

2,4-D and Drinking Water

2,4-Dichlorophenoxyacetic acid (2,4-D) is an herbicide that has been found in surface and ground water in Minnesota. The Minnesota Department of Health (MDH) has developed a health-based guidance value for 2,4-D in drinking water. Based on this new guidance, compared to levels currently found in drinking water, MDH does not expect 2,4-D in drinking water to harm the health of Minnesotans.

Summary

2,4-D is an herbicide that is used to control broadleaf weeds on land and aquatic weeds. 2,4-D has been detected in Minnesota groundwater and surface water, but has not been detected in drinking water in the last ten years. Excess exposure to high levels of 2,4-D can affect the adrenal gland, thyroid and body weight during development, as well as the kidneys over longer periods of time.¹

2,4-D and Possible Increased Future Use

The Minnesota Department of Agriculture (MDA) reports a general decrease of 2,4-D sales in Minnesota over the last few years.² However, the US Environmental Protection Agency (USEPA) recently registered a form of 2,4-D (called 2,4-D Choline) designed to be used with genetically-engineered corn and soybeans.³ This registration may result in an increase in 2,4-D sales and use in Minnesota.³ Products that have 2,4-D in them may come as liquids, salts, or granules.

2,4-D in Minnesota Waters

MDA monitors surface water, groundwater, drinking water, and monitoring wells in Minnesota for many pesticides and herbicides, including 2,4-D. The following information describes 2,4-D detections in water samples in 2014⁴:

- Less than one percent of groundwater tested by MDA contained 2,4-D.
- 2,4-D, along with atrazine and metolachlor, were the three pesticides found most often in Minnesota surface waters.
- The maximum concentration of 2,4-D in surface water was 30.5 parts per billion (ppb), which is the highest concentration MDA has observed since they began monitoring surface water.
- 2,4-D was detected in over 60% of all surface water samples, 100% of urban surface water samples, and 100% of rainfall samples analyzed.

MDH Guidance Value

Based on available information, MDH developed a guidance value of 30 ppb for 2,4-D in drinking water. A person drinking water at or below the guidance value would have little or no risk of health effects.

Potential Exposure to 2,4-D

2,4-D is present in some popular residential weed-control products. Direct contact with 2,4-D while applying these products is common and can include skin contact, ingestion, or breathing in. 2,4-D is used on food crops, low levels of 2,4-D are sometimes detected on food and in drinking water. You can also be exposed to 2,4-D by breathing it in from areas where 2,4-D was recently used, either in an agricultural, commercial, or residential setting. Specially-designed spraying equipment that reduces spray drift is required by EPA as part of the recent new product registration. 2,4-D in drinking water is not a potential exposure route of concern at this time.

Potential Health Effects

Based on studies performed in animals at high doses, 2,4-D can cause changes in the kidneys over months to years. Shorter-term studies showed thyroid, adrenal gland, and decreased body weight effects in developing animals at high doses. A key component of neutralizing 2,4-D toxicity is the body's ability to quickly excrete any absorbed 2,4-D, and current exposures are within the range for quick elimination from the human body.

Using 2,4-D Safely

People who use 2,4-D should follow product label directions and wear long-sleeved shirts, long pants, protective eyewear, and chemical-resistant gloves and shoes during application in order to reduce skin and inhalation exposure. Follow use instructions on the label to minimize runoff into surface waters.

2,4-D in the Environment

2,4-D enters the environment through regular agricultural use, lawn care, and occasional uses to control aquatic weeds. Organisms in water and soil can break down 2,4-D in the environment quickly. 2,4-D breaks down faster in moist soil than in dry soil.⁵

Potential Environmental Impacts of 2,4-D

Terrestrial and aquatic plants (including aquatic algae, which are important to aquatic food webs) are most likely to be affected by low levels of 2,4-D in the environment. Minnesota does not have an aquatic life water quality standard for 2,4-D, but the maximum measured concentration of 2,4-D in Minnesota surface waters in 2014 (30.5 ppb) is above EPA's benchmark value for aquatic vascular plants⁶. There is potential for effects to aquatic vascular plants at the maximum measured levels in Minnesota surface waters.

CEC Program

The MDH Contaminants of Emerging Concern Program (CEC) evaluates health risks from contaminants in drinking water and develops drinking water guidance. 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.

References

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