Chemical contamination of fish: old and new

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Old (examples)

- Mercury
- PCBs
- Dioxins
New (example)

Brominated Flame Retardants (BFR)
(Fat soluble, persistent)

Example: Polybrominated Diphenyl Ethers (PBDE)

PBDE structure
PBDEs

• Like PCBs

• Health effects:
  Cancer
  Nervous system damage
  Endocrine system
  Reproductive/developmental

Farm grown fish

• Usually more contaminated
• They eat:

  Fish meal and
  Fish oil
How contamination can be reduced

- Don’t eat fatty fish
- Cut fat off before eating
- Broil and drip fat away
- Grow in ocean, not fish farms
- Feed farm grown fish vegetable food

Our findings: PBDE contamination

- Salmon most contaminated (fatty)
- Shark heavily contaminated (predator-eats other fish)
- Catfish heavily contaminated (bottom dweller)
Fish PBDE levels

- High 3078 ppt (salmon)
- Median 581 ppt
- Low 2.9 ppt (canned tuna)

Fish and other food
(part-per-trillion wet weight)

<table>
<thead>
<tr>
<th></th>
<th>Median</th>
<th>Range</th>
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<tbody>
<tr>
<td>Fish</td>
<td>581</td>
<td>2.9 - 3078</td>
</tr>
<tr>
<td>Meat</td>
<td>129</td>
<td>n.d. - 1373</td>
</tr>
<tr>
<td>Dairy</td>
<td>81</td>
<td>0.9 - 679</td>
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</tbody>
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Daily U.S. adult PBDE intake estimate

- 20-39 year old males: 1,116 pg/kg BW per day
- 20-39 year old females: 693 pg/kg BW per day

PBDE intake pg/kg BW per day:
- Meat: 1,116
- Dairy Products: 209
- Fish: 241

PBDE congener levels of U.S. fish

Range: 2.9 – 3,078 ppt or pg/g wet weight
PBDE congener levels of meat products in the USA
Median: 129. Mean: 444. Range: 0 – 1,373 ppt. pg/g wet weight

PBDE congener levels of dairy products in the USA
N=13. Median: 81. Mean: 159. Range: 0.9 – 679 ppt or pg/g wet weight
PBDE congener levels and profiles of individual miscellaneous products in the USA.

N=4. Range: 0 – 74 pg/g or ppt. ww.

Comments

- Farm grown fish are presently high in contamination
- “Animal” fats (fish meat and oil)
- Fatty fish higher in PBDE contamination
Solutions

- Different food for fish farms
- Decrease fat before eating
- EPA regulations to decrease pollution