Metolachlor and Drinking Water

Metolachlor

Metolachlor is a common herbicide used on agricultural crops, including corn and soybeans, to control broadleaf weeds and grasses. Metolachlor is one of the top pesticides sold in Minnesota for agricultural use. It is sold under a number of trade names including Bicep and Dual. Products containing this herbicide may be labeled as containing metolachlor or s-metolachlor as the primary ingredient.

Metolachlor in Minnesota Waters

Metolachlor concentrations in Minnesota waters have been monitored since the 1990s. The Minnesota Department of Agriculture (MDA) detected metolachlor in 67 percent of surface water samples in 2016 with a maximum detected concentration of 37.9 micrograms per liter (µg/L).* In groundwater, MDA detected metolachlor in 14 out of 249 monitoring well samples in 2016, with a maximum concentration in groundwater of 5.89 µg/L.[1]

Since 1993, metolachlor has occasionally been detected in Minnesota drinking water. It was detected in 0.3 percent of samples collected between 1993 and 2017, with a maximum concentration of 2.5 µg/L. Since 2011, there have been 13 detections, all below 0.5 µg/L. Metolachlor was also detected in one of 108 community public water supply wells at a concentration of 0.056 µg/L in a 2015 study.[2] Metolachlor was included in the Environmental Protection Agency (EPA) Unregulated Contaminant Monitoring Rule 2 (UCMR) and was not detected at any of the 11 community public water systems that were sampled. [3]

*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 µg/L for metolachlor in drinking water. 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, exposure to metolachlor caused a decrease in body weight of developing and adult animals. At higher doses in laboratory animals, decreased reproductive success was also observed. EPA classified metolachlor as a potential human carcinogen.[4] The MDH guidance value is considered protective for potential carcinogenic effects.

Potential Exposure to Metolachlor

People may be exposed to metolachlor from residues on food and from drinking water. Individuals who apply herbicides to fields may be exposed to higher levels of metolachlor.[4]

Using Metolachlor Safely

Metolachlor is not used in residential settings. Individuals applying herbicides containing metolachlor to agricultural fields should follow the label instructions, use proper equipment, and take precautions to avoid bringing residues into the home.

Metolachlor in the Environment

Metolachlor enters the environment when it is applied as an herbicide to fields. Metolachlor can move through soil and enter groundwater. Metolachlor can also enter surface water from runoff after being applied to an agricultural field.[5] Metolachlor breaks down into metolachlor ESA and metolachlor OXA. Both of these breakdown products are long-lasting in the environment and are more commonly detected than metolachlor.[1]

Potential Environment Impacts of Metolachlor

Because metolachlor is an herbicide designed to control plant growth, plants and algae are mostly likely to be affected in surface water. Most detections of metolachlor in Minnesota surface waters are below the value set to protect aquatic life, including aquatic plants. Although metolachlor's breakdown products are more commonly detected, metolachlor is more toxic to aquatic plants and algae than the breakdown products.[6]

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. MDA. 2017. "2016 Water Quality Monitoring Report." Retrieved from http://www.mda.state.mn.us/chemicals/pesticides/maace/~/media/Files/chemicals/maace/2016wqmrpt.pdf
2. MDH and MDA. 2016. "2015 Reconnaissance Study of Pesticide Compounds in Community Public Water Supply Wells." http://www.mda.state.mn.us/~/media/Files/chemicals/maace/2015reconpestiwells.pdf
3. Minnesota Drinking water Information System. 2017. Accessed by MDH Staff in October 2017.
4. EPA. 1995. "Registration Eligibility Decision for Metolachlor". https://archive.epa.gov/pesticides/reregistration/web/pdf/0001.pdf
5. MDA. 2011. "Water Quality Best Management Practices for Metolachlor." Retrieved from http://www.mda.state.mn.us/~/media/Files/protecting/bmps/bmpsformetolachlor.ashx
6. EPA. 2014. Registration Review Problem Formulation for Metolachlor and S-Metolachlor. https://www.regulations.gov/document?D=EPA-HQ-OPP-2014-0772-0002

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APRIL 2018

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