

Manganese

Sources

Manganese can be naturally found in groundwater and surface water, and it usually occurs with iron. However, human activities may also cause manganese contamination in some areas.

Manganese can come in two forms in water: dissolved and suspended. If groundwater comes from a deep tube well, the manganese may be dissolved and not visible. In surface water, manganese can be dissolved or suspended. Water with high levels of suspended manganese usually has a black colour or black flakes in it.

High concentrations of manganese can turn water a black colour. It also causes an objectionable taste, stains water pipes and laundry, and forms coatings on water pipes. As well, some types of bacteria feed on manganese and leave black-brown deposits that can also clog pipes.

Potential Health Effects

People need small amounts of manganese to keep healthy, and food is the major source of manganese for people. However, too much manganese may also cause adverse neurological effects.

High levels of manganese can turn water a black colour and it may cause people to not use it and choose another, possibly contaminated, water source instead.

World Health Organization Guidelines

Manganese is not of health concern at levels causing acceptability problems in drinking water and there is no World Health Organization (WHO) guideline value (WHO, 2017).

Usually, people do not like the taste of drinking water that has more than 0.1 mg/L of manganese. Also, amounts above 0.1 mg/L can stain water pipes, clothes during washing, and food during cooking. Even levels of manganese at 0.2 mg/L may form black coatings on distribution pipes that come off into water as small black flakes.

The presence of manganese may also lead to bacterial growth that can clog water pipes.

No WHO Guideline since manganese is not of health concern at levels causing acceptability problems in drinking water

Water Quality Testing Methods

Manganese can be tested using a commercial laboratory or portable test kit. Portable digital colorimeters and photometers are available from various commercial manufacturers. These can provide reliable and quantitative measurements of manganese (UNICEF, 2008). Manganese can also be measured using a colour disc comparator.

Information about commercially available test kits are provided in CAWST's Drinking Water Quality Testing Product Sheets.





Household Water Treatment Options

Manganese treatment options are similar to iron; however, the removal rates are not as high. There are some different technology options that can be combined to help take manganese out of drinking water, depending on the level of contamination. Practical household options include aeration to precipitate any dissolved manganese, sedimentation, and then filtration to remove any manganese particles that remain in suspension.

Removing suspended manganese can be as simple as letting the water stand in a container for a period of time ranging from a few hours to a few days then decanting it, or by filtering the water through cloth. The manganese residue will need to be disposed in a safe location.

Biosand or ceramic filters, which are designed primarily for pathogen removal, can also be used to take out some of the manganese from drinking water. High levels of manganese may cause these filters to clog more quickly, requiring more frequent maintenance which can reduce the efficiency of pathogen removal. In this case, it is recommended to sediment the water beforehand.

References

UNICEF (2008). UNICEF Handbook on Water Quality. UNICEF, New York, USA. Available at: <https://www.unicef.org/media/91301/file/Handbook-Water-Quality.pdf>

World Health Organization (2017). Guidelines for Drinking-Water Quality, Fourth Edition Incorporating the First Addendum. WHO, Geneva, Switzerland. Available at: <https://www.who.int/publications/i/item/9789241549950>

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