

Nonylphenols and Drinking Water

Nonylphenols are contaminants that have been found in waters that could be used as drinking water sources in Minnesota. The Minnesota Department of Health (MDH) developed health-based guidance values for nonylphenols in drinking water and, based on these values and levels found in Minnesota water, does not expect levels of nonylphenols in drinking water will harm Minnesotans.

What are nonylphenols?

Nonylphenols exist as a mixture of closely related chemicals. Nonylphenols are used to manufacture nonylphenol ethoxylates (NPEs). NPEs are widely used in commercial and household cleaning products, industrial processing, and in many consumer products such as fabrics, shoes, paints and coatings, personal care products like lotions and liquid cosmetics, and lawn care and crop protection products.¹ When NPEs are released into the environment they break down to nonylphenols.^{1,2}

Have nonylphenols been found in Minnesota waters?

Nonylphenols have been found frequently in treated wastewater in Minnesota at low levels, typically below 1 part per billion (ppb). In surface water, nonylphenols are frequently detected at levels below 0.5 ppb, with a small number of detections up to 2.6 ppb.^{3,4}

There is one known detection of nonylphenols in finished drinking water in Minnesota, at an estimated value of 1.5 ppb. This is lower than the health-based guidance value developed by MDH.³

What is the MDH guidance value for nonylphenols in drinking water?

Based on available information, MDH developed a guidance value of 20 ppb for nonylphenols. A person drinking water at or below the guidance value would have little or no risk of health effects.

Can nonylphenols in drinking water affect my health?

Drinking water that has nonylphenols at levels higher than the guidance value may cause adverse health effects. Animal studies have indicated that exposure to nonylphenols can result in kidney effects over time. At higher doses, adverse developmental effects occurred including decreased weight and changes to the timing of milestones during puberty.

At a Glance

Nonylphenols are...

- used to manufacture NPEs, which are in several consumer products and industrial processing.

Nonylphenols enter your body from...

- using products such as lotion, face cream, liquid cosmetics, and soaps, and
- eating foods that are packaged in materials that contain nonylphenols and/or NPEs.

Your exposure to nonylphenols can be reduced by...

- using personal care products that do not contain nonylphenols, and
- limiting the amount of a product you use to only as much as you need.

Nonylphenols in drinking water are safe if...

- the levels are at or below the MDH guidance value of 20 ppb.

How am I exposed to nonylphenols?

You can be exposed to nonylphenols by using personal care products that contain NPEs. Products that remain on the skin for a period of time (lotions, face creams, and liquid cosmetics) result in a higher exposure than those that are washed off quickly during use (soaps and shampoos). You might also be exposed to nonylphenols by eating foods that are packaged in material that contains NPEs. An infant may be exposed nonylphenols through breastmilk. Overall exposures from all of these sources are well below harmful levels based on the current assessment.⁵

How do nonylphenols get into the environment?

Nonylphenols are a breakdown product of NPEs. Nonylphenols enter the environment when products containing nonylphenols or NPEs are applied to lawns and crops or disposed of into wastewater (shampoos, detergents) or into landfills. Wastewater treatment processes can remove most NPEs from wastewater, but some amount persists after treatment and is discharged into the environment, where it breaks down to nonylphenols. Wastewater treatment discharges are continually releasing nonylphenols and NPEs into rivers and streams.

What are the potential environmental impacts of nonylphenols?

Once in water, nonylphenols adhere strongly to soil and sediment. It takes weeks to months for nonylphenols to break down in the environment.

Nonylphenols are harmful to fish and other aquatic animals and plants. Nonylphenols disrupt the normal endocrine function of fish at low levels in the aquatic environment. The United States Environmental Protection Agency has developed criteria for nonylphenols to assist states in developing water quality standards to protect aquatic life from this chemical.

What Minnesotans need to know...

NPEs are used in many consumer products such as detergent and personal care products like lotions and liquid cosmetics. When NPEs go down household drains after use, they are released into the environment and break down to nonylphenols. Nonylphenols are frequently detected at low levels in treated wastewater and surface water, and have been detected at low levels in Minnesota groundwater. Detections in Minnesota have been below the health-based guidance developed by MDH and drinking water is unlikely to be a main source of exposure.

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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

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