



# TOXAPHENE

## HIGHLIGHTS

- Toxaphene is a synthetic organic compound made from over 670 chemicals. It is not found naturally in our environment.
- The Yukon Contaminants Committee has been investigating toxaphene levels in the Arctic and sub-Arctic environment for many years.
- Toxaphene is carried to the North from other parts of the world in air currents.
- Toxaphene remains in soil and lake sediment for many years.
- Toxaphene is persistent, accumulates in the food chain and is toxic.
- The greatest concentration of toxaphene in the northern environment is found in the tissues of marine mammals such as whales and seals.
- Toxaphene has negative health effects in humans, including suppression of the immune system, negative effects on the central nervous system and degeneration of the kidneys and liver.
- Toxaphene levels are declining in Yukon freshwater fish species and are below Health Canada guidelines.

## WHAT IS TOXAPHENE?

Toxaphene does not occur naturally in the environment. Toxaphene is an amber, waxy, turpentine-scented pesticide containing over 670 chemicals. It is a solid that does not burn but is easily vaporized. It does not dissolve easily in water.

Toxaphene was first used in North America in 1949. Toxaphene was one of the most heavily applied insecticides in the United States, though it had only limited use in Canada. It was used primarily to control insect-pests on cotton and other crops. It was also used to control pests on livestock and to kill unwanted fish species in lakes.

When toxaphene use was at its peak in the mid-'70s, people became concerned about its toxicity, the way it accumulated in aquatic organisms, and the way it stayed in the environment for many years. Toxaphene's effect on human and animal health led to a ban on its use in Canada and the United States in 1982.

Toxaphene is still used in some parts of the world, mostly to control insects on banana and pineapple crops.

## HOW DOES TOXAPHENE ENTER THE ENVIRONMENT?

Toxaphene is found in many parts of the world where it was never used because it evaporates into the air and is carried on air currents over long distances. Toxaphene does not dissolve well in water, so it is most likely to be found in the soil or in sediments

at the bottom of lakes or streams. It is also found in the tissues of aquatic organisms.

Once toxaphene enters the environment it remains there for a long time. Toxaphene has a half-life of up to 12 years in soil. Studies have shown that people in the Canadian Arctic who have a traditional diet of fish and marine animals consume 10 times the accepted tolerable daily intake of toxaphene.

It is difficult and expensive to measure toxaphene in the environment, and the extent of toxaphene contamination of the North has only recently been understood.

## HOW TOXIC IS TOXAPHENE?

Toxaphene is no longer used in North America so risk of high-level exposure is low. Long-term exposure to low levels of toxaphene has the potential to cause liver and kidney degeneration, affect the central nervous system and suppress the immune system.

There is currently little information available on the developmental and reproductive effects of toxaphene on humans. Acute poisoning from the prolonged ingestion or inhalation of high levels of toxaphene causes damage to the lungs, the nervous system, and the liver and kidneys in humans.

Toxaphene builds up in human fat, so people most at risk are those with a diet that includes large quantities of the fatty tissues of fish, shellfish or marine mammals.

In the Yukon, toxaphene levels in trout from Kusawa Lake and Lake Laberge are well below the Health Canada guidelines.

## WHAT ARE THE EFFECTS OF TOXAPHENE ON OUR ENVIRONMENT?

Toxaphene is very persistent, remaining in the soil for many years. It is not broken down by microbial organisms. It may gradually evaporate in the air, where it is slowly broken down by sunlight.

Toxaphene has been found in high concentrations in shellfish, algae, fish and marine mammals. In the Arctic, blubber from beluga whales has been found to contain unhealthy levels of toxaphene.

Levels of toxaphene may be higher in predatory

mammals that eat mainly fish because toxaphene accumulates in the fish's fatty tissues.

The major toxic effect of toxaphene on animals is on the nervous system. Fish are extremely sensitive and become hyperactive, suffering muscular spasms and losing their equilibrium.

In the early 1990s, high concentrations of toxaphene were found in the tissues of fish in some Yukon lakes. Predatory species such as lake trout and burbot were particularly affected. Subsequent studies have shown that toxaphene levels in these fish species have decreased and are below Health Canada guidelines.

In Lake Laberge this decrease is believed to be associated with a change in the diet of the predatory fish as the lake recovered from commercial fishing.

## WHERE TO FIND MORE INFORMATION ON THE WEB:

- **Health Canada**  
<http://www.hc-sc.gc.ca/sr-sr/finance/tsri-irst/proj/persist-org/index-eng.php>  
<http://www.hc-sc.gc.ca/fn-an/securit/chem-chim/environ/index-eng.php>  
<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>
- **Indian and Northern Affairs Canada, Northern Contaminants Program**  
[www.inac-ainc.gc.ca/ncp/index\\_e.html](http://www.inac-ainc.gc.ca/ncp/index_e.html)
- **Arctic Borderlands Ecological Knowledge Society**  
[www.taiga.net](http://www.taiga.net)

## REFERENCES

- Department of Indian and Northern Affairs. *Canadian Arctic Contaminants Assessment Report II: Sources, Occurrence, Trends and Pathways in the Physical Environment*. T. Bidleman, R. Macdonald, and J. Stow, eds. 2003.
- Ryan, M., G. Stern, M. Diamond, M.V. Croft, P. Roach, K. Kidd. "Temporal trends of organochlorine contaminants in burbot and lake trout from three selected Yukon lakes," *Science of the Total Environment*, 2005.
- G.A. Stern, "Trace metals and organohalogen contaminants in fish from selected Yukon lakes: A temporal and spatial study", in *Synopsis of Research, Northern Contaminants Program*, Department of Indian and Northern Affairs, Ottawa, 2008.

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

Update date: March 2010

QS-Y345-000-EE-A1

Aussi disponible en français : QS-Y345-000-FF-A1