

Fluoranthene and Drinking Water

Fluoranthene is a contaminant that has been found in drinking water in Minnesota. The Minnesota Department of Health (MDH) developed a health-based guidance value for fluoranthene in drinking water and, based on this value, does not expect levels in drinking water to harm Minnesotans.

Summary

Fluoranthene is one of a group of chemicals called polycyclic aromatic hydrocarbons (PAHs). PAHs are a group of naturally occurring pollutants and are typically found in the environment together in mixture. Fluoranthene is a natural component of coal tar, crude oil, and fossil fuels. Fluoranthene has been detected in Minnesota waters. Public water systems are monitored for fluoranthene, but private well owners should have their wells tested if they are concerned about fluoranthene in their drinking water.

Fluoranthene

Fluoranthene is released naturally during the burning of fossil fuels and wood. Fluoranthene is an ingredient in dyes, pharmaceuticals, and insulating oils. Fluoranthene can be routinely found in foods, including grilled hamburgers, fruits, vegetables, grains, butter, oils, fats, and seafood. Fluoranthene can be found in car exhaust and cigarette smoke.



Fluoranthene in Minnesota Waters

The Minnesota Pollution Control Agency (MPCA) has detected fluoranthene in public drinking water wells at a maximum concentration of 0.320 parts per billion (ppb).¹ Fluoranthene has been reported in ambient groundwater in Anoka, Beltrami, Dakota, Hennepin, Ramsey and Stearns counties at concentrations from 0.003 to 0.034 ppb.² Many of the detections were near the Mississippi River basin. One study found fluoranthene in a St. Louis Park aquifer that was contaminated by coal tar.³

The U.S. Geological Survey (USGS) studied PAHs in three streams in Minnesota. Fluoranthene was the most frequently detected chemical in this study, being found in at least 50% of the samples.⁴

MDH Guidance Value

Based on available information, MDH developed a guidance value of 70 ppb for fluoranthene in drinking water. A person drinking water at or below the guidance value would have little or no risk of health effects.

Potential Health Effects

The effects of brief exposures to fluoranthene are not known. Longer-term animal studies show that fluoranthene can cause nephropathy (kidney disease), increased liver weight, and increases in liver enzymes.

Potential Exposure to Fluoranthene

People are exposed to fluoranthene because it is often found in air, water, food, and soil. Most people are exposed to some level of fluoranthene when eating grilled or char-broiled foods. People are also commonly exposed to fluoranthene through inhaling car exhaust, cigarette smoke, or fires. Fluoranthene can also be ingested through eating contaminated food or drinking contaminated water. Grilling meats is another way to be exposed, as the cooking process can release fluoranthene. Some people are exposed to fluoranthene at work, especially if they work with coal tar products or oil refineries.

Fluoranthene in the Environment

Fluoranthene is formed when a material, such as gasoline or wood, burns incompletely. Fluoranthene sticks to very small particles that go into the air. People and animals may breathe in the particles that contain fluoranthene and other PAHs. The particles and fluoranthene eventually settle back onto the ground or into ponds, lakes, or rivers. Fluoranthene can also be washed into water by rain. Fluoranthene may settle into sediment or soil. When fluoranthene is attached to particles in soil or water it can be swallowed by animals, including fish or taken up by plants.

When fluoranthene enters the environment, it can remain in the soil, water, or air. Eventually, PAHs are broken down into less harmful molecules by the action of microbes, chemical interactions, or sunlight.

Potential Environmental Impacts of Fluoranthene

Fluoranthene is toxic to aquatic organisms. Water monitoring in Minnesota's rivers and lakes indicates fluoranthene concentrations are below a state water quality standard established to protect aquatic life. A bigger concern is the potential for fluoranthene to build up in aquatic sediments, where it could pose a risk to organisms that live in or near the bottom of lakes and rivers.

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

1. Minnesota Pollution Control Agency (MPCA) 2014. Interagency submission to MDH.
2. Minnesota Pollution Control Agency (MPCA). 2014. Data from EQuIS sent to MDH per request.
3. Hazardous Substances Data Bank. 2014. National Library of Medicine. Query for Fluoranthene 206-44-0. <http://toxnet.nlm.nih.gov/cgi-bin/sis/htmlgen?HSDB>. Accessed October 2014.
4. United States Geologic Survey 2008. Alkylphenols, Other Endocrine-Active Chemicals, and Fish Responses in three Streams in Minnesota February–September 2007. Accessed December 2014. <http://pubs.usgs.gov/ds/405/>

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