

Experiment Number: Multiple

Test Type: TOX

Route: Oral Gavage

Species/Strain: Rat/Harlan Sprague Dawley

C Number:

Multiple

Study Gender:

Male

PA49X: Summary of Cytochrome Activity

Test Compound: Flame Retardants

CAS Number: N/A

Date Report Requested: 04/17/2019

Time Report Requested: 08:52:49

Lab: NTP

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Total Protein Concentration (mg/ml)

Treatment Groups (umol/kg)

Test Article	0	0.1	1	10	100	1000
PBDE-47	7.27 ± 1.03 (6)	8.37 ± 0.91 (6)	6.98 ± 0.80 (6)	8.69 ± 1.06 (6)	9.97 ± 1.18 (6)	7.41 ± 1.29 (6)
decaBDE	8.21 ± 1.21 (6) *	9.43 ± 0.19 (6)	9.35 ± 0.63 (6)	9.46 ± 0.46 (6)	10.04 ± 0.81 (6)	10.80 ± 0.41 (6)
HBCD	9.31 ± 0.88 (6) *	8.62 ± 0.94 (6)	8.89 ± 0.72 (6)	9.68 ± 0.62 (6)	7.55 ± 0.60 (6)	7.15 ± 0.61 (6)
TBB	8.00 ± 0.79 (5)	8.21 ± 1.25 (6)	8.41 ± 0.62 (6)	8.41 ± 0.89 (6)	9.33 ± 0.49 (6)	9.37 ± 1.68 (6)
TBPH	8.67 ± 0.93 (6)	9.77 ± 0.77 (6)	7.57 ± 0.78 (6)	7.90 ± 0.46 (6)	6.94 ± 0.74 (6)	8.19 ± 0.74 (6)
TBBPA-DBPE	8.31 ± 0.50 (6)	8.08 ± 0.54 (6)	8.83 ± 0.62 (6)	8.46 ± 0.25 (6)	7.69 ± 0.60 (6)	9.11 ± 0.34 (6)
BTBPE	9.59 ± 0.54 (6)	9.18 ± 1.02 (6)	10.27 ± 0.88 (6)	9.56 ± 0.36 (6)	10.59 ± 0.38 (6)	9.38 ± 0.56 (6)
DBDPE	10.74 ± 0.60 (6)	9.41 ± 0.84 (6)	10.32 ± 0.24 (6)	10.57 ± 1.10 (6)	10.77 ± 0.59 (6)	10.31 ± 0.36 (6)
HCDBCO	9.90 ± 0.99 (6)	10.67 ± 1.15 (6)	9.50 ± 0.51 (6)	10.14 ± 0.84 (6)	10.10 ± 0.82 (6)	9.77 ± 0.66 (6)

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Cytochrome P450 1A1 Concentration (ng/ml)

Treatment Groups (umol/kg)

Test Article	0	0.1	1	10	100	1000
PBDE-47	18.6 ± 1.4 (6)	18.9 ± 0.8 (5)	19.3 ± 0.5 (6)	20.8 ± 1.2 (6)	22.1 ± 1.9 (6)	15.6 ± 0.8 (5)
decaBDE	18.8 ± 2.2 (6) *	19.9 ± 1.0 (6)	18.0 ± 1.3 (6)	22.4 ± 1.6 (6)	21.8 ± 1.7 (6)	22.0 ± 2.0 (6)
HBCD	21.4 ± 1.4 (6) *	30.1 ± 5.9 (6)	18.9 ± 2.6 (6)	22.3 ± 1.2 (5)	19.4 ± 1.3 (6)	17.9 ± 1.0 (6)
TBB	13.7 ± 0.8 (4)	34.2 ± 8.0 (6)	15.8 ± 1.0 (5)	27.8 ± 9.6 (6)	15.8 ± 0.6 (6)	25.3 ± 8.1 (6)
TBPH	25.7 ± 3.5 (6)	45.2 ± 14.6 (6)	45.8 ± 14.4 (6)	51.4 ± 9.0 (6)	31.2 ± 2.6 (6)	39.6 ± 6.8 (6)
TBBPA-DBPE	24.4 ± 1.8 (6) *	29.2 ± 1.6 (6)	24.2 ± 1.2 (6)	27.4 ± 2.1 (5)	27.6 ± 2.1 (5)	45.3 ± 8.5 (6)
BTBPE	34.5 ± 5.3 (6)	31.8 ± 7.0 (6)	40.7 ± 8.2 (6)	27.9 ± 5.0 (6)	28.5 ± 7.9 (6)	43.4 ± 2.7 (6)
DBDPE	20.8 ± 1.5 (6)	18.8 ± 1.6 (6)	16.8 ± 0.7 (6)	20.1 ± 1.4 (6)	20.7 ± 0.5 (6)	18.1 ± 0.9 (6)
HCDBCO	49.7 ± 6.5 (6)	47.5 ± 9.2 (6)	46.4 ± 3.4 (6)	57.2 ± 10.1 (6)	41.8 ± 6.3 (6)	42.8 ± 7.7 (6)

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Cytochrome P450 1A1 Tissue Concentration (ng/mg)

Test Article	Treatment Groups (umol/kg)					
	0	0.1	1	10	100	1000
PBDE-47	2.790 ± 0.379 (6)	2.773 ± 0.434 (6)	2.935 ± 0.315 (6)	2.552 ± 0.271 (6)	2.327 ± 0.306 (6)	2.763 ± 0.280 (6)
decaBDE	2.098 ± 0.104 (5)	2.112 ± 0.111 (6)	2.052 ± 0.037 (5)	2.373 ± 0.143 (6)	2.223 ± 0.205 (6)	2.057 ± 0.214 (6)
HBCD	2.377 ± 0.233 (6)	3.573 ± 0.551 (6)	2.360 ± 0.617 (6)	3.075 ± 0.768 (6)	2.610 ± 0.162 (6)	2.615 ± 0.310 (6)
TBB	1.875 ± 0.102 (4)	4.750 ± 1.094 (6)	1.842 ± 0.066 (5)	3.332 ± 1.066 (6)	1.715 ± 0.120 (6)	3.583 ± 1.454 (6)
TBPH	3.020 ± 0.365 (6)	4.600 ± 1.230 (6)	6.115 ± 1.550 (6)	6.772 ± 1.403 (6)	4.947 ± 0.902 (6)	4.903 ± 0.752 (6)
TBBPA-DBPE	2.648 ± 0.069 (5) *	3.660 ± 0.249 (6) *	2.785 ± 0.167 (6)	3.258 ± 0.209 (5)	3.660 ± 0.436 (5)	5.103 ± 1.055 (6)
BTBPE	3.588 ± 0.515 (6)	3.452 ± 0.620 (6)	3.902 ± 0.625 (6)	2.968 ± 0.585 (6)	2.633 ± 0.671 (6)	4.723 ± 0.439 (6)
DBDPE	1.967 ± 0.169 (6)	2.015 ± 0.099 (6)	1.635 ± 0.090 (6)	1.945 ± 0.114 (6)	1.948 ± 0.094 (6)	1.755 ± 0.058 (6)
HCDBCO	5.095 ± 0.577 (6)	4.337 ± 0.589 (6)	4.930 ± 0.370 (6)	5.628 ± 0.889 (6)	4.068 ± 0.371 (6)	4.618 ± 1.067 (6)

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Cytochrome P450 2B1 Concentration (ng/ml)

Treatment Groups (umol/kg)

Test Article	0	0.1	1	10	100	1000
PBDE-47	3.20 ± 0.05 (6)	3.41 ± 0.19 (6)	3.39 ± 0.23 (6)	3.45 ± 0.21 (6)	3.14 ± 0.07 (6)	3.19 ± 0.17 (6)
decaBDE	2.47 ± 0.10 (6)	2.80 ± 0.31 (6)	2.78 ± 0.21 (6)	2.46 ± 0.12 (6)	2.46 ± 0.19 (6)	2.32 ± 0.05 (6)
HBCD	3.27 ± 0.15 (6) *	3.18 ± 0.16 (6)	3.23 ± 0.14 (6)	2.93 ± 0.12 (6)	2.79 ± 0.09 (6)	3.06 ± 0.19 (6)
TBB	3.95 ± 0.25 (5)	3.32 ± 0.10 (6)	3.65 ± 0.19 (6)	3.88 ± 0.20 (6)	3.92 ± 0.26 (6)	3.33 ± 0.10 (6)
TBPH	3.45 ± 0.13 (6)	3.29 ± 0.14 (6)	3.63 ± 0.09 (6)	3.36 ± 0.11 (6)	3.47 ± 0.13 (6)	3.47 ± 0.12 (6)
TBBPA-DBPE	3.45 ± 0.09 (6) **	3.61 ± 0.10 (6)	3.50 ± 0.09 (6)	3.60 ± 0.11 (6)	3.77 ± 0.10 (6)	3.84 ± 0.06 (6) *
BTBPE	3.43 ± 0.23 (6)	3.55 ± 0.24 (6)	3.61 ± 0.14 (6)	3.99 ± 0.26 (6)	3.91 ± 0.27 (6)	3.40 ± 0.13 (6)
DBDPE	4.32 ± 0.27 (6)	4.42 ± 0.30 (6)	4.06 ± 0.34 (6)	4.30 ± 0.22 (6)	4.52 ± 0.31 (6)	4.24 ± 0.19 (6)
HCDBCO	3.50 ± 0.21 (6)	3.59 ± 0.21 (6)	3.43 ± 0.24 (6)	3.37 ± 0.22 (6)	3.82 ± 0.15 (6)	3.62 ± 0.13 (6)

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Lab: NTP

Cytochrome P450 2B1 Tissue Concentration (ng/mg)

Test Article	Treatment Groups (umol/kg)					
	0	0.1	1	10	100	1000
PBDE-47	0.496 ± 0.081 (6)	0.424 ± 0.042 (6)	0.511 ± 0.049 (6)	0.424 ± 0.048 (6)	0.335 ± 0.037 (6)	0.472 ± 0.055 (6)
decaBDE	0.353 ± 0.075 (6) *	0.297 ± 0.030 (6)	0.308 ± 0.038 (6)	0.266 ± 0.027 (6)	0.254 ± 0.031 (6)	0.217 ± 0.009 (6)
HBCD	0.369 ± 0.041 (6)	0.409 ± 0.074 (6)	0.373 ± 0.025 (6)	0.314 ± 0.033 (6)	0.377 ± 0.023 (6)	0.443 ± 0.049 (6)
TBB	0.503 ± 0.032 (5)	0.379 ± 0.031 (5)	0.445 ± 0.037 (6)	0.484 ± 0.054 (6)	0.425 ± 0.034 (6)	0.440 ± 0.107 (6)
TBPH	0.414 ± 0.032 (6)	0.346 ± 0.028 (6)	0.503 ± 0.047 (6)	0.431 ± 0.021 (6)	0.535 ± 0.071 (6)	0.443 ± 0.045 (6)
TBBPA-DBPE	0.421 ± 0.018 (6)	0.455 ± 0.028 (6)	0.405 ± 0.029 (6)	0.428 ± 0.018 (6)	0.505 ± 0.041 (6)	0.424 ± 0.019 (6)
BTBPE	0.362 ± 0.029 (6)	0.413 ± 0.055 (6)	0.366 ± 0.037 (6)	0.420 ± 0.029 (6)	0.375 ± 0.037 (6)	0.370 ± 0.031 (6)
DBDPE	0.410 ± 0.040 (6)	0.497 ± 0.068 (6)	0.394 ± 0.032 (6)	0.427 ± 0.043 (6)	0.422 ± 0.023 (6)	0.415 ± 0.028 (6)
HCDBCO	0.376 ± 0.049 (6)	0.361 ± 0.050 (6)	0.369 ± 0.041 (6)	0.346 ± 0.037 (6)	0.394 ± 0.041 (6)	0.378 ± 0.023 (6)

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Lab: NTP

Cytochrome P450 1A2 Concentration (ng/ml)

Treatment Groups (umol/kg)

Test Article	0	0.1	1	10	100	1000
PBDE-47	48.7 ± 14.5 (6)	49.0 ± 8.7 (6)	39.2 ± 4.9 (6)	36.9 ± 4.1 (6)	55.3 ± 15.8 (6)	46.7 ± 5.6 (6)
decaBDE	25.7 ± 5.7 (6)	43.2 ± 5.0 (6)	33.4 ± 5.3 (6)	43.2 ± 4.5 (6)	43.0 ± 2.8 (6)	43.1 ± 6.7 (6)
HBCD	47.6 ± 3.5 (5) **	59.7 ± 10.3 (6)	39.2 ± 7.9 (6)	49.0 ± 6.1 (6)	40.3 ± 4.7 (6)	28.8 ± 4.4 (6) *
TBB	42.7 ± 2.7 (5)	41.7 ± 7.5 (6)	48.2 ± 4.2 (6)	40.7 ± 5.1 (6)	51.3 ± 4.3 (6)	41.4 ± 6.2 (6)
TBPH	37.4 ± 3.6 (6)	50.0 ± 8.0 (6)	39.7 ± 5.5 (6)	37.0 ± 1.4 (6)	35.9 ± 5.6 (6)	34.5 ± 4.0 (6)
TBBPA-DBPE	37.6 ± 1.3 (5)	62.3 ± 13.6 (6)	72.2 ± 19.7 (6)	37.4 ± 3.8 (6)	41.7 ± 5.9 (6)	34.3 ± 4.0 (6)
BTBPE	38.9 ± 3.7 (6)	36.9 ± 4.5 (6)	50.4 ± 5.9 (6)	42.0 ± 3.5 (6)	42.4 ± 5.2 (6)	43.9 ± 1.8 (6)
DBDPE	50.0 ± 4.9 (6)	48.8 ± 17.6 (6)	33.3 ± 2.9 (6)	40.2 ± 6.4 (6)	46.0 ± 4.5 (6)	30.1 ± 6.4 (6)
HCDBCO	47.8 ± 3.6 (6)	50.3 ± 6.4 (6)	39.0 ± 1.1 (5)	48.1 ± 5.6 (6)	41.1 ± 3.6 (6)	39.5 ± 3.2 (5)

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Lab: NTP

Cytochrome P450 1A2 Tissue Concentration (ng/mg)

Test Article	Treatment Groups (umol/kg)					
	0	0.1	1	10	100	1000
PBDE-47	6.762 ± 1.700 (6)	5.973 ± 1.043 (6)	5.988 ± 0.879 (6)	4.757 ± 0.975 (6)	5.808 ± 1.756 (6)	7.072 ± 1.206 (6)
decaBDE	3.127 ± 0.453 (6)	4.578 ± 0.546 (6)	3.480 ± 0.425 (6)	4.550 ± 0.466 (6)	4.327 ± 0.205 (6)	4.025 ± 0.605 (6)
HBCD	6.392 ± 0.872 (6) **	7.120 ± 1.021 (6)	4.728 ± 1.105 (6)	5.023 ± 0.441 (6)	5.532 ± 0.878 (6)	3.388 ± 0.184 (5) **
TBB	5.442 ± 0.386 (5)	5.118 ± 0.625 (6)	5.902 ± 0.641 (6)	4.957 ± 0.596 (6)	5.655 ± 0.709 (6)	4.833 ± 0.765 (6)
TBPH	4.478 ± 0.461 (6)	4.958 ± 0.596 (6)	5.183 ± 0.340 (6)	4.767 ± 0.358 (6)	5.218 ± 0.555 (6)	4.225 ± 0.292 (6)
TBBPA-DBPE	5.682 ± 1.041 (6) *	7.532 ± 1.253 (6)	7.707 ± 1.676 (6)	4.425 ± 0.440 (6)	5.317 ± 0.527 (6)	3.783 ± 0.480 (6)
BTBPE	4.078 ± 0.364 (6)	4.003 ± 0.335 (6)	4.945 ± 0.518 (6)	4.378 ± 0.262 (6)	3.983 ± 0.422 (6)	4.712 ± 0.173 (6)
DBDPE	4.685 ± 0.425 (6)	4.843 ± 1.393 (6)	3.243 ± 0.309 (6)	3.788 ± 0.405 (6)	4.312 ± 0.433 (6)	3.572 ± 0.249 (6)
HCDBCO	5.125 ± 0.719 (6)	4.757 ± 0.458 (6)	3.946 ± 0.158 (5)	4.732 ± 0.363 (6)	4.080 ± 0.203 (6)	5.252 ± 0.980 (6)

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Lab: NTP

UDP GT1A1 Concentration (ng/ml)

Treatment Groups (umol/kg)

Test Article	0	0.1	1	10
PBDE-47	15048.917 ± 1453.437 (6) **	16626.417 ± 2304.970 (6)	14805.417 ± 1592.598 (6)	16437.750 ± 1793.113 (6)
decaBDE	11061.083 ± 1851.625 (6) **	15939.083 ± 713.246 (6)	16076.083 ± 1586.115 (6)	17720.833 ± 1132.744 (6) **
HBCD	18262.167 ± 1841.528 (6) **	21260.167 ± 3128.318 (6)	13823.500 ± 1827.737 (6)	16312.750 ± 2500.187 (6)
TBB	11287.125 ± 198.577 (4)	13978.250 ± 1948.175 (6)	16187.250 ± 2124.849 (6)	12792.583 ± 1596.482 (6)
TBPH	19421.083 ± 3103.378 (6)	24017.083 ± 2110.616 (6)	18496.750 ± 2403.382 (6)	18099.167 ± 2758.902 (6)
TBBPA-DBPE	17282.667 ± 1785.099 (6)	20381.167 ± 3017.919 (6)	19972.917 ± 1403.424 (6)	21572.917 ± 2386.067 (6)
BTBPE	14498.500 ± 1347.583 (6)	14673.917 ± 1368.540 (6)	15930.250 ± 2267.098 (6)	15258.583 ± 753.312 (6)
DBDPE	18885.833 ± 2295.280 (6)	16300.917 ± 2921.952 (6)	15339.833 ± 1486.417 (6)	20042.750 ± 4679.150 (6)
HCDBCO	19495.500 ± 2684.533 (6)	19156.000 ± 1408.278 (6)	16560.100 ± 551.379 (5)	16856.750 ± 2981.839 (6)

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UDP GT1A1 Concentration (ng/ml)

Treatment Groups (umol/kg)

Test Article	100	1000
PBDE-47	25644.667 ± 2938.265 (6) **	22583.917 ± 2239.463 (6) *
decaBDE	19192.000 ± 1181.587 (6) **	19371.167 ± 1438.438 (6) **
HBCD	12470.100 ± 882.771 (5) *	13628.083 ± 1136.968 (6) *
TBB	15428.583 ± 1152.366 (6)	17277.667 ± 2292.356 (6)
TBPH	19806.000 ± 3544.573 (6)	19351.167 ± 3271.917 (6)
TBBPA-DBPE	16410.000 ± 1749.834 (6)	18369.250 ± 1749.258 (6)
BTBPE	15899.333 ± 874.109 (6)	15404.500 ± 1276.204 (6)
DBDPE	18513.083 ± 1598.900 (6)	17187.167 ± 1463.519 (6)
HCDBCO	20329.167 ± 1448.137 (6)	19725.250 ± 2361.806 (6)

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UDP GT1A1 Tissue Concentration (ng/mg)

Test Article	Treatment Groups (umol/kg)			
	0	0.1	1	10
PBDE-47	2376.768 ± 487.613 (6)	2092.099 ± 370.681 (6)	2282.695 ± 337.689 (6)	2039.353 ± 317.127 (6)
decaBDE	1333.481 ± 62.450 (6) **	1695.179 ± 85.595 (6) *	1707.247 ± 83.514 (6) *	1882.562 ± 108.587 (6) **
HBCD	1973.089 ± 103.760 (6)	2561.153 ± 348.670 (6)	1618.925 ± 240.680 (6)	1669.753 ± 219.588 (6)
TBB	1593.184 ± 80.025 (5)	1813.335 ± 244.355 (6)	1661.244 ± 87.524 (5)	1543.427 ± 186.494 (6)
TBPH	2228.271 ± 225.663 (6)	2516.253 ± 267.877 (6)	2438.750 ± 191.428 (6)	2248.733 ± 226.668 (6)
TBBPA-DBPE	2059.958 ± 109.630 (6)	2511.993 ± 301.098 (6)	2290.029 ± 143.148 (6)	2535.729 ± 230.732 (6)
BTBPE	1512.975 ± 111.572 (6)	1611.921 ± 49.895 (6)	1540.997 ± 155.885 (6)	1600.952 ± 74.575 (6)
DBDPE	1751.855 ± 182.530 (6)	1677.362 ± 172.115 (6)	1497.705 ± 163.224 (6)	1778.288 ± 275.959 (6)
HCDBCO	1987.018 ± 215.450 (6)	1837.278 ± 110.077 (6)	1926.714 ± 150.645 (6)	1635.941 ± 212.602 (6)

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UDP GT1A1 Tissue Concentration (ng/mg)

Treatment Groups (umol/kg)

Test Article	100	1000
PBDE-47	2633.788 ± 249.490 (6)	3368.914 ± 513.011 (6)
decaBDE	1941.897 ± 114.874 (6) **	1791.413 ± 104.139 (6) **
HBCD	2072.019 ± 325.013 (6)	1950.475 ± 181.504 (6)
TBB	1680.362 ± 162.104 (6)	2214.796 ± 46.390 (5)
TBPH	2784.631 ± 345.679 (6)	2328.577 ± 281.198 (6)
TBBPA-DBPE	2132.415 ± 161.326 (6)	2006.024 ± 150.128 (6)
BTBPE	1568.491 ± 16.937 (5)	1634.752 ± 68.265 (6)
DBDPE	1736.869 ± 161.313 (6)	1660.615 ± 107.544 (6)
HCDBCO	2044.236 ± 142.173 (6)	1995.764 ± 126.307 (6)

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LEGEND

Data are displayed as mean \pm SEM (N) unless otherwise noted

Statistical analysis performed by Jonckheere (trend) and Shirley or Dunn (pairwise) tests

Statistical significance for the control group indicates a significant trend test

Statistical significance for a treatment group indicates a significant pairwise test compared to the vehicle control group

* Statistically significant at $P \leq 0.05$

** Statistically significant at $P \leq 0.01$

Legacy Flame Retardants: PBDE-47 = 2,2',4,4'-Tetrabromodiphenyl ether; decaBDE = Decabromodiphenyl ether; HBCD = 1,3,5,7,9,11-Hexabromocyclododecane

Emerging Flame Retardants: TBB = 2-Ethylhexyl-2,3,4,5-tetrabromobenzoate; TBPH = Bis(2-ethylhexyl) tetrabromophthalate; TBBPA-DBPE = Tetrabromobisphenol A-bis(2,3 dibromopropyl ether); BTBPE = 1,2-Bis(2,4,6-tribromophenoxy)ethane; DBDPE = 1,2-Bis(pentabromophenyl)ethane; HCDBCO = Hexachlorocyclopentadienyl-dibromocyclooctane

PBDE-47: One value for Cytochrome P450 1A1 Concentration in the 0.1 $\mu\text{mol/kg}$ group and one value for Cytochrome P450 1A1 Concentration in the 1000 $\mu\text{mol/kg}$ group were excluded because they were outliers.

decaBDE: One value for Cytochrome P450 1A1 Tissue Concentration in the 0 mg/kg group and one value for Cytochrome P450 1A1 Tissue Concentration in the 1 $\mu\text{mol/kg}$ group were excluded because they were outliers.

HBCD: One value for Cytochrome P450 1A2 Concentration in the 0 $\mu\text{mol/kg}$ group, one value for Cytochrome P450 1A1 Concentration in the 10 $\mu\text{mol/kg}$ group, one value for UDP Glucuronosyltransferase 1 Concentration in the 100 $\mu\text{mol/kg}$ group, and one value for Cytochrome P450 1A2 Tissue Concentration in the 1000 $\mu\text{mol/kg}$ group were excluded because they were outliers.

TBB: One value for Cytochrome P450 Concentration in the 0 $\mu\text{mol/kg}$ group, one value for Cytochrome P450 1A1 Tissue Concentration in the 0 $\mu\text{mol/kg}$ group, one value for UDP Glucuronosyltransferase 1 Concentration in the 0 $\mu\text{mol/kg}$ group, one value for Cytochrome P450 2B1 Tissue Concentration in the 0.1 $\mu\text{mol/kg}$ group, one value for Cytochrome P450 1A1 Concentration in the 1 $\mu\text{mol/kg}$ group, one value for Cytochrome P450 1A1 Tissue Concentration in the 1 $\mu\text{mol/kg}$ group, one value for UDP Glucuronosyltransferase 1 Tissue Concentration in the 1 $\mu\text{mol/kg}$ group, and one value for UDP Glucuronosyltransferase 1 Tissue Concentration in the 1000 $\mu\text{mol/kg}$ group were excluded because they were outliers.

TBBPA-DBPE: One value for Cytochrome P450 1A1 Tissue Concentration in the 0 $\mu\text{mol/kg}$ group, one value for Cytochrome P450 1A2 Concentration in the 0 $\mu\text{mol/kg}$ group, one value for Cytochrome P450 1A1 Concentration in the 10 $\mu\text{mol/kg}$ group, one value for Cytochrome P450 1A1 Tissue Concentration in the 10 $\mu\text{mol/kg}$ group, one value for Cytochrome P450 1A1 Concentration in the 100 $\mu\text{mol/kg}$ group, and one value for Cytochrome P450 1A1 Tissue Concentration in the 100 $\mu\text{mol/kg}$ group were excluded because they were outliers.

BTBPE: One value for UDP Glucuronosyltransferase 1 Tissue Concentration in the 100 $\mu\text{mol/kg}$ group was excluded because it was an outlier.

HCDBCO: One value for Cytochrome P450 1A2 Concentration in the 1 $\mu\text{mol/kg}$ group, one value for Cytochrome P450 1A2 Tissue Concentration in the 1 $\mu\text{mol/kg}$ group, one value for UDP Glucuronosyltransferase 1 Concentration in the 1 $\mu\text{mol/kg}$ group, and one value for Cytochrome P450 1A2 Concentration in the 1000 $\mu\text{mol/kg}$ group were excluded because they were outliers.

Experiment Number: Multiple

Test Type: TOX

Route: Oral Gavage

Species/Strain: Rat/Harlan Sprague Dawley

PA49X: Summary of Cytochrome Activity

Test Compound: Flame Retardants

CAS Number: N/A

Date Report Requested: 04/17/2019

Time Report Requested: 08:52:49

Lab: NTP

**** END OF REPORT ****