

Sulfentrazone, Sulfentrazone 3-Carboxylic Acid and Water

Sulfentrazone is an herbicide used to control broadleaf weeds, grasses, and sedges in various crops. It is also applied to turf, rights-of-way, and at other non-agricultural sites. Sulfentrazone 3-carboxylic acid (S3CA) is a major degradate of sulfentrazone.

The Minnesota Department of Health (MDH) Risk Assessment Unit evaluates health risks for contaminants in drinking water and develops health-based guidance values for groundwater. The toxicological summary for sulfentrazone can be found at the MDH Human Health-Based Water Guidance Table website.¹ MDH works in collaboration with the Minnesota Pollution Control Agency (MPCA) and the Minnesota Department of Agriculture (MDA) to understand the occurrence and environmental effects of these contaminants.

Sulfentrazone in Minnesota waters

The Minnesota Department of Agriculture (MDA) monitors Minnesota's surface water and groundwater for pesticides and related chemicals.² Sulfentrazone is commonly detected in Minnesota surface water and groundwater. It has been detected in 33 percent of surface water samples collected since 2012 and 9.5 percent of groundwater samples collected since 2013. The highest levels detected were 3.4 µg/L (surface water) and 24.8 µg/L (groundwater). Compared to sulfentrazone, S3CA is less commonly detected in surface water (3.8 percent in 2023) and groundwater (5.8 percent in 2023).² 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 60 µg/L (or ppb) for sulfentrazone in drinking water. Risk assessment advice (RAA) of 60 ppb was developed for S3CA based on data from sulfentrazone, as there was limited data available for S3CA. MDH does not use health-based guidance values to regulate water quality, but they may be useful for situations where federal regulations do not exist. MDH develops guidance values to protect people who are most highly exposed and people who are most sensitive to the potentially harmful effects of a contaminant, including pregnant people, fetuses, infants, and children. 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, oral exposure to sulfentrazone has effects on the hematological (blood), liver, and nervous systems and causes developmental and reproductive toxicity, such as decreased survival, birth weight, and fertility in addition to increased skeletal abnormalities.³ People with questions about their personal risk of health impacts from sulfentrazone exposure should consult with their physician.

No human-based data are available on the effects of sulfentrazone following exposure.³

Potential exposure to sulfentrazone

Many people are exposed to small amounts of sulfentrazone and S3CA through their diet. As part of its pesticide registration process, the U.S. EPA estimated sulfentrazone exposure levels to be far below the level that MDH has determined to be without health risk, even for sensitive populations, and assuming a high level of pesticide use.³ People who work in agriculture may be exposed to sulfentrazone through direct contact with the chemical after it is applied to crops. We recommend that all users of farm chemicals carefully follow application and safety instructions.

Sulfentrazone in the environment

In soil, sulfentrazone biodegrades into S3CA and other degradates over a period of months or longer. Neither sulfentrazone nor its degradates move easily from surface water to the atmosphere, or from water to suspended particles and sediment.

In soil and groundwater, both sulfentrazone and S3CA are highly mobile, and may be transported away from their original location in the flow of groundwater.

References

1. Minnesota Department of Health (MDH). (January 2025). Human Health-Based Water Guidance Table. "Toxicological Summary for: sulfentrazone."
<https://www.health.state.mn.us/communities/environment/risk/docs/guidance/gw/sulfentrazone.pdf>.
2. Minnesota Department of Agriculture (MDA). (2024) 2023 Water Quality Monitoring Report: January through December 2023. <https://wrl.mnpals.net/node/4249>.
3. United States Environmental Protection Agency (EPA). (2024). Memorandum: Sulfentrazone - Human-Health Risk Assessment for the Establishment of Tolerances for Residues in/on Pop Corn Commodities. Washington, DC. Retrieved from <https://www.regulations.gov/document/EPA-HQ-OPP-2024-0169-0003>.

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