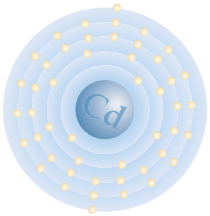
Indian and Northern Affairs Canada
Affaires indiennes et du Nord Canada



Metals of Concern Fact Sheet Series

Cadmium

Highlights

- Erosion and weathering of the local geology are the primary sources of cadmium in the Yukon environment.
- Cadmium is used in batteries, protective metal coatings, pigments and stabilizers.
- Willow (Salix artica) is known as a cadmium-accumulating plant.
- A consumption guideline exists for cadmium in organ meats in Yukon game, and a guide is provided in this fact sheet. Caribou and moose continue to be monitored.
- A balanced diet can reduce the amount of cadmium absorbed by the body from food and drink. Diets that are low in calcium, iron and protein and high in fat allow for higher absorption of cadmium.
- Cigarette smoking is the most significant source of cadmium in humans.
- Cadmium is not found in Yukon country foods at levels of concern.

What is Cadmium?

Pure cadmium is a bluish-white soft metal that occurs naturally in Yukon lead-zinc minerals.

Cadmium is conductive, bright in appearance and does not corrode easily. Most of the cadmium produced globally is used in nickel-cadmium batteries. Cadmium is also used in plastic stabilizers to prevent polyvinyl chloride (PVC) from decomposing through heat and light. Plastics, ceramics, glasses and enamels may be tinted with cadmium based pigments.

Some metal products are electroplated with a cadmium protective coating to slow down rusting. Solder, dental amalgams, alloys, electronic devices, television picture tubes, mirrors and solar cells all use cadmium.

How does Cadmium enter the environment?

The primary source of cadmium in the North is from natural erosion and weathering of the land.

When cadmium enters the environment, plants can absorb it. Concentrations vary by species and the absorption rate may be encouraged by certain environmental conditions. For example, willows are known cadmium accumulators. Animal foraging brings cadmium into the food chain and, as a result, cadmium accumulates in caribou, moose, beaver and other animals.

There is a consumption limit guideline in the Yukon for specific animal organ meats.

Is Cadmium Toxic?

Cadmium is absorbed in the gastrointestinal tract and is transported through the bloodstream and deposited in the liver and the kidneys, where proteins bind with the metal. This may help to protect the animal from toxic effects. Most cadmium is excreted by animals and does not biomagnify in the food chain.

Consumption of large quantities of organ meats may present a risk to humans. This is because an animal may ingest more cadmium than it is able to flush out of its system. As a result, cadmium accumulates in the body, which can lead to toxic health effects when humans consume a large amount of kidney or liver meat from these animals. It should be noted, however, that exposure to cadmium through diet and environment are minor compared to the cadmium inhaled from cigarette smoking.

Although cadmium does accumulate in the liver and kidney of both animals and humans, it does not accumulate in the muscle tissue or meat. There is no consumption limit for the meat of Yukon wild game.

Long-term chronic exposure to cadmium has been linked to kidney disease, lung damage and the development of less dense, fragile bones. Animal studies completed in the U.S. have shown that

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more cadmium is absorbed into the body if the diet is low in calcium, protein and iron and high in fat. A balanced diet can reduce the amount of cadmium absorbed by the body from food and drink.

References:

- Department of Indian and Northern Affairs. (1997). Canadian Arctic Contaminants Assessment Report: Jensen, J., Adare, K., Shearer, R. (Eds.).
- Gamberg, M. (2008). Arctic Caribou and Moose Contaminant Monitoring Program. Synopsis of Research, Northern Contaminants Program. 2007-2008. pp.108-113. Department of Indian and Northern Affairs, Northern Contaminants Program, Ottawa, Ont.

Health Advisory for Yukon Wildlife issued by Health and Social Services, Government of Yukon

Animal	Maximum number of kidneys per year recommended for consumption	Maximum number of livers per year recommended for consumption
Caribou		
Bonnet Plume	32	16
Nahanni	28	13
Porcupine	25	12
Forty Mile	20	12
Wolf Lake	15	8
Finlayson	8	5
Tay	7	4
Moose	1	1
Sheep	178	No Limit
Goat	382	26
Beaver	15	46
Porcupine	13	17
Snowshoe Hare	485	No limit

Where to find more information on the web:

- **Health Canada**
  http://www.hc-sc.gc.ca/ewh-semt/pubs/contaminants/psl1-lsp1/cadmium_comp/
  http://www.hc-sc.gc.ca/fn-an/securit/chem-chim/index-eng.php
  http://www.hc-sc.gc.ca/ewh-semt/contaminants/index-eng.php
- **Environment Canada**
  http://www.chemicalsubstanceschimiques.gc.ca/index-eng.php
  http://www.ec.gc.ca/default.asp?lang=En&n=FD9B0E51-1
- **Indian and Northern Affairs Canada, Northern Contaminants Program**
  www.inac-ainc.gc.ca/ncp/index_e.html
- **Arctic Borderlands Ecological Knowledge Society**
  www.taiga.net
- **Government of Yukon, Environment**
  http://www.environmentyukon.gov.yk.ca/monitoringenvironment/

The Yukon Contaminants Committee co-ordinates the Northern Contaminants Program for the territory. Its members represent Canada, Yukon and the Council of Yukon First Nations, Yukon Conservation Society, and Yukon College.

Since its establishment in 1991, the Committee has acted as a link between the scientific community and Northerners on contaminants issues. Please direct any comments to the Yukon Contaminants Committee (867) 667-3283 or toll-free 1 (800) 661-0451 ext. 3283

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