

Cadmium in BC Shellfish

What is cadmium?

Cadmium is a chemical element, commonly associated with rechargeable (ni-cad) batteries. It does not have any known function in human metabolism. Ingestion of cadmium over long periods of time may lead to kidney and bone problems.

Updated health concerns about cadmium

Cadmium reduces the kidney's ability to absorb essential nutrients, such as calcium, glucose, and amino acids into the body. In particular, the loss of calcium can result in decreased bone strength. Cadmium exposure has also been linked to other health effects, including diabetes and high blood pressure, but the scientific evidence to support a relationship between cadmium and these health effects is not strong^[1].

Levels of cadmium in BC shellfish

On land and in ocean waters, cadmium is found in varying amounts dependant on the local geology. Levels of cadmium tend to be higher in the Pacific Ocean than the Atlantic due to a "conveyor belt system" that deposits cadmium circulating in the world's oceans into the northwest Pacific - located at the end of the "ocean conveyor belt"^[2]. Man-made sources of cadmium in the environment derive from mining and agricultural activities^[3-5]. Other than near to mines and waste disposal sites, natural sources (in particular, cadmium in soils and in ocean waters) are likely more important than man-made sources in determining levels of cadmium on land and in coastal waters.

There is a wide range of cadmium levels reported in oysters from the Pacific northwest. The amount of cadmium, reported as parts per million (ppm) wet weight in Pacific northwest oysters has been measured at between 1 and 4 ppm.

Generally, levels of cadmium are much lower in oysters elsewhere in the world.

Cadmium levels reported in oysters

Location	Oyster Cadmium Levels ppm wet weight	Ref
Alaska	Average: 2.2	[6]
	Range: 1.6 to 4.0	
BC	Range: 1.5 to 3.5	[7]
BC	Range: 1.2 to 3.6	[8]
Oregon	Average: 1.3	[6]
	Range: 0.7 to 2.0	
Washington	Average: 1.2	[6]
	Range: 0.4 to 2.5	
California	Average: 0.6	[6]
	Range: 0.4- 0.8	
Hong Kong	Average: 0.7	[9]
France	Range: 0.04-0.7	[9]
England	Average: 0.2	[9]

Safe consumption of BC oysters and scallops for the general population

Surveys of BC shellfish have shown that only oysters and scallops have higher than expected levels of cadmium – most clams and mussels surveyed have low cadmium levels^[7]. Scallops are only a problem when consumed whole. The more commonly consumed adductor muscle (the fleshy part of the scallop) is low in cadmium^[10].

Not all of the cadmium you ingest is absorbed into your body. Recent scientific studies show that cadmium absorption varies widely between people^[1, 11]. As the effects of cadmium on health relate to long-term exposure, clear hazard levels are hard to define. Recently, international authorities have recommended that exposure to cadmium from all sources (such as cigarettes, as well as oysters and scallops) be lowered in order to better protect the health of the public^[12].

The current Health Canada policy^[13] on cadmium in BC oysters is to reduce risk by limiting consumption: for adults, Health Canada recommends a maximum of 12 oysters per month and for children, no more than 1½ oysters per month.

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Safe consumption for higher risk groups

Certain individuals have a higher risk of experiencing adverse health effects if they are exposed to cadmium through eating oysters and whole scallops^[1, 14]. These individuals should limit their oyster and scallop consumption. They include:

- 1) **Smokers:** Smokers already tend to have higher levels of cadmium in their bodies compared to non-smokers due to the presence of cadmium in cigarette smoke. Eating 1 typical 40g BC oyster is approximately equal to smoking 40 cigarettes, in terms of the cadmium absorbed^[1, 15].
- 2) **Regular consumers** such as self-harvesters, oyster and scallop farmers and members of coastal First Nations groups who consume large numbers of oysters and whole scallops. For scallops, consumption of the entire mollusc can lead to far greater levels of cadmium exposure than occurs when only the scallop muscle is eaten.
- 3) **Consumers of traditional game meats** (particularly organ meats, which like oysters, contain cadmium), may be at a higher risk of being affected by cadmium if they also eat oysters or whole scallops.
- 4) **Diabetics and people with renal disease** may have pre-existing kidney problems, which can be made worse through exposure to cadmium-containing foods.
- 5) **Women:** Women who have low iron levels (anaemia) may absorb more cadmium into their bodies than women with normal iron levels.
- 6) **Children:** Children may absorb more cadmium into their bodies than adults.

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