4 (23)	92.7 ± 6.8 (24)				
Viability index D)	98.2 ± 4.1 (22)	99.0 ± 2.9 (20)	98.2 ± 3.8 (23)	98.6 ± 2.8 (24)				
Day 4								
Live offspring	13.1 ± 3.3 (22)	13.7 ± 2.6 (20)	14.8 ± 1.7 (23)	13.5 ± 2.4 (24)				
Viability index E)	100.0 ± 0.0 (22)	99.0 ± 2.6 (20)	99.5 ± 1.7 (23)	96.7 ± 4.8 ** (24)				
Offspring after culling	7.8 ± 0.9 (22)	8.0 ± 0.0 (20)	8.0 ± 0.0 (23)	7.9 ± 0.4 (24)				
Males	3.9 ± 0.9	3.8 ± 0.9	4.1 ± 0.3	4.0 ± 0.2				
Females	3.9 ± 0.8	4.2 ± 0.9	3.9 ± 0.3	4.0 ± 0.5				
Day 21								
Live offspring	7.7 ± 0.9 (22)	8.0 ± 0.0 (20)	8.0 ± 0.0 (23)	7.9 ± 0.4 (24)				
Males	3.9 ± 0.9	3.8 ± 0.9	4.1 ± 0.3	4.0 ± 0.2				
Females	3.9 ± 0.8	4.2 ± 0.9	3.9 ± 0.3	4.0 ± 0.5				
Weaning index F)	99.4 ± 2.7 (22)	100.0 ± 0.0 (20)	100.0 ± 0.0 (23)	100.0 ± 0.0 (24)				

A): Delivery index; dams = (no. of dams having live newborns / no. of pregnant females) x 100

B): Delivery index; fetuses = (no. of fetuses delivered / no. of implantations) x 100

C): Birth index = (no. of live newborns / no. of implantations) x 100

D): Viability index; Day 0 = (no. of live newborns / no. of offspring delivered) x 100

E): Viability index; Day 4 = (no. of live offspring on day 4 / no. of offspring on day 0) x 100

F): Weaning index = (no. of live offspring at weaning / no. of live offspring on day 4) x 100

a: vehicle control, corn oil (2 mL/kg)

***: Significant difference from control, p<0.01

Table 21

Two generation reproductive toxicity study of BBP by oral administration in rats
 Body weight of F₁ offspring up to weaning; Means±S.D. (Litter)

Compound	Dose (mg/kg)	Butyl benzyl phthalate			
		0 ^a	20	100	500
Day 0					
Male		6.8 ± 0.5 (22)	6.8 ± 0.4 (20)	6.4 ± 0.4 * (23)	6.3 ± 0.4 ** (24)
Female		6.4 ± 0.5 (22)	6.5 ± 0.4 (20)	6.0 ± 0.3 ** (23)	6.0 ± 0.4 ** (24)
Day 4 (After culling)					
Male		10.9 ± 1.5 (22)	11.2 ± 1.3 (20)	10.4 ± 1.1 (23)	10.2 ± 1.4 (24)
Female		10.4 ± 1.4 (22)	10.7 ± 1.2 (20)	9.8 ± 0.9 (23)	9.8 ± 1.3 (24)
Day 7					
Male		18.1 ± 1.8 (22)	18.4 ± 1.4 (20)	17.6 ± 1.4 (23)	17.1 ± 1.7 (24)
Female		17.4 ± 1.9 (22)	17.6 ± 1.4 (20)	16.5 ± 1.1 (23)	16.3 ± 1.7 (24)
Day 14					
Male		36.6 ± 2.7 (22)	36.7 ± 2.1 (20)	36.1 ± 2.3 (23)	33.8 ± 2.7 ** (24)
Female		35.4 ± 2.5 (22)	35.6 ± 2.1 (20)	34.3 ± 2.0 (23)	32.7 ± 2.4 ** (24)
Day 21					
Male		59.0 ± 4.3 (22)	59.8 ± 3.1 (20)	58.7 ± 4.1 (23)	54.9 ± 4.5 ** (24)
Female		56.6 ± 3.2 (22)	57.1 ± 2.9 (20)	55.6 ± 3.7 (23)	52.4 ± 4.0 ** (24)

a: vehicle control, corn oil (2 mL/kg)

*: significant difference from control, p<0.05

**: significant difference from control, p<0.01

Table 22

Two generation reproductive toxicity study of BBP by oral administration in rats
 Anogenital distance of F₁ pups at birth; Mean±S.D. (Litter)

Compound	Butyl benzyl phthalate			
	0 ^a	20	100	500
Male				
Anogenital distance (mm)	2.6 ± 0.2 (22)	2.6 ± 0.2 (20)	2.5 ± 0.1 (23)	2.4 ± 0.3 ** (24)
Body weight (g)	6.7 ± 0.5 (22)	6.8 ± 0.5 (20)	6.4 ± 0.4 * (23)	6.3 ± 0.4 ** (24)
Female				
Anogenital distance (mm)	1.2 ± 0.1 (22)	1.1 ± 0.1 (20)	1.2 ± 0.1 (23)	1.2 ± 0.1 * (24)
Body weight (g)	6.3 ± 0.5 (22)	6.4 ± 0.4 (20)	6.0 ± 0.4 * (23)	5.9 ± 0.4 ** (24)

a: vehicle control, corn oil (2 mL/kg)

*: significant difference from control, p<0.05

**: significant difference from control, p<0.01

Table 23

Two generation reproductive toxicity study of BBP by oral administration in rats
Behavioral and physical development F₁ males offspring; Means±D. (Litter)

Compound	Butyl benzyl phthalate			
	0 ^a	20	100	500
Behavioral development (days)				
Righting reflex	3.3 ± 1.1 (19)	3.2 ± 0.9 (19)	3.8 ± 1.4 (23)	2.8 ± 0.8 (24)
Cliff drop aversion response	6.3 ± 1.2 (19)	6.2 ± 0.8 (19)	7.9 ± 1.0 ** (23)	6.6 ± 0.9 (24)
Negative geotaxis	12.4 ± 1.1 (19)	11.6 ± 1.0 (19)	12.8 ± 1.3 (23)	12.7 ± 1.3 (24)
Physical development (days)				
Upper tooth eruption	10.2 ± 0.7 (19)	9.7 ± 0.7 (19)	9.9 ± 0.7 (23)	9.5 ± 1.0 ** (24)
Ear opening	13.2 ± 0.7 (19)	12.3 ± 0.4 ** (19)	12.5 ± 0.6 ** (23)	12.8 ± 0.6 (24)
Eyelid opening	15.0 ± 0.8 (19)	14.3 ± 0.5 ** (19)	14.9 ± 0.6 (23)	14.6 ± 0.7 (24)

a: vehicle control, corn oil (2 mL/kg)

** : significant difference from control, p<0.01

Table 24

Two generation reproductive toxicity study of BBP by oral administration in rats
Behavioral and physical development F₁ females offspring; Mean±S.D. (Litter)

Compound	Butyl benzyl phthalate			
	0 ^a	20	100	500
Behavioral development (days)				
Righting reflex	4.0 ± 1.3 (21)	3.8 ± 1.0 (19)	4.1 ± 1.4 (23)	3.2 ± 0.9 (23)
Cliff drop aversion response	6.8 ± 1.2 (21)	6.3 ± 0.8 (19)	7.5 ± 1.2 (23)	6.6 ± 0.9 (23)
Negative geotaxis	12.4 ± 1.1 (21)	11.7 ± 1.0 (19)	12.6 ± 1.1 (23)	12.7 ± 1.1 (23)
Physical development (days)				
Upper tooth eruption	10.0 ± 0.9 (21)	9.7 ± 0.8 (19)	9.9 ± 0.8 (23)	9.5 ± 0.9 (23)
Ear opening	13.0 ± 0.9 (21)	12.3 ± 0.5 ** (19)	12.4 ± 0.7 ** (23)	12.7 ± 0.6 (23)
Eyelid opening	14.7 ± 0.8 (21)	14.2 ± 0.5 * (19)	14.8 ± 0.7 (23)	14.6 ± 0.6 (23)

a: vehicle control, corn oil (2 mL/kg)

*: significant difference from control, p<0.05

**: significant difference from control, p<0.01

Table 25

Two generation reproductive toxicity study of BBP by oral administration in rats
 Morphological observations of F₁ live pups at birth

Compound	Butyl benzyi phthalate		
	0 ^a	20	100
Dose (mg/kg)	0	20	100
Number of live pups examined	288	277	342
<u>External abnormalities</u>			
Number of pups	0	0	1
<u>Types and number</u>			
Anasarca	0	0	1

a: vehicle control, corn oil (2 mL/kg)

Table 26

Two generation reproductive toxicity study of BBP by oral administration in rats
 Morphological observations of F₁ dead pups during lactation period

Compound	Butyl benzyl phthalate			
	0 ^a	20	100	500
Dose (mg/kg)				
Number of dead pups ^b	6	5	8	17
Number of dead pups collected	5	3	6	7
<u>External abnormalities</u>				
Number of pups	0	0	0	0
<u>Visceral abnormalities</u>				
Number of pups	0	0	0	0

a: vehicle control, corn oil (2 mL/kg)

b: including missing pups

Table 27

Two generation reproductive toxicity study of BBP by oral administration in rats
 Morphological observations of F₁ pups culled on postnatal day 4

Compound	Butyl benzy1 phtalate		
	0 ^a	20	100
Dose (mg/kg)			500
Number of pups examined	117	114	135
<u>External abnormalities</u>			
Number of pups	0	0	0
<u>Visceral abnormalities</u>			
Number of pups	0	0	0

a: vehicle control, corn oil (2 mL/kg)