Supporting Information:

Assimilation efficiency of PBDE congeners in Chinook salmon.

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Chemical analysis – Quality assurance and instrument calibration. All quality assurance criteria were met for the method blanks and National Institute of Standards and Technology (NIST) Standard Reference Materials (fish tissue, SRM 1947) analyzed with each set of salmon and food samples. For example, concentrations of ≥ 70% of individual analytes that were measured in SRM 1947 were within 30% of either end of the 95% confidence interval range of the published NIST certified or recommended analyte concentrations. Method blanks contained no more than four analytes that exceeded four times the lower limit of quantitation (LOQ), unless the analyte was not detected in the whole body or food samples in each sample set.

The LOQ of the analytes in whole bodies and fish food ranged from < 0.10 to < 0.42 ng/g wet weight and < 0.041 to < 0.053 ng/g wet weight, respectively. The LOQ for each analyte is the concentration that would be calculated if the analyte had a GC/MS response area equivalent to its area in the lowest level calibration standard used in the calibration. When an analyte was not detected in a sample or had an area that was smaller than its area in the lowest level calibration standard used, the concentration of the analyte in the sample was reported to be less than the value of its lower limit of quantitation.

For each sample set, the sensitivity of the GC/MS was checked by analyzing the lowest level calibration standard that was used to quantitate the PBDEs in the samples. To determine the stability of the GC/MS for each sample set, a sequence of three or more repetitions of a mid-level calibration standard was analyzed at the start and end of every analytical sequence and every 10 or fewer experimental samples. The relative standard deviation of the analyte responses relative to the responses to their internal standard was calculated for each analyte. The GC/MS was considered stable if the response of an analyte relative to the response of its internal standard in a given repetition was within ± 15% of the respective average for the repetitions.

Calculation α, assimilation efficiency. Estimates of assimilation efficiency were calculated on a congener basis in each whole body sample (individual fish or composites) chemically analyzed. Assimilation efficiency (α_i) for a PBDE congener (*i*) was determined as:

$$\alpha_i = BB_{BDEi} / \Sigma Fed_{BDEi} \qquad \textbf{Equation 1}$$

Where, BB_{BDEi} is the total mass of PBDE congener *i* in the fish (i.e. body burden), and Fed_{BDEi} is the mass of PBDE congener *i* fed to the fish each day, summed over the total exposure period. BB_{BDEi} is the concentration of the congener in the individual fish or composite of fish determined from the chemical analysis multiplied by the mass of the fish or mean mass of the composite.

The masses of the PBDE congeners fed to an individual fish per day were calculated from: the mass of the PBDE congener delivered to each tank; the number of fish in each tank per day; the concentration of the PBDE congener in the food; the mean mass of fish prior to each dietary exposure; the mean mass of fish per tank after exposure; and the known mass of individual fish after exposure that were chemically analyzed for PBDEs. First, the growth rate (k_G) was determined for each tank of fish based on a first order exponential growth rate and the mean mass of the fish prior to dietary exposure (*M(0)*) and the mean mass of fish per tank after exposure (*M(40)*):

$$M(t) = M(0)*EXP(k_G*t) \qquad \textbf{Equation 2}$$

Where, *M(t)* is the mean mass of the fish in that tank on day *(t)* of exposure. Second, the mean amount of food fed to the fish per tank per day (*Fed(t)*) was determined as a proportion of their body weight per day:

$$Fed(t) = Food(t) / (n * M(t)) \qquad \textbf{Equation 3}$$

Where, *Food(t)* is the total mass of food delivered to a tank on exposure day *t* and *n* is the total number of fish in the tank. Third, the daily mass ($M_{CHEM}(t)$) of the individual fish (or composite of fish) that were chemically analyzed for PBDEs was determined by back-calculating from their known mass at the end of exposure and the previously determined mean growth rate (k_G):

$$M_{CHEM}(t) = M_{CHEM}\ (t+1)*EXP(-k_G*t) \qquad \textbf{Equation 4}$$

Finally, the mass of the PBDE congener fed to this fish per day was determined by multiplying the proportion of food fed to the fish, the mass of the fish, and the amount of the PBDE congener in the food (M_{BDEi}):

$$Fed_{BDEi}(t) = Fed(t)* M_{CHEM}(t)* M_{BDEi} \qquad \textbf{Equation 5}$$

Where, M_{BDEi} was determined from the chemical analysis of the food.

FIGURES

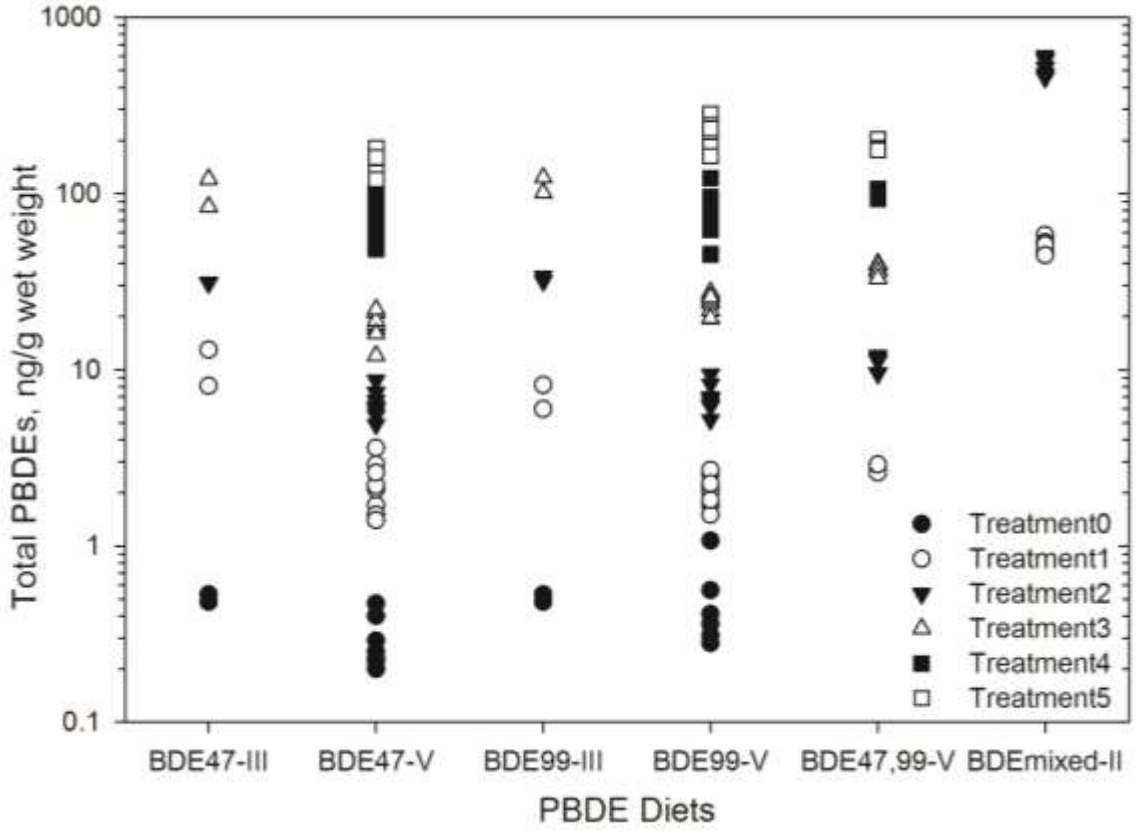

Figure S1. Total PBDE concentrations in whole body samples of Chinook salmon after exposure to a treatment level from one of the six diets. *Estimates of PBDE congener assimilation efficiency were determined for each sample (point).*

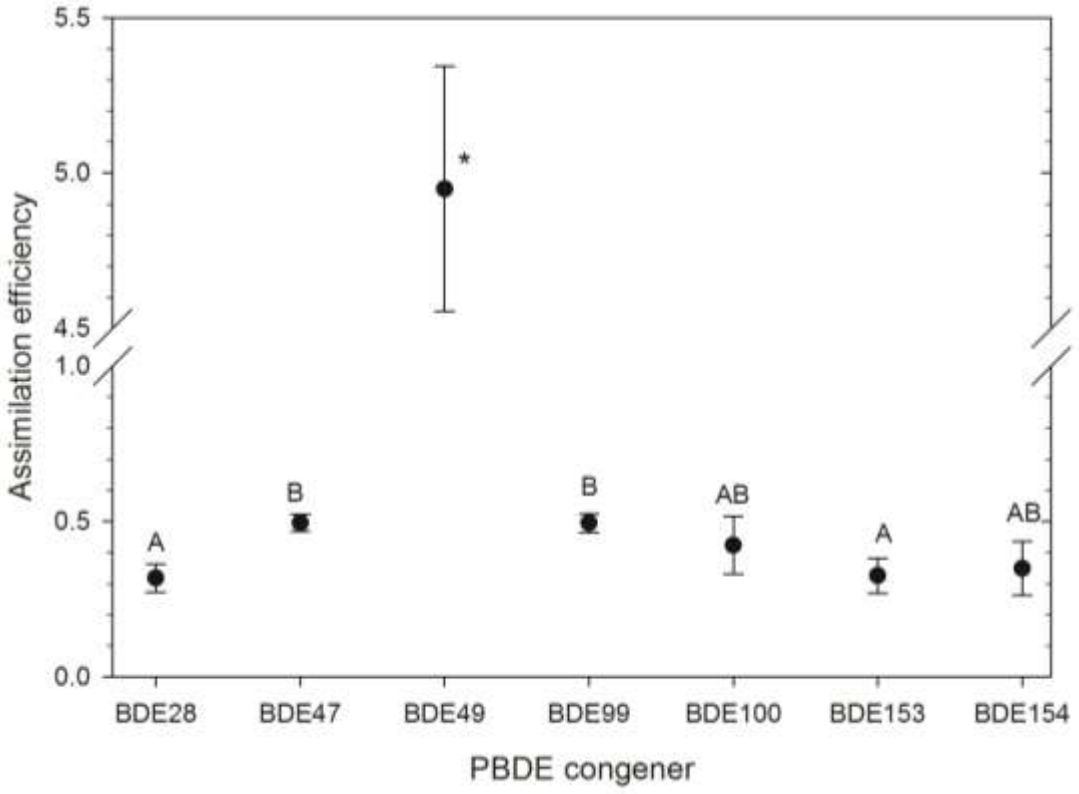

Figure S2. Estimates of the net assimilation efficiency of PBDE congeners in Chinook salmon. *Error bars indicate 95% confidence intervals of the mean. Points that do not have a letter in common are significantly different based on Tukey HSD post hoc test; * BDE49 estimates were excluded from the ANOVA.*

TABLES

Table S1. Estimates of PBDE assimilation efficiency (α) in juvenile Chinook salmon by treatment level of the Individual and Mixed congener diets.

	α by PBDE diet (±SD_{rel})[a]						
Diet, level	BDE28	BDE47	BDE49	BDE99	BDE100	BDE153	BDE154
BDE47-III							
1	NA[b]	0.53 (0.15)	NA[b]	NA[b]	NA[b]	NA[b]	NA[b]
2	0	0.44 (0.03)	NA[b]	NA[b]	NA[b]	NA[b]	NA[b]
3	0.49 (0.19)	0.66 (0.18)	NA[b]	NA[b]	NA[b]	NA[b]	NA[b]
BDE47-V							
1	NA[b]	0.52 (0.20)	NA[b]	NA[b]	NA[b]	NA[b]	NA[b]
2	NA[b]	0.44 (0.07)	NA[b]	NA[b]	NA[b]	NA[b]	NA[b]
3	NA[b]	0.36 (0.06)	NA[b]	NA[b]	NA[b]	NA[b]	NA[b]
4	0.33 (0.18)	0.40 (0.09)	NA[b]	NA[b]	NA[b]	NA[b]	NA[b]
5	0.28 (0.05)	0.45 (0.06)	NA[b]	1.2 (0.4)[c]	NA[b]	NA[b]	NA[b]
BDE99-III							
1	NA[b]	0.50 (0.12)	NA[b]	0.23 (0.06)	NA[b]	NA[b]	NA[b]
2	NA[b]	0.46 (0.05)	NA[b]	0.44 (0.04)	NA[b]	0	NA[b]
3	NA[b]	0.51 (0.06)	3.6 (0.7)	0.65 (0.11)	NA[b]	0.50 (0.05)	NA[b]
BDE99-V							
1	NA[b]	0.38 (0.08)	NA[b]	0.45 (0.09)	NA[b]	NA[b]	NA[b]
2	NA[b]	0.53 (0.24)	NA[b]	0.35 (0.06)	NA[b]	NA[b]	NA[b]
3	NA[b]	0.53 (0.07)	NA[b]	0.39 (0.05)	NA[b]	NA[b]	NA[b]
4	NA[b]	0.45 (0.13)	NA[b]	0.42 (0.14)	NA[b]	0	NA[b]
5	NA[b]	0.46 (0.06)	5.2 (0.6)	0.61 (0.10)	NA[b]	0.33 (0.15)	NA[b]
BDE47,99-V							
1	NA[b]	0.69 (0.06)	0	0.57 (0.04)	0	NA[b]	NA[b]
2	0	0.66 (0.07)	0	0.59 (0.07)	0	0	NA[b]
3	0	0.63 (0.04)	0	0.63 (0.06)	0	0	NA[b]
4	0	0.55 (0.04)	4.3 (2.2)	0.57 (0.04)	0	0	NA[b]
5	0	0.49 (0.03)	5.5 (0.8)	0.51 (0.04)	0	0	NA[b]
BDEmixed-II							
1	NA[b]	0.43 (0.04)	NA[b]	0.35 (0.04)	0.34 (0.07)	0.19 (0.13)	0.30 (0.18)
2	NA[b]	0.56 (0.07)	NA[b]	0.54 (0.07)	0.50 (0.08)	0.37 (0.07)	0.36 (0.06)

[a] Estimates are the means across all feed tank rplicates and samples within a treatment levels, in which fish were exposed to the congener and individual sample assimilation efficiency estimates were > 0. Relative standard deviations for the derived quantity of assimilation efficiency were calculated as per Burreau et al.[1]

[b] Not applicable; this congener was not present in the diet.

[c] A single treatment in the diet had a background of BDE99 and a single chemistry sample detected BDE99 in a whole body composite.

1. Burreau, S.; Axelman, J.; Broman, D.; Jakobsson, E., Dietary uptake in pike (Esox lucius) of some polychlorinated biphenyls, polychlorinated naphthalenes and polybrominated diphenyl ethers administered in natural diet. *Environ. Toxicol. Chem.* **1997,** *16*, (12), 2508-2513.