Manganese in Drinking Water
Fact Sheet and Frequently Asked Questions

This document is intended to answer common questions about manganese and health and using water with higher levels of manganese.

What is manganese and where does it come from?

Manganese is a common, naturally-occurring mineral found in rocks, soil, groundwater, and surface water. Manganese is a natural component of most foods. Manganese is an essential nutrient, and eating a small amount of it each day is important to stay healthy.

How are people exposed to manganese?

The majority of manganese exposure in the general population comes from the food we eat. Grains, beans, nuts and teas are rich in manganese and it is also found in infant formula. A normal diet typically provides adequate manganese intake. The principal source of exposure to manganese is from food, but in situations where manganese levels in drinking water are elevated, the contribution from drinking water can increase the overall intake of manganese.

Manganese is found naturally in groundwater and surface waters in Iowa. Manganese may become noticeable in water at levels greater than 0.05 milligrams per liter (mg/L). At this level, the water will have a brown color and may leave black deposits on sinks and bathroom fixtures.

Manganese Levels of Concern in Drinking Water

The United States Environmental Protection Agency (US EPA) has developed a health advisory level (HAL) for manganese in drinking water of 0.3 mg/L which is intended to be protective of life-time exposure for the general population.

The US EPA recommends that infants up to 6 months of age should not be given water with manganese concentrations greater than 0.3 mg/L for more than a total of 10 days per year, nor should the water be used to make formula for more than 10 days per year.

The US EPA recommends that the general population should not ingest water with manganese concentrations greater than 1 mg/L for more than a total of 10 days per year.

Much lower manganese levels in water can result in noticeable staining and taste complaints. It is for this reason that the US EPA has a “secondary” drinking water guideline of 0.05 mg/L.

The US EPA health advisory levels of 0.3 mg/L and 1 mg/L were set based upon typical daily dietary manganese intake levels not known to be associated with adverse health effects. This does not imply that intakes above these levels will necessarily cause health problems. As a precaution, the general population should consider limiting their consumption of drinking water when levels of manganese are above the US EPA health advisory to decrease their exposures and to decrease the possibility of adverse neurological effects.

Currently, there is no regulatory limit set by the US EPA or the Iowa Department of Natural Resources (DNR).

Potential Manganese Health Effects

Many years of exposure to high levels of manganese can cause harm to the nervous system. A disorder similar to Parkinson's disease called Manganism can result. Tremors, shaking, and an unsteady gait are characteristic of very high exposure to manganese. This type of effect is most likely to occur in the elderly after a lifetime of exposure to high levels of manganese or with individuals exposed to welding vapor that contains high levels of manganese. The US EPA's health advisory is intended to protect against this effect.

Is manganese of concern for infants and young children?

Yes, especially for bottle-fed infants. Certain baby formulas contain manganese as a nutrient, and if prepared with water that also contains manganese, the infant may get a higher dose than recommended. Some studies suggest that prenatal and early childhood exposures to manganese can have effects on learning and behavior. Thus, it is very important to know what the manganese levels in drinking water are when using it to make baby formula.

When manganese levels in drinking water are above 0.3 mg/L, infants under 6 months of age should immediately stop consuming the water and formula that was prepared with the water.

Manganese is poorly absorbed through the skin. There are not concerns about manganese exposure through skin contact with food or water containing manganese.

How do I find out about manganese levels in my drinking water?

If you get your water from a public water supply system you should contact representatives of your public water supply system and request the concentrations of manganese. Please be aware that not all systems are required to test for manganese.

If you obtain your water from a private well and suspect high manganese in your drinking water, you should contact your local county health department or visit the Iowa DNR's private well program website at https://www.iowadnr.gov/Environmental-Protection/Water-Quality/Private-Well-Program . This website includes testing and treatment information.

For more information:

EPA's Office of Ground water and Drinking Water: https://www.epa.gov/ground-water-and-drinking-water

EPA's Drinking Water Health Advisory for Manganese: https://www.epa.gov/sites/production/files/2014-09/documents/support_cc1_magnese_dwreport_0.pdf

EPA's Secondary Drinking Water Standards: https://www.epa.gov/dwstandardsregulations/secondary-drinking-water-standards-guidance-nuisance-chemicals

EPA's Drinking Water Criteria Document for Manganese: https://www.epa.gov/wqc/drinking-water-criteria-document-manganese

State Hygienic Laboratory at the University of Iowa Well Water Quality and Home Treatment Systems: http://shl.uiowa.edu/env/privatewell/homewater.pdf

Public Health Statement for Manganese from the Centers for Disease Control (The EPA has updated the manganese HALs since this was posted): https://www.atsdr.cdc.gov/PHS/PHS.asp?id=100&tid=23

Frequently Asked Questions

What levels of manganese are of concern in drinking water? The United States Environmental Protection Agency (US EPA) has developed a health advisory level for manganese in drinking water of 0.3 mg/L (milligrams per liter) and a secondary drinking water guideline of 0.05 mg/L for aesthetic issues. These are not enforceable standards. It is recommended to not drink water that has manganese above the 0.3 mg/L.

Can I drink this water? Elevated levels of manganese in the water can cause discoloration. If the water contains elevated levels of manganese or is discolored, it is recommended that you use an alternate water source for drinking.

Should I use this water to make formula for my baby? The most important thing to do is to switch to bottled water or water that is low in manganese to make formula. If you have concerns about your child, you should speak to your health care provider.

Should I stop drinking the water if I am breastfeeding my child? No. There is no correlation between manganese levels in water and manganese levels in breast milk. If you are healthy and breastfeeding you should continue to do so.

Should I be concerned if I am pregnant? If you are concerned, you should talk to your health care provider.

Can I cook with the water? No. As a precaution, do not use the water for cooking.

Do not boil the water. Boiling will concentrate the levels of manganese.

Can I use the water to make ice and drinks? No. As a precaution, do not use the water for making ice or drinks.

Can I use the water to wash dishes? Yes.

Can I bathe, shower, or wash my hands with the water? Yes. Manganese is poorly absorbed through the skin.

Can I brush my teeth with the water? Yes.

Can I give the water to my pets and livestock? Information is not available on the effect of elevated manganese in drinking water on pets and livestock. Please contact your veterinarian.

Iowa Department of Public Health Contact Information:
For additional health related inquiries regarding manganese in drinking water, contact Stuart Schmitz at 515-281-8707.

Iowa DNR Contact Information:
For additional questions or information, please contact the appropriate DNR Field Office:

Field Office 1, Manchester	563-927-2640	Field Office 4, Atlantic	712-243-1934
Field Office 2, Mason City	641-424-4073	Field Office 5, Des Moines	515-725-0268
Field Office 3, Spencer	712-262-4177	Field Office 6, Washington	319-653-2135