

Perfluorobutanoic acid (PFBA) and Water

PFBA

PFBA is one of a group of related chemicals known as per- and polyfluoroalkyl substances (PFAS). This group of chemicals is commonly used in non-stick and stain-resistant consumer products, food packaging, fire-fighting foam, and industrial processes.

PFBA is a breakdown product of other PFAS used in stain-resistant fabrics, paper food packaging, and carpets. PFBA was also used for manufacturing photographic film. The 3M Company was once a major manufacturer of PFBA and products containing PFBA but production was phased out in 1998.

PFBA in Minnesota Waters

The Minnesota Pollution Control Agency (MPCA) has detected PFBA in Minnesota rivers that have been tested for PFAS. Most test locations were downstream from towns or cities. PFBA was more commonly detected than other PFAS in those waters.^{1,2}

PFBA has been detected in private drinking water wells and public drinking water systems in several parts of Minnesota where known industrial use or disposal of PFBA occurred in the past. PFBA has been detected in sources of public drinking water at levels up to 3.7 µg/L*.³ MDH and MPCA routinely sample affected areas for PFBA and related chemicals.

*One microgram per liter (µg/L) is the same as one part per billion (ppb).

MDH Guidance Value

Based on available information, MDH developed a guidance value of 7 ppb for PFBA in drinking water. MDH guidance values are developed to protect people who are most vulnerable to the potentially harmful effects of a contaminant. MDH does not use guidance values to regulate water quality, but they may be useful for situations in which no regulations exist. MDH develops guidance values to protect people who are most vulnerable to the potentially harmful effects of a contaminant. A person drinking water at or below the guidance value would be at little or no risk for harmful health effects.

Potential Health Effects

In laboratory animal studies, exposure to high levels of PFBA resulted in thyroid and liver effects, such as increased thyroid and liver weight, changes in thyroid hormones, decreased cholesterol, and cellular changes in both organs. Other effects of PFBA exposure included delayed development and decreased red blood cells and hemoglobin. Studies of PFBA in people are lacking.

Potential Exposure to PFBA

PFBA has been detected in the blood of people exposed to PFAS, but is less common than other PFAS. The human body is able to eliminate PFBA faster than some other PFAS.⁴

For people living in areas affected by PFAS release or disposal, drinking water may be a major source of PFBA exposure. Reverse osmosis and activated carbon filter treatment systems can reduce the levels of PFBA in drinking water in your home.

PFBA in the Environment

While industrial production and use of PFBA has declined in recent years, PFBA can be formed in the environment as a breakdown product of related PFAS that are still in use. PFBA is persistent in the environment, meaning it does not break down easily in soil or water. PFBA more easily dissolves in water than other PFAS and does not stick to soil. This means it can move faster in the environment and may contaminate large areas of groundwater. In several large areas of Minnesota, PFBA has moved into groundwater over the course of many years.

Health Risk Assessment Unit

The MDH Health Risk Assessment Unit evaluates the health risks from contaminants in drinking water sources and develops health-based guidance values for drinking water. 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. National Water Quality Monitoring Council. 2017. Water Quality Portal (<https://www.waterqualitydata.us>). Accessed April 2022.
2. Minnesota Pollution Control Agency (MPCA). 2013. "Perfluorochemicals in Mississippi River Pool 2: 2012 Update." Retrieved from <https://www.pca.state.mn.us/sites/default/files/c-pfc1-21.pdf>. Accessed April 2022.
3. Minnesota Drinking Water Information System (MNDWIS). 2022. Accessed by MDH staff April 2022.
4. Minnesota Department of Health. 2009. "Environmental Public Health Tracking and Biomonitoring in Minnesota." Retrieved from <https://www.health.state.mn.us/communities/environment/biomonitoring/docs/pfccomrpttocomm2009.pdf>. Accessed April 2022.

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