

Iron

Sources

Iron can be naturally found in groundwater and some surface water (such as creeks, rivers and some shallow dug wells). There are some areas of the world that have naturally high amounts of iron in their groundwater. Iron can also be found in drinking water that is passed through rusty steel or cast iron pipes.

Iron can come in two forms in water: dissolved and suspended. If groundwater comes from a deep tube well, the iron may be dissolved and not visible. However, once the iron is exposed to air, it usually turns the water a black or orange colour. If surface water has iron in it, it will be a red-orange colour from the iron that is suspended in the water.

Iron is a nuisance – high levels can cause an objectionable colour and taste and can stain cooked food, water pipes, and laundry. Some types of bacteria use dissolved iron as an energy source and leave slimy red deposits that can clog water pipes.

Potential Health Effects

Drinking water with high concentrations of iron will not make people sick. Iron however, can change the colour and smell of water and it may cause people to not use it and choose another, possibly contaminated, water source instead.

World Health Organization Guidelines

The World Health Organization (WHO) does not have a suggested guideline for iron in drinking water since it does not have any adverse health effects (WHO, 2017).

Usually, people do not like the taste and smell of drinking water that has more than 0.3 mg/L of iron. Concentrations between 1.0-3.0 mg/L can be acceptable to people used to drinking anaerobic (low levels of oxygen) well water.

Iron levels above 0.3 mg/L can stain water pipes and clothes during washing.

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

No WHO Guideline for Iron in Drinking Water

Water Quality Testing Methods

Iron 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 iron (UNICEF, 2008). Iron can also be measured using a colour disc comparator.

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





Household Water Treatment Options

There are some different technology options that can be combined to help take iron out of drinking water, depending on the level of contamination. Practical household options include aeration to precipitate any dissolved iron, sedimentation, and then filtration to remove any iron particles that remain in suspension.

Removing suspended iron 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 a cloth. The iron residue will need to be disposed.

Biosand or ceramic filters, which are designed primarily for pathogen removal, can also be used to remove some of the iron from drinking water. High levels of iron 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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