

Chloroform and Drinking Water

Summary

Chloroform (also called trichloromethane) is a chemical used to make other chemicals and a byproduct of chlorinating water. Chloroform has been detected in Minnesota groundwater, surface water, and drinking water. Some of the detections have been above the Minnesota Department of Health (MDH) Health Risk Limit (HRL) of 20 micrograms per liter (or parts per billion [ppb]). Ingesting, through drinking water, high levels of chloroform for a long time can damage your liver and kidney.¹

Chloroform

We are in contact with chloroform every day. Chloroform is a byproduct of chlorinating drinking water, municipal sewage, and cooling water in electric power generating plants. Chlorine is used in drinking water treatment to reduce the risk of illness from bacteria or viruses. Some algae create chloroform and some chemicals create chloroform when they breakdown in sunlight. Chloroform is used in making refrigerants and rubber.² In the past, chloroform was used as an anesthetic for surgery and in products like cough suppressants and toothpaste. Chloroform can also be released into the air, but the amount of chloroform released into Minnesota air has decreased sharply over the past few decades. One pound of chloroform was released in Minnesota air in 2014 compared to 342,430 pounds in 1988.³

Chloroform in Minnesota Waters

Chloroform is commonly detected in Minnesota groundwater and surface waters. Detections of chloroform in groundwater range from 0.1 ppb to 190 ppb with a median of 0.8 ppb.⁴ Chloroform has also been detected in Minnesota public drinking water. Twenty-nine percent of drinking water records from 1993 to 2016 showed detections of chloroform. While some of the detections were over the MDH HRL of 20 ppb, most were not. The median level of chloroform detected in public drinking water was 1.5 ppb.⁵

MDH Guidance Value

Based on available information, MDH developed a guidance value of 20 ppb for chloroform in drinking water. A person drinking water at or below the guidance value would have little or no risk for health effects.

Potential Exposure to Chloroform

You breathe in chloroform each day. You also come into contact with chloroform when you drink water treated with chlorine or breathe in water vapor. Your skin can also absorb chloroform when you swim or bathe in chlorinated water. In general, rural areas tend to have less chloroform in the air than urban areas. People who work at drinking water treatment plants, waste water treatment plants, and paper and pulp mills may come into larger amounts of chloroform.¹

Potential Health Effects

Animal studies indicate that short exposures could be associated with suppression of the immune system, increased liver weight and liver lesions, incomplete skull formation and decreased body weight gain in pups.

Additionally, longer exposures in laboratory animals at levels above the guidance value are associated with effects to male reproductive organs as well.

Chloroform in the Environment

Chloroform enters the environment through chlorinating water, discharging waste water, using it for industrial purposes, and through some natural processes. Chloroform can move very easily from water into the air. Chloroform stays in air for a long time. It also dissolves easily in water, which means it can easily move into groundwater. Once chloroform is in groundwater, it is expected the chemical will be in the groundwater for a long time.

Health Risk Assessment Unit

The MDH Health Risk Assessment Unit evaluates the health risks from contaminants in groundwater. MDH works in collaboration with the Minnesota Pollution Control Agency and the Minnesota Department of Agriculture to understand the occurrence and environmental effects of contaminants in water.

References

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3. U.S. Environmental Protection Agency. 2016b. Toxic Release INventory Reporting. https://iaspub.epa.gov/triexplorer/tri_release.chemical. Accessed September 2016.
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5. Minnesota Drinking Water Information System (MNDWIS). 2016. Accessed by MDH staff July 2016.

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