

Xylenes and Groundwater

Xylenes

Xylenes are naturally found in petroleum, coal tar, wood, and some plants. Xylenes are also used as solvents in printing processes and the production of rubber and leather, and may be found in some fibers, plastics, and coatings.^{1,2} They are included in a group of chemicals often associated with petroleum known as BTEX, which stands for benzene, toluene, ethylbenzene, and xylenes.

Xylenes have three different chemical structures: m-xylene, o-xylene, and p-xylene. They are commonly found as a mixture of all three structures, and the mixture may also contain ethylbenzene.

Xylenes in Minnesota Waters

At sites with known contamination, xylenes have been detected in groundwater in approximately 20 percent of samples, with a maximum detection of over 9,000 µg/L*. In ambient groundwater not impacted by a known contamination source, xylenes have been detected in approximately 9 percent of samples, with a maximum detection of 5.6 µg/L.³ In surface water, xylenes have been detected in approximately 10 percent of samples, with a maximum concentration of 13 µg/L.⁴

Xylenes have been detected in approximately four percent of 19,525 drinking water samples collected in the last 10 years, with a maximum detection of 42 µg/L. All detections in drinking water have been below the MDH health-based guidance value and below the Safe Drinking Water Act limit of 10,000 µg/L.⁵

*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 300 parts per billion (ppb) for xylenes in drinking water. 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 animal studies, the most common effect after eating or drinking xylenes was a decrease in body weight. At higher doses, offspring of animals exposed to xylenes experienced cleft palate abnormalities. For durations longer than 30 days, laboratory animals showed additional effects on the kidneys.

Exposure to xylenes can also cause effects on the nervous system, including hyperactivity and changes in response to visual stimuli. Nervous system effects can be common in animals and humans after breathing in xylenes for short periods.

There is not enough data to assess whether eating or drinking xylenes causes cancer in animals or people.

Potential Exposure to Xylenes

You can be exposed to xylenes by breathing them in or touching products containing xylenes, including gasoline, paint, and varnishes. Xylenes are also naturally found in wood, and you may breathe them in

during a forest fire or while burning wood.² You can also be exposed through eating or drinking contaminated food or water.

If you smoke; if you work in an industry that uses gasoline, paints and varnishes, or other products with xylenes; or if you work in a facility that manufactures xylenes, automobile garage, biomedical laboratory, petroleum refinery, or metal shop, you may be exposed to higher levels of xylenes than most people.²

Using Xylenes Safely

You can reduce your exposure to xylenes by limiting your exposure to burning wood, quitting smoking, and limiting your handling of products that contain xylenes. If you use products that contain xylenes, such as paints, coatings, or gasoline, always follow the directions and use adequate ventilation.

Xylenes in the Environment

Xylenes mainly enter the environment from spills or leaks at locations where they are manufactured, used, or stored.² Xylenes move easily into the air. In the air or in surface water exposed to sunlight and air, xylenes break down in a few days. Once in the soil, xylenes can enter groundwater. It may take several months for xylenes to break down in groundwater. Under certain conditions, xylenes can remain in groundwater for years.^{1,2}

Potential Environment Impacts of Xylenes

Known detections of xylenes are dealt with most often through remedial actions to avoid the xylenes moving into groundwater and surface water. Minnesota has a water quality standard for xylenes to protect aquatic life, and measured surface water concentrations have not exceeded this standard.

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 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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Minnesota Department of Health
Health Risk Assessment Unit
PO Box 64975, St. Paul MN 55164
651-201-4899
health.risk@state.mn.us
www.health.state.mn.us



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