

Chlorpyrifos and Drinking Water

Chlorpyrifos (CPF) is a pesticide that has been found in surface water in Minnesota and has the potential to be present in drinking water sources. Chlorpyrifos oxon (CPFO) is a breakdown product of CPF. The Minnesota Department of Health (MDH) developed health-based guidance for CPF and CPFO in drinking water and, based on these values, does not expect levels in drinking water to harm Minnesotans.

What are CPF and CPFO?

Chlorpyrifos (CPF) is an insecticide used on food and non-food crops, including corn, soybeans, wheat, sugar beets, as well as on turf and greenhouse plants. Homeowner use is limited to roach bait station products and is not expected to result in residential exposures.

Chlorpyrifos oxon (CPFO) is a chemical formed when CPF is broken down in the body or in the environment. CPFO can also be formed when water containing CPF is chlorinated during water treatment. CPFO is both more toxic and less stable than CPF.

Have CPF and CPFO been found in Minnesota waters?

The Minnesota Department of Agriculture (MDA) monitors for CPF and CPFO in surface water and groundwater, including some drinking water wells. In Minnesota, CPF and CPFO have not been detected in groundwater. In the past, CPF was occasionally detected in surface water at levels too low to measure accurately. Since 2010, an increasing number of CPF detections in surface water have had higher concentrations, at levels up to 0.24 parts per billion (ppb). CPFO has not been found in Minnesota surface water.^{1,2}

What is the MDH drinking water guidance for CPF and CPFO?

Based on available information, MDH developed a guidance value of 0.6 ppb for CPF and 0.4 ppb for CPFO in drinking water.³

Can CPF and CPFO in drinking water affect my health?

Based on the guidance values developed by MDH for CPF and CPFO, MDH does not expect levels in drinking water to harm Minnesotans.

How am I exposed to CPF and CPFO?

Exposure to CPF may occur through drinking contaminated water or by eating food that contains pesticide residues. CPF and CPFO have not been found in drinking water sourced from groundwater in Minnesota.

At a Glance

Chlorpyrifos (CPF) is...

- an insecticide used on food and non-food crops in Minnesota.

Chlorpyrifos oxon (CPFO) is...

- a breakdown product of CPF that is more toxic and breaks down more quickly in the environment.

CPF gets into the environment by...

- agricultural application

CPFO gets into the environment when....

- CPF breaks down, or
- water containing CPF is chlorinated during drinking water treatment.



CPF and CPFO in drinking water are safe if...

The levels are at or below the MDH guidance value of 0.6 ppb for CPF and 0.4 ppb for CPFO.

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Levels of CPF and CPFO in food products are very low and are not considered to be harmful to your health.⁴ It is possible for CPF to be present in the homes of people who have contact with the pesticide in an occupational setting.

How do CPF and CPFO get into the environment and how long do they stay in the environment?

CPF can enter the environment through regular agricultural use. CPF can be carried into surface water by storm water runoff, spray drift, or soil erosion, even when used according to label instructions. CPFO can form in the environment when CPF breaks down, or when water containing CPF is chlorinated during drinking water treatment.

In soil and water, CPF dissipates over a period of weeks to months. CPF bonds strongly to soil, so leaching to groundwater is not expected. In soil and water, CPFO breaks down more easily than CPF.⁵

What are the potential environmental impacts of CPF?

CPF is harmful to birds, bees, and other beneficial insect species exposed to direct treatment or residues on blooming crops and weeds. It is also harmful to animals that live in or near lakes and streams. Very small amounts of CPF can impact the reproduction of fish and other animals living in Minnesota's waters. CPF may bioaccumulate (build up) in the tissues of fish to levels that can impact animals that feed on fish, such as birds. Limited studies also show that CPF may affect behavior and interfere with normal endocrine system function of aquatic animals.

What Minnesotans Need to Know . . .

CPF and CPFO have not been found at levels of concern for human health in drinking water or food. CPF has been found in Minnesota streams near agricultural fields at levels that are harmful to aquatic animals. The MDA and the Minnesota Pollution Control Agency are actively responding to these issues.

If you work with CPF, follow the label instructions, use proper equipment, and take precautions to avoid bringing pesticide residues into the home. If you have containers of chlorpyrifos in your home (sold under the brand names Dursban, Lorsban, and others), you should dispose of it at a hazardous waste collection site. Do not dump it or throw it away. Check with your city or county government to find a site near you.

For more information contact:

Health Risk Assessment

Phone: (651) 201-4899

Website: www.health.state.mn.us/risk

E-mail: health.risk@state.mn.us

The Contaminants of Emerging Concern (CEC) Program...

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

1. MDA (2013). 2012 Water Quality Monitoring Report: January – December 2012. MAU-13-101. www.mda.state.mn.us/chemicals/pesticides/~media/Files/chemicals/maace/2012wqm.ashx
2. MDA and MDH (2010). February 2010 Reconnaissance Study of Pesticide Compounds in Community Public Water Supply Wells. www.health.state.mn.us/divs/eh/water/pesticide.pdf
3. MDH. Toxicological Summary for Chlorpyrifos. Oct 2013. <http://www.health.state.mn.us/divs/eh/risk/guidance/gw/chlorpy.pdf>
4. US EPA (2011). Chlorpyrifos: Preliminary Human Health Risk Assessment for Registration Review. DP No. D388070. www.epa.gov/oppsrrd1/registration_review/chlorpyrifos/EPA-HQ-OPP-2008-0850-DRAFT-0024%5B1%5D.pdf
5. US EPA (2011). Revised Chlorpyrifos Preliminary Registration Review Drinking Water. www.epa.gov/oppsrrd1/registration_review/chlorpyrifos/EPA-HQ-OPP-2008-0850-DRAFT-0025%5B1%5D.pdf

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