



# Oil and Seafood: Evaluating the Risks for People Who Eat Fish and Shellfish

Crude oil and other petroleum-based oils are complex mixtures of related chemicals. Of those chemicals, the most important to consider when evaluating seafood (fish and shellfish) safety after an oil spill are polycyclic aromatic hydrocarbons (PAHs) because:

- PAHs are the most likely to accumulate in the tissues of seafood species.
- If PAH levels in seafood are high enough, they may pose a health threat to people who eat seafood often.

Even at levels too low to affect human health, PAHs and other chemicals in oil can cause seafood to have an unusual smell or taste. This is called “taint.” Taint does not necessarily mean that fish or shellfish are unsafe to eat, but tainted seafood is not permitted to be sold in interstate commerce.

PAHs are common contaminants in the environment and can be found in many foods, tobacco and wood smoke, drinking water, and polluted air. Oil spills may also be a major source of PAHs in seafood.

## How do scientists determine if there are harmful PAHs in seafood?

Crude oils differ in how they behave in the environment and how they affect fish and shellfish.

Where oil is spilled also makes a difference. After a spill, the first thing scientists do is evaluate the type of oil spilled and the location of the spill to determine which fish or shellfish species are most likely to be exposed to the oil.

- Oils that mix with the water and spills that occur in deep water are more likely to affect finfish.
- Heavier oils that strand on shorelines are more likely to affect shellfish, especially bivalve molluscs like mussels.



If scientists determine that fish or shellfish may be exposed to the oil, the next step is to collect seafood samples from the spill area and measure levels of PAHs in their tissues. Fish and shellfish are also evaluated for taint.

Scientists collect seafood samples from nearby areas not affected by the spill to determine the “background” levels of PAHs normally found in seafood in that area.

## How do scientists determine what levels of PAHs in seafood are safe?

Many potentially harmful chemicals can be found in our food, drinking water and air at levels too low to harm us. Scientists use a process called “risk assessment” to determine levels of chemical

exposure that may cause health problems. For those chemicals that may harm human health, scientists set safe levels of exposure for each chemical, taking into account the most sensitive populations such as children, the elderly, and people with weakened immune systems. Exposures below that level are believed to be safe, while exposures above that level should be avoided.

For chemicals like PAHs that are suspected to cause cancer, scientists set an acceptable cancer “risk level.” This risk is extremely low compared to the risk of cancer related to lifestyle choices like diet, smoking, or sunbathing.

Scientists determine safe levels of exposure based on national averages for:

- How much people weigh.
- How much seafood they eat.
- How long they live.
- How long they might be exposed to a chemical.



Scientists then evaluate research conducted in humans and animals that tells them the probability that PAHs might cause cancer in humans. Using all this information, they calculate a safe threshold in meals of fish and shellfish.

### **What do health officials do with these results?**

After an oil spill, health officials receive results of PAH testing in fish and shellfish. They compare these measured levels to threshold values of PAHs in fish and shellfish that are considered safe for people who eat seafood. If fish or shellfish have PAH levels that are below the safe threshold and are not tainted, no restrictions are needed on seafood consumption.

If fish or shellfish have PAH levels that are above the safe threshold or are tainted, then appropriate actions will be taken. For example:

- Fisheries may be closed or may remain closed.
- Seafood consumption advisories may be issued.
- Gear restrictions may be imposed.

Monitoring of fish and shellfish will continue in areas where PAH levels are high or tainting has been found, until PAH levels decline to safe levels and seafood is no longer tainted.

**SOURCE:** Office of Environmental Health Hazard Assessment, Pesticide and Environmental Toxicology Branch, California Environmental Protection Agency