Reducing the Bioavailability of Polychlorinated Biphenyls (PCBs) from Sediment to Clams

Overview

- PCBs in sediment threaten local food chains
  - Fish consumption advisories
  - Adverse health effects, possibly cancer

- Traditional “dredge and dump” is expensive, disrupts habitat, and leaves residual PCBs

- Need new in-situ technologies to clean up PCB-contaminated sites

Hypotheses

Adding activated carbon to PCB-contaminated sediment can reduce PCB bioavailability to clams.

Effectiveness will depend on:
1. Carbon dose
2. Carbon size

Scientific Approach

- Obtain PCB-contaminated sediment from Hunters Point Naval Shipyards, San Francisco, CA (Superfund site)
- Expose clams (Macoma balthica) to Hunters Point sediment with and without carbon amendment
- Carbon and sediment well-mixed for one month
- Clams in sediment for 28 days
- 20 clams per jar
- Measure PCB concentrations in clam tissues, using gas chromatography (GC)

Results and Impact

70-80% reduction in total PCB uptake by clams, at high carbon dose and short contact time

% reduction in PCB uptake
1. increases with carbon dose
2. decreases with carbon size

- Field demonstration at Hunters Point
  - Validate laboratory results
  - Investigate mixing strategies
- Potential benefits for impaired sites
  - Increase redevelopment opportunities
  - Limit human exposure to PCBs through food

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