

Table 28

Two generation reproductive toxicity study of BBP by oral administration in rats  
Morphological observations of F1 weanlings

Compound	Butyl benzyl phthalate			
	0 <sup>a</sup>	20	100	500
Number of weanlings examined	82	82	92	94
<u>External abnormalities</u>				
Number of weanlings	0	0	0	0
<u>Visceral abnormalities</u>				
Number of pups	0	0	0	4
<u>Types and number</u>				
Atrophy thymus	0	0	0	1
Liver and diaphragm adhesion	0	0	0	1
Small epididymis	0	0	0	3
<u>Visceral variations</u>				
Number of pups	0	0	1	0
<u>Types and number</u>				
Dilatation of renal pelvis	0	0	1	0

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

Table 29

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

Organ weight of F<sub>1</sub> male weanlings; Mean±S.D. (N)

Compound	Butyl benzyl phthalate				
	0 <sup>a</sup>	20	100	500	
Terminal body weight (g)	62.8 ± 4.4 (41)	64.1 ± 4.2 (37)	63.5 ± 5.0 (48)	59.1 ± 5.8 ** (47)	
Testes (mg)	284.4 ± 24.5 <sup>b</sup> (41)	297.1 ± 36.2 (36)	285.5 ± 40.1 (48)	251.4 ± 34.6 ** (47)	
	453.3 ± 31.7 <sup>c</sup> (41)	463.0 ± 40.1 (36)	448.7 ± 45.4 (48)	426.1 ± 45.5 ** (47)	
Epididymides (mg)	46.6 ± 6.7 (41)	50.0 ± 7.7 (36)	46.1 ± 6.8 (48)	42.4 ± 7.6 * (46)	
	74.2 ± 9.8 (41)	78.0 ± 11.6 (36)	72.6 ± 9.6 (48)	72.0 ± 13.0 (46)	
Prostate and seminal vesicle (mg)	75.8 ± 15.4 (41)	77.0 ± 14.7 (37)	75.1 ± 16.1 (48)	68.6 ± 14.1 (47)	
	120.9 ± 24.1 (41)	120.4 ± 22.8 (37)	118.8 ± 25.7 (48)	116.8 ± 24.2 (47)	

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

b: absolute weight

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

\*: significant difference from control, p&lt;0.05

\*\*: significant difference from control, p&lt;0.01

Table 30

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

Organ weight of F1 female weanlings; Mean±S.D. (N)

Compound	Butyl benzyi phthalate				
	0 <sup>a</sup>	20	100	500	
Dose (mg/kg)					
Terminal body weight (g)	61.1 ± 4.5 (41)	61.7 ± 4.4 (45)	60.3 ± 4.8 (44)	55.7 ± 7.3 ** (47)	
Ovary					
(mg)	19.8 ± 3.5 <sup>b</sup> (41)	19.4 ± 4.5 (45)	18.5 ± 3.8 (44)	16.7 ± 3.1 ** (46)	
	32.5 ± 5.3 <sup>c</sup> (41)	31.4 ± 6.9 (45)	30.6 ± 5.8 (44)	29.7 ± 4.5 (46)	
Uterus					
(mg)	28.4 ± 5.0 (41)	28.0 ± 5.0 (45)	29.2 ± 4.2 (44)	29.1 ± 4.5 (47)	
	46.8 ± 8.4 (41)	45.5 ± 8.4 (45)	48.5 ± 6.8 (44)	53.0 ± 9.5 ** (47)	

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

b: absolute weight

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

\*\*: significant difference from control, p&lt;0.01

Table 31  
Two generation reproductive toxicity study of BBP by oral administration in rats  
Summary of histopathological findings in F1 male at weaning

Group	0 mg/kg	20 mg/kg	100 mg/kg	500 mg/kg
Grade	- ± † †† Pos.	- ± † †† Pos.	- ± † †† Pos.	- ± † †† Pos.
(Testis)	[10]	[10]	[10]	[10]
Atrophy, seminiferous tubule, bilateral	10 0 0 0 0	10 0 0 0 0	10 0 0 0 0	9 0 0 0 1
Decrease, spermatocyte, seminiferous tubule, bilateral	10 0 0 0 0	9 1 0 0 0	10 0 0 0 0	1 2 5 1 1** 9##
Decrease, spermatogonia, seminiferous tubule, bilateral	10 0 0 0 0	10 0 0 0 0	10 0 0 0 0	7 1 1 0 1 3
Hyperplasia, leydig cell, bilateral	10 0 0 0 0	10 0 0 0 0	10 0 0 0 0	9 0 1 0 0 1
(Epididymis)	[10]	[0]	[0]	[10]
No remarkable change	[10]	[0]	[0]	[10]
(Prostate: ventral lobe)	[10]	[0]	[0]	[10]
No remarkable change	[10]	[0]	[0]	[10]
(Seminial vesicle & coagulating gland)	[10]	[0]	[0]	[10]
No remarkable change	[10]	[0]	[0]	[10]

- , Negative; ±, Very slight; †, Slight; ††, Moderate; †††, Severe; Pos., Total of positive grade

[ ], Number of animals examined

\*\* , Significantly different from control p<0.01 (Two-tailed Mann-Whitney U test)

## , Significantly different from control p<0.01 (One-tailed Fisher exact test)

Table 32  
 Two generation reproductive toxicity study of BBP by oral administration in rats  
 Summary of histopathological findings in F1 female at weaning

Group Grade	0 mg/kg - ±	20 mg/kg - ±	100 mg/kg - ±	500 mg/kg - ±
(Ovary)	[10]	[10]	[10]	[10]
Hypoplasia, vesicular follicle, bilateral	10 0 0 0 0	10 0 0 0 0	10 0 0 0 0	9 0 0 0 1
Hypoplasia, vesicular follicle, unilateral	9 1 0 0 0	10 0 0 0 0	9 1 0 0 0	8 1 1 0 0
Increase, atresia, follicle, with degenerated oocyte (Uterus)	9 1 0 0 0	9 1 0 0 0	9 1 0 0 0	9 1 0 0 0
No remarkable change	[10]	[0]	[0]	[10]

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

Table 33

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 F1 male weanlings; Mean±S.D. (N)

Compound	Butyl benzyl phthalate			
	0 <sup>a</sup>	20	100	500
Testosterone (ng/mL)	0.9 ± 0.5 ( 18)	1.2 ± 0.6 ( 19)	0.8 ± 0.5 ( 23)	0.9 ± 0.6 ( 23)
LH (ng/mL)	5.9 ± 1.6 ( 19)	6.3 ± 1.3 ( 19)	6.7 ± 1.8 ( 23)	5.4 ± 1.0 ( 24)
FSH (ng/mL)	213 ± 98 ( 19)	170 ± 40 ( 19)	163 ± 43 ( 23)	136 ± 39 ** ( 24)
TSH (ng/mL)	11.2 ± 1.7 ( 19)	11.1 ± 2.4 ( 19)	9.5 ± 2.1 * ( 23)	9.1 ± 2.0 ** ( 24)
T3 (ng/mL)	1.3 ± 0.3 ( 19)	1.6 ± 0.3 ** ( 19)	1.4 ± 0.3 ( 23)	1.2 ± 0.2 ( 24)
T4 (ng/mL)	50 ± 9 ( 19)	52 ± 6 ( 19)	51 ± 7 ( 23)	51 ± 9 ( 24)

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

\*: significant difference from control, p&lt;0.05

\*\*: significant difference from control, p&lt;0.01

Table 34

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 F<sub>1</sub> females weanlings; Means.D. (N)

Compound	Butyl benzyl phthalate			
	0 <sup>a</sup>	20	100	500
PRL (ng/mL)	15.0 ± 6.0 (21)	17.6 ± 7.6 (19)	15.0 ± 5.5 (23)	17.1 ± 12.2 (23)
LH (ng/mL)	6.1 ± 2.2 (21)	7.0 ± 2.2 (19)	7.6 ± 2.0 (23)	6.8 ± 2.6 (23)
FSH (ng/mL)	160 ± 44 (21)	149 ± 25 (19)	166 ± 50 (23)	158 ± 51 (23)
TSH (ng/mL)	9.3 ± 1.5 (21)	9.6 ± 1.4 (19)	9.3 ± 2.6 (23)	10.1 ± 2.3 (23)
T3 (ng/mL)	1.8 ± 0.2 (21)	1.8 ± 0.2 (19)	1.5 ± 0.4 ** (23)	1.2 ± 0.1 ** (23)
T4 (ng/mL)	54 ± 8 (21)	56 ± 9 (19)	56 ± 9 (23)	59 ± 9 (23)
Estradiol (pg/mL)	23.8 ± 8.0 (19)	23.2 ± 8.5 (19)	24.7 ± 8.2 (22)	28.6 ± 8.0 (23)

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

\*: significant difference from control, p&lt;0.05

\*\*: significant difference from control, p&lt;0.01

Table 35

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

Body weight of F1 males after weaning; Mean±S.D. (N)

Compound	Butyl benzyl phthalate			
	0 <sup>a</sup>	20	100	500
Days of age				
21	58.6 ± 4.3 ( 85)	59.5 ± 3.8 ( 76)	58.7 ± 4.3 ( 94)	55.0 ± 5.1 ** ( 95)
28	102.5 ± 6.4 ( 44)	102.6 ± 4.9 ( 39)	99.6 ± 7.4 ( 46)	94.0 ± 7.9 ** ( 48)
35	160.4 ± 11.5 ( 44)	159.7 ± 10.4 ( 39)	156.2 ± 12.8 ( 46)	151.8 ± 13.5 * ( 48)
42	223.3 ± 19.7 ( 44)	220.9 ± 15.7 ( 39)	219.5 ± 17.7 ( 46)	215.6 ± 20.2 ( 48)
49	289.3 ± 28.1 ( 44)	283.3 ± 21.6 ( 39)	283.1 ± 22.1 ( 46)	276.3 ± 24.9 ( 48)
56	346.2 ± 35.7 ( 44)	339.1 ± 27.1 ( 39)	338.1 ± 25.9 ( 46)	330.4 ± 29.7 ( 48)
63	398.3 ± 39.7 ( 44)	391.2 ± 29.7 ( 39)	388.6 ± 30.0 ( 46)	375.2 ± 33.8 * ( 48)
70	439.7 ± 43.5 ( 44)	431.8 ± 31.9 ( 39)	426.3 ± 33.1 ( 46)	410.3 ± 40.1 ** ( 48)
77	485.2 ± 48.7 ( 22)	473.0 ± 27.4 ( 20)	457.8 ± 38.7 ( 23)	446.7 ± 36.3 ** ( 24)
84	516.4 ± 49.9 ( 22)	506.0 ± 31.7 ( 20)	488.7 ± 44.5 ( 23)	476.6 ± 38.7 ** ( 24)
91	550.1 ± 55.1 ( 22)	534.1 ± 35.1 ( 20)	517.0 ± 46.9 * ( 23)	504.0 ± 43.2 ** ( 24)

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

\*: significant difference from control, p&lt;0.05

\*\*: significant difference from control, p&lt;0.01



Table 36

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

Body weight of F1 females after weaning; Mean±S.D. (N)

Compound	Butyl benzyl phthalate				
	0 <sup>a</sup>	20	100	500	
Days of age					
21	56.7 ± 4.0 ( 85)	57.3 ± 3.7 ( 84)	55.6 ± 4.2 ( 90)	52.2 ± 5.4 ** ( 95)	
28	92.2 ± 5.6 ( 44)	94.7 ± 5.6 ( 39)	90.8 ± 6.3 ( 46)	86.9 ± 6.5 ** ( 48)	
35	136.1 ± 9.6 ( 44)	138.1 ± 9.1 ( 39)	133.2 ± 9.7 ( 46)	130.5 ± 10.2 ( 48)	
42	169.4 ± 12.4 ( 44)	172.2 ± 11.7 ( 39)	167.6 ± 13.3 ( 46)	164.2 ± 12.8 ( 48)	
49	199.6 ± 14.7 ( 44)	199.7 ± 12.0 ( 39)	196.8 ± 15.5 ( 46)	191.8 ± 15.7 ( 48)	
56	226.8 ± 16.3 ( 44)	226.8 ± 16.5 ( 39)	220.8 ± 19.3 ( 46)	215.0 ± 16.8 * ( 48)	
63	249.6 ± 18.1 ( 44)	250.5 ± 18.8 ( 39)	244.9 ± 21.7 ( 46)	237.5 ± 19.3 * ( 48)	
70	267.4 ± 19.9 ( 44)	267.7 ± 21.6 ( 39)	264.3 ± 24.5 ( 46)	253.9 ± 19.7 * ( 48)	
77	277.2 ± 17.4 ( 22)	278.3 ± 21.0 ( 20)	280.7 ± 29.0 ( 23)	273.1 ± 21.1 ( 24)	
84	290.3 ± 17.2 ( 22)	290.1 ± 21.9 ( 20)	292.4 ± 27.6 ( 23)	287.4 ± 22.7 ( 24)	
91	299.3 ± 19.0 ( 22)	300.7 ± 25.8 ( 20)	306.0 ± 29.4 ( 23)	299.6 ± 24.7 ( 24)	

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

\*: significant difference from control, p&lt;0.05

\*\*: significant difference from control, p&lt;0.01

Table 37

Two generation reproductive toxicity study of BBP by oral administration in rats  
 Body weight of F1 females during gestation period; Mean±S.D. (N)

Compound	Butyl benzyl phthalate			
	0 <sup>a</sup>	20	100	500
Days of gestation				
0	312.2 ± 22.0 ( 17)	309.0 ± 25.9 ( 15)	317.6 ± 28.1 ( 21)	305.6 ± 26.3 ( 17)
7	338.2 ± 22.9 ( 17)	335.7 ± 26.3 ( 15)	344.5 ± 31.8 ( 21)	331.4 ± 30.1 ( 17)
14	369.3 ± 22.7 ( 17)	375.0 ± 26.2 ( 15)	381.2 ± 35.3 ( 21)	366.4 ± 31.1 ( 17)
20	437.8 ± 36.9 ( 17)	449.7 ± 29.1 ( 15)	451.6 ± 40.9 ( 21)	434.4 ± 39.3 ( 17)

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

\*: significant difference from control, p<0.05

\*\*: significant difference from control, p<0.01

Table 38

Two generation reproductive toxicity study of BBP by oral administration in rats  
 Body weight of F1 females during lactation period; Mean±S.D. (N)

Compound	Butyl benzyl phthalate			
	0 <sup>a</sup>	20	100	500
Days of lactation				
0	357.7 ± 29.6 ( 16)	356.0 ± 28.4 ( 15)	371.5 ± 34.7 ( 21)	356.8 ± 36.3 ( 17)
4	351.7 ± 26.5 ( 16)	355.4 ± 24.5 ( 15)	364.4 ± 37.4 ( 21)	361.1 ± 33.5 ( 17)
7	357.8 ± 25.6 ( 16)	363.2 ± 23.1 ( 15)	371.6 ± 33.3 ( 21)	365.2 ± 31.4 ( 17)
14	377.8 ± 23.6 ( 16)	381.6 ± 25.2 ( 15)	388.4 ± 29.0 ( 21)	378.9 ± 29.1 ( 17)
21	360.7 ± 21.1 ( 16)	364.3 ± 19.3 ( 15)	366.0 ± 25.3 ( 21)	362.3 ± 28.5 ( 17)

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

\*: significant difference from control, p<0.05

\*\*: significant difference from control, p<0.01

Table 39

Two generation reproductive toxicity study of BBP by oral administration in rats  
 Food consumption of F<sub>1</sub> males after weaning; Mean±S.D. (Litter)

Compound	Butyl benzyl phthalate			
	0 <sup>a</sup>	20	100	500
Days of age				
23-24	10.4 ± 1.0 ( 22)	10.9 ± 0.9 ( 20)	9.8 ± 1.0 ( 23)	9.4 ± 1.0 ** ( 24)
30-31	16.8 ± 1.5 ( 22)	16.8 ± 1.5 ( 20)	15.9 ± 1.7 ( 23)	16.2 ± 1.3 ( 24)
37-38	22.2 ± 2.5 ( 22)	22.1 ± 1.9 ( 20)	22.0 ± 2.6 ( 23)	22.9 ± 2.5 ( 24)
44-45	26.0 ± 3.5 ( 22)	25.7 ± 2.3 ( 20)	25.8 ± 2.4 ( 23)	25.9 ± 2.7 ( 24)
51-52	29.0 ± 2.9 ( 22)	29.0 ± 2.1 ( 20)	28.5 ± 2.4 ( 23)	28.5 ± 2.4 ( 24)
58-59	29.5 ± 3.4 ( 22)	29.8 ± 2.9 ( 20)	29.2 ± 2.4 ( 23)	30.5 ± 2.7 ( 24)
65-66	29.7 ± 3.5 ( 22)	29.2 ± 3.6 ( 20)	28.6 ± 3.0 ( 23)	29.2 ± 3.2 ( 24)
72-73	29.8 ± 3.0 ( 22)	28.6 ± 2.6 ( 20)	28.8 ± 2.9 ( 23)	29.0 ± 3.7 ( 24)
79-80	29.1 ± 7.1 ( 22)	30.8 ± 3.7 ( 20)	29.4 ± 3.3 ( 23)	30.9 ± 3.5 ( 24)
86-87	30.9 ± 4.7 ( 22)	30.7 ± 3.1 ( 20)	30.0 ± 3.3 ( 23)	31.0 ± 4.5 ( 24)

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

\*\* : significant difference from control, p<0.01

Table 40

Two generation reproductive toxicity study of BHP by oral administration in rats  
 Food consumption of F<sub>1</sub> females after weaning; Mean±S.D. (Litter)

Compound	Butyl benzyl phthalate			
	0 <sup>a</sup>	20	100	500
Days of age				
23-24	9.4 ± 1.1 (22)	10.3 ± 1.3* (20)	9.2 ± 1.0 (23)	8.9 ± 0.9 (24)
30-31	14.6 ± 1.3 (22)	15.3 ± 1.3 (20)	14.3 ± 1.3 (23)	14.3 ± 1.3 (24)
37-38	17.5 ± 2.1 (22)	18.3 ± 1.7 (20)	17.8 ± 1.6 (23)	17.8 ± 1.6 (24)
44-45	19.2 ± 2.1 (22)	19.1 ± 1.5 (20)	18.8 ± 2.1 (23)	18.9 ± 2.1 (24)
51-52	19.7 ± 1.8 (22)	19.8 ± 2.1 (20)	19.8 ± 2.2 (23)	20.4 ± 1.9 (24)
58-59	20.2 ± 2.5 (22)	20.8 ± 2.4 (20)	20.0 ± 2.1 (23)	20.7 ± 2.3 (24)
65-66	19.5 ± 2.8 (22)	20.4 ± 2.3 (20)	20.2 ± 2.6 (23)	19.9 ± 2.4 (24)
72-73	20.6 ± 2.0 (22)	20.2 ± 2.6 (20)	20.5 ± 2.5 (23)	20.8 ± 2.3 (24)
79-80	20.5 ± 2.3 (22)	19.4 ± 3.1 (20)	19.7 ± 2.4 (23)	21.6 ± 3.2 (24)
86-87	19.8 ± 2.7 (22)	20.3 ± 2.8 (20)	20.6 ± 3.0 (23)	21.7 ± 3.4 (24)

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

\*: significant difference from control, p<0.05

Table 41

Two generation reproductive toxicity study of BBP by oral administration in rats  
 Food consumption of F<sub>1</sub> females during gestation period; Mean±S.D. (N)

Compound	Butyl benzyl phthalate			
	0 <sup>a</sup>	20	100	500
Days of gestation				
1-2	22.5 ± 3.8 ( 17)	22.1 ± 2.7 ( 15)	21.7 ± 3.9 ( 21)	22.8 ± 4.3 ( 17)
7-8	24.4 ± 3.2 ( 17)	24.2 ± 2.4 ( 15)	25.7 ± 3.1 ( 21)	25.6 ± 3.5 ( 17)
13-14	25.2 ± 3.6 ( 17)	25.8 ± 2.7 ( 15)	26.1 ± 2.9 ( 21)	25.7 ± 3.3 ( 17)
19-20	23.2 ± 3.3 ( 17)	24.5 ± 2.4 ( 15)	24.2 ± 3.9 ( 21)	24.7 ± 3.9 ( 17)

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

Table 42

Two generation reproductive toxicity study of BBP by oral administration in rats  
 Food consumption of F<sub>1</sub> females during lactation period; Mean±S.D. (N)

Compound	Butyl benzyl phthalate			
	0 <sup>a</sup>	20	100	500
Days of lactation				
3-4	35.7 ± 7.0 ( 16)	35.9 ± 7.2 ( 15)	34.2 ± 8.5 ( 21)	42.6 ± 23.3 ( 17)
6-7	41.7 ± 3.7 ( 16)	44.4 ± 5.6 ( 15)	43.5 ± 6.8 ( 21)	39.7 ± 5.2 ( 17)
9-10	51.3 ± 4.9 ( 16)	53.0 ± 7.0 ( 15)	50.9 ± 5.8 ( 21)	45.6 ± 5.0 * ( 17)

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

\*: significant difference from control, p<0.05

Table 43

Two generation reproductive toxicity study of BBP by oral administration in rats  
Open field test in F<sub>1</sub> males; Mean±S.D. (N)

Compound	Butyl benzyl phthalate							
	0 <sup>a</sup>		20		100		500	
<u>The first day</u>								
Latency (sec.)	21 ± 18 (22)	15 ± 15 (19)	14 ± 10 (23)	13 ± 13 (24)				
Ambulation (cm)	957 ± 518 (22)	964 ± 428 (19)	1464 ± 526 ** (23)	1216 ± 527 (24)				
Rearing (no.)	5 ± 4 (22)	4 ± 3 (19)	5 ± 3 (23)	5 ± 3 (24)				
Grooming (no.)	0 ± 0 (22)	0 ± 0 (19)	0 ± 0 (23)	0 ± 1 (24)				
Defecation (no.)	2 ± 2 (22)	2 ± 1 (19)	1 ± 1 (23)	2 ± 2 (24)				
Urination (no.)	0 ± 1 (22)	0 ± 1 (19)	0 ± 1 (23)	0 ± 1 (24)				
<u>The second day</u>								
Latency (sec.)	12 ± 11 (22)	12 ± 12 (19)	5 ± 6 * (23)	8 ± 6 (24)				
Ambulation (cm)	1359 ± 613 (22)	1586 ± 653 (19)	1885 ± 1056 (23)	1399 ± 905 (24)				
Rearing (no.)	4 ± 3 (22)	4 ± 3 (19)	5 ± 3 (23)	5 ± 4 (24)				
Grooming (no.)	1 ± 1 (22)	1 ± 1 (19)	1 ± 1 (23)	1 ± 1 (24)				
Defecation (no.)	1 ± 1 (22)	1 ± 2 (19)	1 ± 1 (23)	1 ± 2 (24)				
Urination (no.)	0 ± 1 (22)	0 ± 0 (19)	0 ± 1 (23)	0 ± 1 (24)				
<u>The third day</u>								
Latency (sec.)	4 ± 4 (22)	5 ± 4 (19)	4 ± 5 (23)	9 ± 16 (24)				
Ambulation (cm)	1921 ± 654 (22)	2100 ± 750 (19)	2522 ± 1144 (23)	1740 ± 943 (24)				
Rearing (no.)	6 ± 4 (22)	6 ± 3 (19)	9 ± 7 (23)	7 ± 6 (24)				
Grooming (no.)	1 ± 1 (22)	1 ± 1 (19)	1 ± 1 (23)	1 ± 1 (24)				
Defecation (no.)	1 ± 1 (22)	1 ± 1 (19)	1 ± 2 (23)	2 ± 2 (24)				
Urination (no.)	0 ± 0 (22)	0 ± 1 (19)	1 ± 1 (23)	0 ± 1 (24)				

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

\*: significant difference from control, p<0.05

\*\* : significant difference from control, p<0.01



Table 44

Two generation reproductive toxicity study of BBP by oral administration in rats  
Open field test in F<sub>1</sub> females; Mean±S.D. (N)

Compound	Butyl benzyl phthalate				
	Dose (mg/kg)	0 <sup>a</sup>	20	100	500
<u>The first day</u>					
Latency (sec.)	15 ± 15 (22)	12 ± 17 (19)	14 ± 11 (23)	14 ± 11 (23)	14 ± 13 (24)
Ambulation (cm)	1730 ± 646 (22)	1740 ± 672 (19)	1784 ± 653 (23)	1852 ± 599 (24)	1852 ± 599 (24)
Rearing (no.)	7 ± 4 (22)	7 ± 4 (19)	7 ± 5 (23)	8 ± 4 (24)	8 ± 4 (24)
Grooming (no.)	0 ± 0 (22)	0 ± 1 (19)	0 ± 0 (23)	0 ± 1 (24)	0 ± 1 (24)
Defecation (no.)	1 ± 1 (22)	1 ± 1 (19)	1 ± 1 (23)	0 ± 1 (24)	0 ± 1 (24)
Urination (no.)	0 ± 1 (22)	0 ± 0* (19)	0 ± 1 (23)	0 ± 0 (24)	0 ± 0 (24)
<u>The second day</u>					
Latency (sec.)	6 ± 5 (22)	5 ± 6 (19)	9 ± 10 (23)	8 ± 6 (24)	8 ± 6 (24)
Ambulation (cm)	2181 ± 913 (22)	2409 ± 1071 (19)	2339 ± 1083 (23)	2330 ± 735 (24)	2330 ± 735 (24)
Rearing (no.)	6 ± 4 (22)	8 ± 5 (19)	7 ± 5 (23)	8 ± 5 (24)	8 ± 5 (24)
Grooming (no.)	1 ± 1 (22)	1 ± 1 (19)	1 ± 1 (23)	1 ± 1 (24)	1 ± 1 (24)
Defecation (no.)	1 ± 1 (22)	0 ± 1 (19)	0 ± 0 (23)	0 ± 0 (24)	0 ± 0 (24)
Urination (no.)	0 ± 0 (22)	0 ± 0 (19)	0 ± 0 (23)	0 ± 0 (24)	0 ± 0 (24)
<u>The third day</u>					
Latency (sec.)	4 ± 4 (22)	2 ± 3 (19)	4 ± 4 (23)	4 ± 4 (24)	4 ± 4 (24)
Ambulation (cm)	2623 ± 1005 (22)	2832 ± 896 (19)	2708 ± 1110 (23)	2826 ± 750 (24)	2826 ± 750 (24)
Rearing (no.)	8 ± 5 (22)	9 ± 4 (19)	9 ± 5 (23)	8 ± 4 (24)	8 ± 4 (24)
Grooming (no.)	1 ± 1 (22)	1 ± 1 (19)	1 ± 1 (23)	1 ± 1 (24)	1 ± 1 (24)
Defecation (no.)	1 ± 1 (22)	0 ± 0* (19)	0 ± 0 (23)	0 ± 0* (24)	0 ± 0* (24)
Urination (no.)	0 ± 0 (22)	0 ± 0 (19)	0 ± 0 (23)	0 ± 0 (24)	0 ± 0 (24)

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

\*: significant difference from control, p<0.05

Table 45

Two generation reproductive toxicity study of BBP by oral administration in rats  
 Water multiple T-maze test in F1 males; Mean±S.D. (N)

Compound	Butyl benzyl phthalate				
	0 <sup>a</sup>	20	100	500	
<u>The first day</u>					
1st trial	Time (sec.)	52 ± 24 ( 21)	48 ± 23 ( 19)	48 ± 15 ( 23)	51 ± 18 ( 23)
	Error (no.)	11 ± 6 ( 21)	11 ± 5 ( 19)	11 ± 5 ( 23)	10 ± 5 ( 23)
2nd trial	Time (sec.)	38 ± 14 ( 20)	53 ± 28 ( 18)	51 ± 28 ( 21)	45 ± 24 ( 23)
	Error (no.)	8 ± 4 ( 20)	12 ± 6 ( 18)	10 ± 6 ( 21)	8 ± 5 ( 23)
3rd trial	Time (sec.)	33 ± 18 ( 22)	34 ± 32 ( 19)	33 ± 19 ( 23)	43 ± 33 ( 24)
	Error (no.)	6 ± 5 ( 22)	6 ± 6 ( 19)	5 ± 5 ( 23)	8 ± 8 ( 24)
<u>The second day</u>					
1st trial	Time (sec.)	38 ± 26 ( 22)	35 ± 24 ( 18)	29 ± 17 ( 23)	49 ± 28 ( 24)
	Error (no.)	6 ± 8 ( 22)	8 ± 7 ( 18)	5 ± 5 ( 23)	10 ± 8 ( 24)
2nd trial	Time (sec.)	19 ± 8 ( 22)	25 ± 17 ( 19)	18 ± 11 ( 23)	28 ± 20 ( 24)
	Error (no.)	2 ± 2 ( 22)	4 ± 5 ( 19)	3 ± 4 ( 23)	4 ± 5 ( 24)
3rd trial	Time (sec.)	17 ± 10 ( 22)	21 ± 26 ( 19)	14 ± 7 ( 23)	17 ± 7 ( 24)
	Error (no.)	2 ± 4 ( 22)	2 ± 6 ( 19)	2 ± 2 ( 23)	2 ± 3 ( 24)
<u>The third day</u>					
1st trial	Time (sec.)	20 ± 11 ( 22)	24 ± 22 ( 19)	17 ± 10 ( 23)	20 ± 13 ( 24)
	Error (no.)	3 ± 3 ( 22)	4 ± 6 ( 19)	2 ± 4 ( 23)	2 ± 3 ( 24)
2nd trial	Time (sec.)	16 ± 16 ( 22)	13 ± 3 ( 19)	16 ± 16 ( 23)	15 ± 6 ( 24)
	Error (no.)	2 ± 5 ( 22)	1 ± 1 ( 19)	2 ± 5 ( 23)	1 ± 2 ( 24)
3rd trial	Time (sec.)	14 ± 6 ( 22)	12 ± 5 ( 19)	13 ± 4 ( 23)	14 ± 6 ( 24)
	Error (no.)	1 ± 2 ( 22)	1 ± 2 ( 19)	1 ± 2 ( 23)	1 ± 2 ( 24)

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

Table 46

Two generation reproductive toxicity study of BBP by oral administration in rats  
Water multiple T-maze test in F<sub>1</sub> females; Mean±S.D. (N)

Compound	Butyl benzyl phthalate				
	0 <sup>a</sup>	20	100	500	
<u>The first day</u>					
1st trial	Time (sec.)	62 ± 41 (20)	59 ± 42 (17)	48 ± 19 (21)	61 ± 31 (24)
	Error (no.)	14 ± 10 (20)	14 ± 8 (17)	11 ± 4 (21)	14 ± 7 (24)
2nd trial	Time (sec.)	67 ± 41 (20)	57 ± 28 (17)	54 ± 30 (22)	66 ± 32 (24)
	Error (no.)	14 ± 10 (20)	13 ± 6 (17)	12 ± 8 (22)	14 ± 7 (24)
3rd trial	Time (sec.)	52 ± 34 (21)	46 ± 32 (17)	39 ± 16 (22)	46 ± 27 (23)
	Error (no.)	11 ± 7 (21)	9 ± 6 (17)	8 ± 6 (22)	9 ± 7 (23)
<u>The second day</u>					
1st trial	Time (sec.)	42 ± 33 (22)	37 ± 34 (18)	48 ± 40 (22)	52 ± 41 (23)
	Error (no.)	10 ± 11 (22)	8 ± 8 (18)	10 ± 10 (22)	11 ± 13 (23)
2nd trial	Time (sec.)	31 ± 27 (22)	26 ± 14 (18)	20 ± 14 (23)	20 ± 13 (23)
	Error (no.)	6 ± 7 (22)	6 ± 4 (18)	3 ± 3 (23)	3 ± 4 (23)
3rd trial	Time (sec.)	16 ± 7 (22)	21 ± 12 (18)	17 ± 10 (23)	17 ± 9 (24)
	Error (no.)	2 ± 2 (22)	4 ± 5 (18)	2 ± 2 (23)	2 ± 3 (24)
<u>The third day</u>					
1st trial	Time (sec.)	22 ± 14 (22)	24 ± 26 (19)	17 ± 10 (23)	22 ± 13 (24)
	Error (no.)	3 ± 5 (22)	4 ± 4 (19)	2 ± 4 (23)	3 ± 4 (24)
2nd trial	Time (sec.)	19 ± 14 (22)	16 ± 9 (18)	14 ± 6 (23)	21 ± 29 (24)
	Error (no.)	3 ± 4 (22)	2 ± 3 (18)	1 ± 2 (23)	3 ± 9 (24)
3rd trial	Time (sec.)	14 ± 10 (22)	18 ± 18 (19)	12 ± 5 (23)	15 ± 8 (24)
	Error (no.)	1 ± 3 (22)	2 ± 4 (19)	0 ± 1 (23)	1 ± 2 (24)

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

Table 47

Two generation reproductive toxicity study of BBP by oral administration in rats  
 Spontaneous motor activity in F<sub>1</sub> males; Mean±S.D. (N)

Compound	Butyl benzyl phthalate			
Dose (mg/kg)	0 <sup>a</sup>	20	100	500
Wheel cage activity (counts/24hour)	1776 ± 922 ( 22)	2252 ± 1205 ( 19)	1870 ± 701 ( 23)	2022 ± 1000 ( 24)

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