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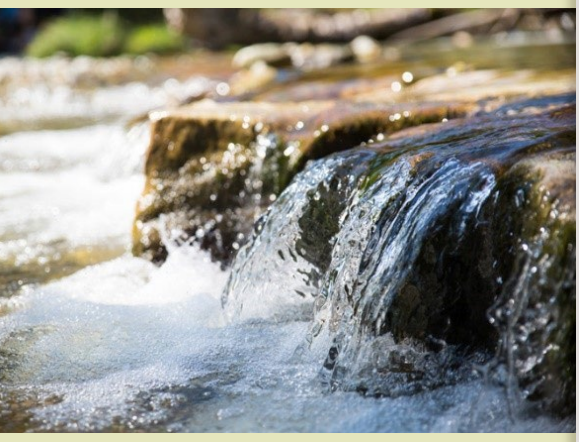
MANGANESE IN DRINKING WATER

Manganese is one of the most abundant metals on the earth's surface. Manganese is naturally occurring in many surface and groundwater sources and in soils that may erode into these waters. The detection frequency of manganese in the nation's groundwater is high due to its abundance, but the levels detected in groundwater are generally below levels of public health concern. North Dakota does have naturally occurring levels of manganese in its groundwater.



Contact Information

North Dakota Department of Environmental Quality
Division of Water Quality

4201 Normandy St.
Bismarck, ND 58503-1324

701-328-5210

How can manganese affect human health?

Manganese is an essential nutrient for humans. It can be found in both food and water and is more easily absorbed through water. The recommended daily intake of manganese depends on a person's age, and typically, people get enough manganese through their diets. However, the level at which manganese benefits one person could overlap with the level at which it is harmful to another person.

The U.S. Environmental Protection Agency (EPA) has established a lifetime health advisory level of 0.3 milligrams per liter (mg/L), which means health effects are not expected below this level of exposure.

Infants exposed to manganese levels over 0.3 mg/L may develop learning and behavioral problems, and adults drinking water with high levels of manganese for many years may experience problems with memory, attention and motor skills.

Manganese is not absorbed through the skin so bathing, washing dishes and clothes in water with high levels of manganese are not harmful to your health. However, high levels of manganese in your water can have aesthetic effects such as staining your laundry, scaling on your plumbing, and making your water look, smell or taste bad.

How is manganese regulated in drinking water?

EPA has not established a National Primary Drinking Water Regulation for manganese. However, the EPA has established a Secondary Maximum Contaminant Level (SMCL) standard of 0.05 mg/L. SMCLs are nonmandatory guidance for public water systems to manage drinking water for aesthetics such as taste, color, and odor.

Community public water systems generally test their water for manganese, but noncommunity public water systems (e.g., campgrounds, rest areas) are not required to test. You can contact your water system to find out if it tests for manganese. If your public water system does not test for manganese, you can arrange and pay for an accredited laboratory to test your water.

North Dakota does not regulate private wells. Private well owners are encouraged to test their drinking water for manganese, especially if infants drink the tap water.

For more information

https://deq.nd.gov/Publications/MF/Manganese_FAQ.pdf

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North Dakota Laboratories for Well Water Testing

Fargo-Cass Public Health Environmental Laboratory
Fargo, North Dakota
701-298-6997

Minnesota Valley Testing Laboratories, Inc.
Bismarck, North Dakota
701-258-9720
800-279-6885

North Dakota Department of Environmental Quality
Division of Chemistry
Bismarck, North Dakota
701-328-6140

RMB Environmental Laboratories, Inc.
Watford City, North Dakota
701-444-2202

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What can I do about manganese in my drinking water?

The only way to know the level of manganese in your drinking water is to contact your public water system or have your tap water tested. All water testing should be done through an accredited laboratory. Contact information for accredited laboratories is included with this fact sheet. If water testing indicates your drinking water has manganese levels above guidance values, you can take the following steps:

- DO NOT GIVE TAP WATER TO INFANTS. Formula and other food preparations for infants under six months of age should not be prepared with tap water.
- DO NOT BOIL THE WATER. Boiling, freezing or letting water stand does not reduce manganese. Boiling can increase levels of manganese because manganese remains behind when the water evaporates.
- Install a household treatment system for drinking water.

Adults and children can continue to bathe and shower; brush teeth; and wash clothes, food and dishes in tap water.

What are household treatment systems?

There are two main types of household treatment systems. A household point-of-entry system treats all of the water you use in your home. A household point-of-use system treats water at a particular point such as a kitchen faucet. Iron and manganese are often found together, and most systems are designed to treat them both. Some common household treatment systems for removing iron and manganese are:

- Water softener - typically used to treat hard water, it can remove small amounts of reduced iron and manganese using an ion exchange process.
- Oxidation filtration - injects oxygen into the water to remove impurities. While it is effective at removing iron, it requires additional chemical treatment, including chlorine bleach, to remove manganese.
- Reverse osmosis - this filter uses a membrane to remove unwanted molecules from the water while letting purified water pass to the other side.

The effectiveness of a treatment system will vary based on water chemistry. The North Dakota Department of Environmental Quality recommends contacting a professional to evaluate your water system to determine the right water treatment for your use.

REFERENCES

EPA Drinking Water Health Advisory for Manganese

https://www.epa.gov/sites/production/files/2014-09/documents/support_cc1_magnese_dwreport_0.pdf

https://deq.nd.gov/Publications/MF/Manganese_in_Drinking_Water_Fact_Sheet.pdf

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