

Glyphosate and Drinking Water

Summary

Glyphosate is a common herbicide used for agriculture and lawn and garden care. People are most likely to come into contact with glyphosate when they mix or apply it. You can ingest low levels of glyphosate from eating foods that were treated with glyphosate or from drinking contaminated water. Glyphosate has been detected at low levels in Minnesota surface water and drinking water. Drinking water detections are very rare.

Glyphosate

Glyphosate is a widely used herbicide that controls broadleaf weeds, grasses, and aquatic plants. Glyphosate is a commonly used herbicide in Minnesota, sold under several different trade names, including products sold for home use. It is applied in agriculture, forestry, lawn care, and gardening.^{1,2}

Glyphosate in Minnesota Waters

The Minnesota Department of Agriculture (MDA) regularly monitors groundwater and surface water for glyphosate. It is frequently detected at low levels in both urban and rural surface waters. In 2016, the highest level detected in surface water was 42.8 micrograms per liter ($\mu\text{g/L}$)*. MDA's groundwater monitoring efforts have not yet detected glyphosate in groundwater.³

Since 1993, glyphosate has only been detected four times in Minnesota public drinking water systems, at levels that range from 1.1 $\mu\text{g/L}$ to 39 $\mu\text{g/L}$.⁴

*One microgram per liter ($\mu\text{g/L}$) is the same as one part per billion (ppb).

MDH Guidance Value

Based on available information, MDH developed a guidance value of 500 ppb for glyphosate in drinking water. MDH guidance values are developed 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.

Glyphosate is a primary drinking water contaminant of the federal Safe Drinking Water Act and has a Maximum Contaminant Level (MCL) and Maximum Contaminant Level Goal (MCLG) of 700 ppb.

Potential Health Effects

In animal studies, glyphosate caused developmental effects, including reduced infant body weight and skeletal changes. Long-term ingestion of glyphosate also caused some minor gastrointestinal effects, including changes to the salivary gland in rodents. Various cancers were reported in some animal studies but not in others, and when cancer occurred it was found only at very high doses that are not relevant to environmental exposures that humans might experience. The US Environmental Protection Agency (EPA) classifies glyphosate as 'not likely to be carcinogen [cancer causing] to humans.' The International Agency for Research on Cancer (IARC) classifies it as a probable carcinogen. The U.S. Agricultural Health Study did not find any evidence for glyphosate-related cancer in humans. MDH does not consider glyphosate to be carcinogenic at levels people are likely to be exposed to in the environment. However, even if glyphosate is a carcinogen at very high doses in animals, MDH considers the non-cancer water guidance value of 500 ppb to be protective, based on currently available information.

Potential Exposure to Glyphosate

You may be exposed to glyphosate in drinking water, but this exposure is likely lower than other ways people come in to contact with the herbicide. Most people are exposed to glyphosate through their diet because of its use on crops.^{5,6} However, the EPA has concluded that the chronic risk of exposure through food is low. You may also be exposed to glyphosate if you work with glyphosate or apply it to your lawn or garden. When using glyphosate, it is possible to inhale it or get it on your skin. You may also be exposed to glyphosate if it drifts in the air from a nearby area or you re-enter an area where it was recently used.⁷

Using Glyphosate Safely

Using glyphosate safely can reduce your exposure and reduce the amount that enters our environment. Any time you use a pesticide on your lawn, garden or crops, follow the handling, mixing, and application instructions on the label. This includes recommendations for the clothing you should wear, use of personal protective equipment such as a facemask, gloves, or eye protection, and proper storage of unused product.

Glyphosate in the Environment

Glyphosate enters the environment when it is applied for weed and grass control to land surfaces or to water. Most glyphosate in Minnesota is sold for, and applied to, agricultural areas. When applied to land, glyphosate does not move easily through soil. Glyphosate easily binds to soil and sediment and breaks down quickly. It also degrades into other chemicals, such as [aminomethylphosphonic acid \(AMPA\)](#).¹

Potential Environmental Impacts of Glyphosate

Glyphosate and its primary degradate, AMPA, have been monitored in surface water since 2012. Though glyphosate was detected each year, concentrations in the environment have been over two hundred times lower than the EPA aquatic life benchmark values for aquatic plants. Glyphosate is less toxic to aquatic animals than plants.

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. Hazardous Substances Data Bank. 2014. Results for 1071-83-6. Retrieved from <http://toxnet.nlm.nih.gov/cgi-bin/sis/search2/f?/.temp/~iWGDXT:1>. Accessed August 27, 2014.
2. U.S. Environmental Protection Agency (2017). [Glyphosate \(https://www.epa.gov/ingredients-used-pesticideproducts/glyphosate\)](https://www.epa.gov/ingredients-used-pesticideproducts/glyphosate). Accessed February 2017.
3. Minnesota Department of Agriculture. 2016. 2016 Water Quality Monitoring Report. <http://www.mda.state.mn.us/~media/Files/chemicals/maace/2016wqmrpt.pdf>
4. Minnesota Drinking Water Information System. 2017. Data received for "Glyphosate" from MDH Drinking Water Protection Section.
5. World Health Organization. 2005. Glyphosate and AMPA in Drinking Water. Retrieved from http://www.who.int/water_sanitation_health/dwq/chemicals/glyphosateampa290605.pdf. Accessed August 27, 2014.
6. California Environmental Protection Agency, Office of Environmental Health Hazard Assessment. 2007. Public health goals for chemicals in drinking water: Glyphosate. June 2007.
7. Williams et al. 2000. Safety Evaluation and Risk Assessment of the Herbicide Roundup and its Active Ingredient, Glyphosate, for Humans. *Reg Tox. Pharm.* 31:117-16

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



OCTOBER 2017

To obtain this information in a different format, call: 651-201-4899.