

Chemicals in the Water: Effect on Algae

Water pollution is anything contaminating a body of water. Point sources are distinct locations such as a factory that pumps its waste into a nearby river. Nonpoint sources are more diffuse areas like a farming region with fertilizers and pesticides and herbicides, a suburban community with many homes and lawns that have runoff fertilizer or dog waste, or many parking lots with oil.

1. Why is nonpoint source pollution more difficult to control than point source pollution?

Inorganic compounds, like lead, arsenic and mercury, and acids not only impact bodies of water but human health. They are difficult to remove from municipal supplies. Lead comes from old pipes, and exposure can damage the brain, nervous system and kidneys. Arsenic comes naturally from the Earth's crust as well as mining waste. There are very high levels of arsenic in the water along the Rio Grande. Health problems include skin, lung and kidney cancer. Mercury is a byproduct of burning coal. Bacteria convert inorganic mercury into methylmercury, which damages human nervous systems. Most mercury poisoning comes from eating contaminated fish. Sulfur dioxide and nitrogen dioxide are also released into the air from combustion. These dioxides convert to sulfuric and nitric acid, which return to the Earth as acid rain. The pH of a body of water should be around 7, but with the addition of acids, the pH declines.

2. Note one human impact each for lead, arsenic and mercury poisoning.

Other synthetic organic compounds wreck havoc on our water supplies. Pesticides, herbicides and insecticides drain into streams from lawns and farms. Pharmaceutical drugs and synthetic hormones are surprisingly detectable in 80% of our water supplies. In most cases, the effects on humans and wildlife are unknown.

3. Most people "flush" unused medicines down the toilet (adding them to the water cycle). Suggest a better way to dispose of unused medications.

Problem question: **How does the presence of small amounts of different chemicals affect the activity of algae in the water?**

- A. Set up and perform your own experiment to observe what happens to microscopic life when various chemicals often found in rainwater runoff are added to the water.**
- B. Identify all safety measures you must take to perform your lab.**
- C. Record your own data in a table.**
- D. Draw your own conclusions.**

Consult with your campus chemical safety officer before procuring different chemicals for students to use in this experiment.