

The drop on water

Nitrite

Nitrite (NO_2^-) is a naturally occurring chemical made of nitrogen (N) and oxygen (O).

Sources

Nitrogen and nitrogen compounds, such as nitrite, are found in air, soil, water, and plants.

In certain conditions, when oxygen is unavailable, nitrate (NO_3^-) may be converted to nitrite. Therefore many sources of nitrate are also potential sources of nitrite.

Sources of nitrite in groundwater include

- leaching of chemical fertilizers
- leaching of animal manure
- improperly treated septic and sewage discharges
- decaying plant or animal material
- erosion of natural deposits

One of the main sources of ingested nitrite originates from sodium nitrite used as a food preservative in cured meats, fish, and certain cheeses.

QUICK FACTS

- Primary nitrite sources in well water include sources of nitrate, such as septic discharges and agricultural nutrients, such as fertilizers.
- Nitrite in drinking water has no taste, smell, or colour.
- Nitrite can only be detected through chemical testing.
- The Canadian drinking water quality guideline for nitrite-nitrogen is **1 mg/L**.
- Nitrite-nitrogen levels greater than **1 mg/L** in drinking water can pose a potentially fatal risk to infants under six months old.
- Well water with nitrite-nitrogen levels greater than **1 mg/L** should not be used for drinking, cooking, or teeth brushing. It may be used for bathing, handwashing, and dishwashing.
- If nitrite is present above the guideline limit in drinking water, consider alternative sources of water or water treatment options.

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Maximum Acceptable Concentration in Drinking Water = 1 mg/L

In water, nitrite has no taste, smell, or colour. It can only be detected through a chemical test.

The Canadian drinking water quality guideline for nitrite depends on the method the laboratory uses to measure nitrite concentration in water:

- **nitrite measured directly = 3.2 milligrams per litre (mg/L)**
- **nitrite-nitrogen calculated from the total nitrogen concentration = 1 milligram per litre (mg/L)**

Health Risks

Nitrite-nitrogen levels greater than 1 mg/L can pose a risk to infants under six months old.

Infants who are fed water or formula made with water that contains a high concentration of nitrite can develop a condition commonly called blue baby syndrome (methaemoglobinaemia). Nitrite can diminish the oxygen-carrying capability of the infant's blood, causing the skin to turn a bluish colour. If the nitrite level in the water is very high, lack of oxygen may lead to death.

The risk to humans is through ingestion only – drinking, cooking, teeth brushing. Well water with nitrite-nitrogen levels greater than 1 mg/L may be used for bathing, handwashing, and dishwashing.

Elevated nitrite levels in groundwater may indicate other water quality problems, that can cause other health problems.

Testing

Regularly test your well water for a standard suite of chemical parameters, including nitrite. Use an accredited water testing laboratory. Find a list of accredited water testing laboratories at www.gov.ns.ca/nse/water/waterlabs.asp or see the Yellow Pages under “laboratories.”

Get the special sampling bottles and instructions on proper sampling from the laboratory.

The cost of analyzing water samples can range from \$15 for a single parameter to \$230 for a full suite of chemical parameters. The cost can vary depending on the lab and the number of parameters being tested.



Solutions

If nitrite is present above the guideline limit in the first test, get a second test to confirm the original results. While you are waiting for your test results, find an alternate source of water for drinking, cooking, and teeth brushing that has been tested and found to be safe.

If nitrite is confirmed to be present above the guideline limit in the well water, determine the source of nitrite:

- Check the bacterial quality of the water.
- Inspect well construction and reconstruct the existing well, if necessary.

If bacterial quality and well construction are acceptable and no evidence of other contamination is found, you have the following options:

- Treat your current source of water to reduce nitrite levels.
- Use bottled water for drinking, cooking, and teeth brushing.

Treatment

Nitrite cannot be removed from water through boiling. Boiling water may increase the concentration of nitrite.

Effective treatment methods include

- anion exchange
- distillation
- reverse osmosis

Buy a treatment system that has been certified to meet the current NSF standards for nitrite reduction. NSF International is a not-for-profit, non-governmental organization that sets health and safety standards for manufacturers in 80 countries. See its website at www.nsf.org.

Once installed, re-test your water to ensure the treatment system is working properly. Maintain the system according to the manufacturer's instructions to ensure a continued supply of safe drinking water.

For more information on water treatment, see our publications *Water Treatment Options* and *Maintaining Your Water Treatment*, part of the *Your Well Water* booklet series at www.gov.ns.ca/nse/water/privatewells.asp.

REGULAR TESTING

Homeowners are responsible for monitoring the quality of their well water:

- Test for bacterial quality every 6 months.
- Test for chemical quality every 2 years.
- Test more often if you notice changes in physical qualities – taste, smell, or colour.

Regular testing alerts you to problems with your drinking water.

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Considerations

Shallow wells, dug wells, improperly constructed and damaged wells are most vulnerable to nitrite contamination.

Nitrite contamination may be a sign of deteriorating groundwater quality and could indicate other problems with well water quality.

Consideration for anion exchange method

Nitrite is a negative ion (anion) in solution. When you use anion exchange treatment, the resin in the unit will remove certain anions more readily than others. If other more preferred anions are present such as uranium, sulphate, arsenic, or nitrate, the effectiveness of the unit may be reduced. The resin in the anion exchange unit may need to be regenerated more frequently to reduce the concentration of nitrite to a satisfactory level. It is important that a detailed chemical analysis of your water be completed to determine if other substances are present that will affect nitrite treatment.

FOR MORE INFORMATION

Contact

Nova Scotia Environment at
1-877-9ENVIRO
or 1-877-936-8476

www.gov.ns.ca/nse/water/

