

CYANOBACTERIAL ("Blue-Green Algae") TOXICITY



Cyanobacterial blooms

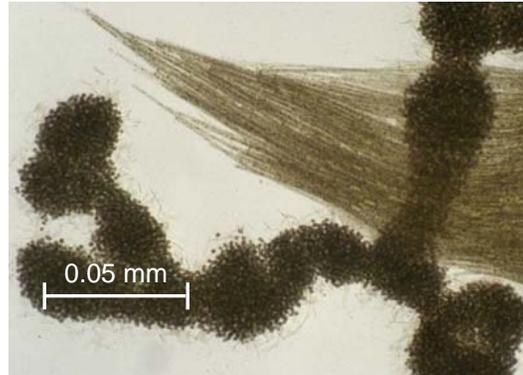
Cyanobacteria, a unique group of algae-like bacteria, often grow profusely and form surface blooms in Alberta's nutrient-rich lakes, reservoirs and ponds. Though natural to an extent, nutrient enrichment resulting from urban, industrial and agricultural development is increasing the frequency and severity of blooms.

Cyanobacterial toxins

Cyanobacteria produce several types of toxins, the most common being liver toxins. Nerve toxins are more rare, but can cause periodic loss of wildlife. Some cyanobacteria cause skin irritation. In Alberta, numerous cases of animal poisonings have occurred and reports of human illness linked to cyanobacteria also exist.

Predicting toxicity

Not all cyanobacteria produce toxins although some species produce several types. Within a single species, some strains are toxic while others are not. This makes prediction a difficult task. Toxic and non-toxic strains of a species usually occur simultaneously.



Common cyanobacteria, magnified 40X

Toxin concentration depends on the density of toxin-producing species in a lake. Cyanobacterial blooms vary in time and location in lakes, as does toxicity. Lakes can suddenly become toxic and, conversely, lakes that have shown toxicity in the past may not show it for several years. Some areas of a lake can be toxic, while other regions remain safe. Caution should be taken at lakes where blooms have occurred in the past.

Toxicity is temporary. About 90% of toxin will degrade naturally within two weeks after the collapse of a bloom.

Cyanobacterial toxins and animals

Wildlife, livestock or dogs can be poisoned by toxic cyanobacteria when they have no other sources of clean drinking water.

Some toxins affect the animal's liver and can cause death within 36 hours of drinking tainted water. Common symptoms of poisoning are lethargy, pallor, extreme gastro-intestinal pain and diarrhea. This may lead to liver damage and hemorrhaging and in severe cases result in death by shock if much of the animal's blood pools in the liver.

In contrast, nerve toxins cause rapid death (often within 30 minutes) due to paralysis and respiratory arrest. Several toxins may be present at once, so symptoms may vary or lack clear definition.

The volume of water required to kill an animal depends on the density of toxin-containing cyanobacteria and the size and health of the animal. Much smaller volumes of water will poison old, very young, sick or weak animals with lower tolerance levels.

Cyanobacterial toxins and humans

Humans are as susceptible to cyanobacterial toxins as animals, but most of us will not voluntarily drink affected lake water because of its objectionable appearance and odor. Accidental swallowing of cyanobacteria can result in fever, headache, dizziness, stomach cramps, vomiting, diarrhea and sore throat.

Humans can also suffer skin and eye irritation and swelling, sore throat and swollen lips. These seldom persist for more than two or three days.

Children can be more intensely affected because they spend more time in the water than adults and have lower tolerances to the toxins.



Shoreline bloom on Pigeon Lake, AB.

Monitoring toxicity

Laboratories in Alberta can rapidly determine the concentrations of liver and some nerve toxins. Alberta Environment monitors toxin levels in many recreational lakes and reservoirs.



Severe cyanobacterial bloom

Precautions to take

- Treat all blooms with caution
- Do not drink water from cyanobacteria laden or bloom-infested lakes and reservoirs. Do not drink any untreated surface waters
- Do not swim or wade in water containing dense accumulations of cyanobacteria
- Provide alternative sources of drinking water for domestic animals and pets

Contacts

- If you suspect that cyanobacteria may be endangering swimming, contact your **regional health authority**
- If symptoms related to cyanobacteria are experienced, **contact a physician** immediately
- If your pet shows symptoms, **contact a veterinarian** immediately
- If you have questions about water quality or to report dead animals or wildlife near a lake, contact a regional Alberta Environment office or the Environmental Monitoring and Evaluation Branch by calling **toll-free (310-0000)**

For more information

- On cyanobacterial blooms and toxicity: see *Problems and Issues* FAQs on Alberta Environment's Surface Water Quality webpage.
- Water quality characteristics, such as clarity, pH, alkalinity, and nutrients and summary data reports for many of Alberta's lakes, may be found on Alberta Environment's *Online Surface Water Quality Reports* webpage.

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