

# Blue-Green Algae

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Blue-green algae (also called cyanobacteria) are microscopic organisms that are naturally present in many lakes, ponds and streams. These algae, given the right conditions, may multiply quite a bit in summer months causing growths called blooms. When it is calm, algae often form on water surfaces, looking like blue-green or greenish-brown scum. The algae can produce a musty earth or grassy odour.

Some bloom-forming species of blue-green algae also produce strong toxins. When toxic blooms die and decay, toxic chemicals may be released into the water. While most toxins are quickly degraded within two weeks, they can still be found in the water at lower concentrations for several months after the bloom has occurred. Some blooms have been severe enough to cause livestock deaths. Although some algal blooms do not contain toxic species of algae, it is not possible to know from how it looks whether or not a bloom is harmful. If an algal bloom is present, precautions should be taken as if it were toxic.

## **HUMAN HEALTH EFFECTS**

Human illnesses have been reported after being in contact with water containing blue-green algae. Symptoms of skin irritation, rashes, sore throat, sore red eyes, swollen lips and hay-fever like allergic reactions, have been reported through recreational activities such as swimming and boating.

Drinking water with blue-green algae in it has been known to cause nausea, stomach cramps, vomiting, diarrhea, fever, headache, pains in muscles and joints, weakness and liver damage. Children may become very sick because they tend to spend more time in the water than adults and may swallow contaminated shoreline water. Treat all algae blooms with caution. Visit your doctor or hospital if you have been in contact with water containing blue-green algae and are having any symptoms noted above.

## **LIVESTOCK AND PETS**

Although a good source of drinking water for livestock and pets, lakes contaminated with blue-green algae can be deadly if toxins from the algae are present. Some illnesses and deaths of livestock and wildlife have been linked to these animals drinking water containing blue-green algae. Animals should be kept away from natural water sources that contain algal blooms. Animals tend to drink water, regardless of how it looks or smells.

## **WATERING VEGETABLE GARDENS**

Do not use water contaminated with blue-green algae to water edible plants, especially plants that have edible portions exposed to the ground surface such as cabbages, lettuces, tomatoes and other salad vegetables. It is not known if fruits and vegetables absorb the toxins found in algae-contaminated water.

## **LAUNDRY AND COOKING**

Do not use algae-contaminated water for washing clothes or dishes if a safe source of water is available. Boiling the water does not remove toxins from water.

## **EATING FISH**

While it is known that fish do store toxins in their liver, more research is needed to learn if the toxins accumulate in the flesh. Therefore, fish caught from algae-affected water should be eaten in moderation and avoid eating the guts (liver, kidney, etc.) of the fish.

## PREVENTION OF ALGAE GROWTH

Good watershed management is the key to limiting the potential for algal growth. The major factor to controlling algae in natural waters is limiting the input of nutrients into the water body (e.g. wastewater effluent, agriculture runoff). Residents should take action to limit nutrient additions to their lakes by avoiding lawn fertilizers and properly maintaining their private sewage systems.

Use common sense to ensure the safety of yourself and your family:

- Avoid contact with scum layers, large mats, or other visible blooms of blue-green algae.
- Do not allow pets or children to play in shallow, scummy areas or areas where blooms of algae are present.
- If you come in contact with a bloom, wash off thoroughly, paying special attention to the swimsuit area.
- Do not use raw untreated water for drinking, cleaning food or washing clothing.
- Do not attempt to boil contaminated water as this may release more toxins from the algae.
- Provide an alternate source of drinking water for pets and livestock.
- If your pet comes in contact with a bloom, wash off your pet's coat to prevent it from ingesting the algae while self-cleaning.
- Contact your local health department if a bloom occurs in your area.
- Contact a doctor if any symptoms occur after being in contact with algae-affected waters.
- Contact a veterinarian if your pet has been in contact with contaminated water.

For more information contact your local health department

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# Blue-Green Algae

## Frequently Asked Questions

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### GENERAL

#### *What are blue-green algae?*

Blue-green algae – also known as *Cyanobacteria* – are a form of algae many people call "pond scum." These algae often have a blue-green color. Blue-green algae grow in lakes, ponds, and slow moving streams when the water is warm and enriched with nutrients like phosphorus or nitrogen. Sometimes environmental conditions are just right and these algae grow very quickly and float to the surface where they form scum layers or floating mats. When this happens, you may be able to see an "algae bloom." In Alberta, algae blooms generally show up in June and may last until late September. It is not always the same species that blooms throughout the summer months. In fact, many lakes experience a bloom that lasts throughout the summer months, but it may actually be altogether different species growing in June than those that show up in August.

#### *What purpose do blue-green algae serve in the environment?*

Algae, including blue-green algae, are very important to the food chain. They are known as "primary producers" – a name that is given to living organisms that can convert sunlight and inorganic chemicals into usable energy for other living organisms. Most algae are microscopic and serve as the main supply of "high energy" food for larger organisms like zooplankton which in turn are eaten by small fish, larger fish, mammals, raptors, and even people.

#### *What are algal toxins?*

*Algal toxins* are naturally produced chemical compounds that are found at times inside the cells of certain species of blue-green algae. For most species, these chemicals are not produced all of the time and there is no easy way to tell when the algae are producing them and when they are not.

These chemicals can be categorized as:

- **Endotoxins** – chemicals that affect the skin and other mucous membranes causing allergy like reactions (rash, eye/nose/throat irritation, asthma, etc.). They may also cause stomach cramps, fever, headaches, etc.
- **Hepatotoxins** – chemicals that damage the liver and other internal organs. They may cause gastroenteritis, nausea, convulsions/seizures, vomiting, muscle weakness, vision problems, etc.
- **Neurotoxins** – chemicals that affect the central nervous system by acting as neuromuscular blocking agents leading to seizures, paralysis and respiratory or cardiac arrest.

When blue-green algae are growing in the water, they sometimes produce these toxins and store them within the algal cell itself. If a cell is broken open, the toxins may be released. Sometimes this occurs when the cells die off naturally and they break open as they sink and decay in a lake or pond. Other times, the cells may be broken open when the water is treated with chemicals meant to kill algae or when the cells are swallowed and they are mixed with the digestive acids in the stomachs of people or animals.

#### *Does the presence of blue-green algae always mean the water is contaminated?*

The short answer is "No" and "Yes." Many blue-green algae do not produce toxins and while algae blooms may be unsightly, it does not always mean the water is contaminated with toxic substances. Simply seeing a bloom will not tell you whether or not toxins may be found in the water.

### ***Are blue-green algae and their blooms a new problem?***

No. Fossil evidence suggests that blue-green algae have been around for millions of years and they are believed to be the precursor to true plants. Scientists have recorded blue-green blooms dating back to the 12th century and they have documented the toxic effects to livestock for more than 100 years. It is probable that blooms seem to be more prominent now than in the past as a result of increased volumes of nutrients having reached our waters due to many human activities, including certain agricultural practices, discharge of untreated sewage, and use of phosphorus-based fertilizers and detergents.

### ***Why do blooms sometimes appear overnight?***

Even if you can't see algae floating on the surface of the water, that doesn't mean that a bloom isn't present in the water - the bloom could be suspended at various depths in the water where you can't see it. The depth at which algae blooms float depends on a number of factors. The most important of these are light and food (phosphorus and nitrogen). Many species of blue-green algae have evolved to be able to control their buoyancy as the availability of these light and food change with the time of day and the local weather conditions. By being able to sink and rise at will, they are able to move to take advantage of the best light and nutrient levels. Light is a key factor that activates the mechanism for algae blooms to move. At night, when there is no light, cells are unable to adjust their buoyancy and often float to the surface, forming a surface scum. This scum literally appears overnight and lingers until the wind and waves scatter the cells throughout the water.

### ***What can be done to reduce the frequency and intensity of blue-green algae blooms?***

There are no quick and easy remedies for the control of blue-green algae once they appear in a lake or pond. Reducing the amount of nutrients that wash into our lakes and ponds may eventually reduce the intensity of algae blooms. Even if the nutrients washing into the water are reduced, there may still be large amounts of the nutrients in the sediment or muck at the bottom of many lakes and ponds that serve as food for the blue-green algae.

On a local basis, there are many practices that can be promoted within your neighborhood or your community that will help, including:

- Use lawn fertilizers only where truly needed,
- Prevent yard debris (i.e., leaves, grass clippings, etc.) from washing into storm drains,
- Support local ordinances that require silt curtains for residential and commercial construction sites,
- Plant and maintain vegetative buffer strips along public and private land bordering lakes, streams, and ponds.
- Allow native plant species to grow along shorelines of lakes, streams, and ponds. Native plants are much more effective at filtering runoff than the typical grass species found on most residential lawns.

## **EFFECTS ON HUMANS & ANIMALS**

### ***Can blue-green algae make me sick?***

Some people may develop allergic reactions if they come in contact with water containing some species of blue-green algae when toxins are being produced. Symptoms may include skin rash, hives, itchy eyes and throat, etc. If blue-green algae are swallowed through the mouth or nose, it is possible for more severe illness to occur. Because of the uncertainty about when the algae are actually producing toxins and just how much is being produced, there is no way to say how much is too much. A physician should be consulted if someone ingests these algae and one or more of the following symptoms occur: stomach cramps, vomiting, diarrhea, fever, headache, severe muscle or joint pain. Emergency room attention is warranted if someone is showing signs of seizure or convulsions after swimming or drinking water where blue-green algae are present.

### ***Are children more vulnerable than adults?***

Yes. Children may be at greater risk than adults for two primary reasons. First, children love to play in the water and they may not truly understand the health risks as well as adults. As a result, they may drink the water because they are thirsty or swallow it accidentally while swimming. Second, children have less relative body weight and a smaller quantity of the toxin may be trigger an adverse response in their liver or central nervous system.

### ***Can blue-green algae make my pet sick?***

Animals are not necessarily more sensitive to algal toxins than humans. However, many animals like dogs and cattle enjoy being in the water and they do not seem to be concerned with the fact that there is an unsightly green scum layer floating on the water. They will drink the water and are likely to consume large quantities of the algae as well. If the algae are producing toxins at the time the animals ingest them, they can become very ill and even die. Signs of algal toxin poisoning may range from general lethargy and loss of appetite to more severe symptoms like seizures, vomiting, and convulsions. Dogs are particularly susceptible to blue-green algal poisoning because scums can attach to their coats and be swallowed during selfcleaning. If you suspect that your animals are showing any of these symptoms you should seek veterinary advice.

### ***Should I let my pets or my livestock drink or swim in water containing algal blooms?***

No. Animals can and do commonly become extremely ill and even die after swallowing water containing blue-green algae. As public awareness has increased, so has the number of reports of veterinarians suggesting that algal toxins have played a role in the deaths of dogs where other causes are not obvious. It is probable that the number of dogs that die from this phenomenon is an under-reported statistic.

## **DRINKING WATER CONCERNS**

### ***Other than recreation on the water, how likely am I to drink water contaminated with blue-green algae and/or its toxins?***

Not very likely if your water supply is provided by a municipal drinking water agency. For most Alberta residents and tourists, drinking water is provided by underground water sources that are not going to have blue-green algae or its toxins present. Keep in mind that water that is not treated may pose risks far beyond those associated with blue-green algae. All natural surface waters contain bacteria, algae, viruses, and other pathogens that if consumed may post health risks to humans, pets, and other domestic animals. No one should ingest raw lake or pond water at any time.

### ***Can I treat my water at home to remove blue-green algae and their toxins?***

There are a number of home water treatment options available to provide filtered water. Some of these systems include an activated charcoal step that will help remove certain chemicals like algal toxins if maintained and operated properly. However, variability in the design of the products on the market and the operation and maintenance by the homeowner prevent health officials from declaring these products fail-safe.

### ***Can I cook using water with blue-green algae in it?***

No! Boiling water does not remove toxins from the water. Since it is impossible to detect the presence of toxins in the water by taste, odor or appearance, you are better off assuming that they may be present.

### ***What about using water with blue-green algae for washing?***

If blue-green algae are visible, try to find a better source of water for washing food (i.e., fruits & vegetables, etc.), dishes, and clothes. Bathing or showering in water with blue-green algae should also be avoided, as skin contact with the algae may lead to skin irritation and rashes.

## RECREATIONAL WATER CONCERNS

### *Can water containing blue-green algae blooms be used for recreational activities?*

Because local health officials cannot easily determine when algal toxins are being produced, anyone considering recreation on or in the water should use common sense. Simply put, if a scum-layer or floating mat is present, the chance for health effects is greater if you or your children participate in water-related activities like swimming, wading, water or jet-skiing, or wind surfing, especially if you ingest a large quantity of water containing the algae. It is advisable to try to find areas where the blooms are not present.

## FISH CONSUMPTION

### *Can I eat fish from water with blue-green algae?*

Certain algal toxins have been shown to accumulate in the tissues of fish and shellfish, particularly in the viscera (liver, kidney, etc.). Whether or not the accumulation levels are sufficient to pose a risk to humans is uncertain although it would depend in part on the levels of consumption and the severity of the algal blooms where the fish or shellfish were caught or collected. The World Health Organization has advised that people choosing to eat fish from waters where blue-green algae blooms exist should eat them in moderation and avoid eating the guts of the fish where accumulation of toxins may be greatest.

## IMPORTANT FACTS ABOUT HYGIENE & CONTACT INFORMATION

### **★Important Note:**

All natural surface waters contain bacteria, algae, viruses, and other pathogens that if consumed may pose health risks to humans, pets, and other domestic animals (cattle, swine, etc...). No one should ingest raw lake or pond water at any time.

### **★General Recreational Use Guidance:**

- Common sense should be the guide to choosing whether or not to recreate on or in the water of any lake or pond that contains blue-green algae.
- No one should swim or dive where algae are visible (e.g., scum layers) or the water is discolored.
- Humans who enter the water where blue-green algae are present should not drink the water and should take precautions to prevent inhalation of water into the sinuses.
- Parents of children should keep them out of the water whenever algae are visible or the water is discolored, as it is possible that children are more susceptible to algal toxins than most adults.
- Pet owners should avoid allowing their pet to swim or drink the water whenever algae are visible or the water is discolored. Pet owners should also keep animals from eating algae that may have washed up along the shoreline.

**★ If you experience illness that may be due to exposure or ingestion of blue-green algae, contact your doctor.**

**★ If your pet shows symptoms such as seizures, vomiting, or diarrhea after contact with the water, contact your local veterinarian.**

For more information about contacting your local health department:

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