



NITRATE IN DRINKING WATER

Frequently Asked Questions

General Information about nitrate and its health effects

What is nitrate and where does it come from?

Nitrate is a naturally occurring oxide of nitrogen. Nitrogen is present in the air and it reacts with oxygen and ozone to produce nitrate. Nitrate is an essential component of living things and is a major part of animal manure, human sewage waste and commercial fertilizers. Nitrates and nitrites may be associated with septic systems and have been used for centuries as fertilizers, in explosives and as food preservatives.

When does nitrate in drinking water become a health concern?

Nitrate is measured in milligrams per liter (mg/L) (1 mg/L = 1 part per million (ppm)). Nitrate occurs naturally in surface and groundwater at concentrations up to 1-2 mg/L. At these naturally occurring levels, nitrate is not harmful to health.

The U.S. Environmental Protection Agency (EPA) has established the safe drinking water standard (also called maximum contaminant level) for nitrate as 10 mg/L as measured nitrogen (NO₃-N). If your water has nitrate levels above 10 mg/L, it is advisable to switch to bottled water.

How can nitrate affect my health?

Nitrate is a potential health hazard. Drinking water that has high levels of nitrate can cause health effects such as:

- Methemoglobinemia or “blue baby syndrome” which results from nitrate decreasing the blood’s capacity to carry oxygen, especially in infants who receive baby formula mixed with water containing nitrate above 10 mg/L
- Potential increased risk of:
 - Recurrent respiratory infections
 - Thyroid dysfunction
 - Negative reproductive outcomes such as spontaneous abortion
 - Certain cancers including cancer of the stomach or bladder

Safely using nitrate-contaminated water

Can I wash my food with nitrate-contaminated water?

If nitrate levels in your water are above 10 mg/L, you should use bottled water or water from a safe source to wash, prepare and cook your food.

Can I irrigate or water my garden with nitrate-contaminated water?

Yes.

What about bathing and showering?

Nitrate does not easily enter the body through the skin. Bathing, swimming and showering with water that has levels of nitrate over 10 mg/L is safe as long as you avoid swallowing the water. Supervise small children when they are bathing and brushing teeth to ensure they do not swallow the water.

Washing dishes, utensils and food preparation areas:

Only a very small amount of water clings to smooth surfaces, like dishes. Water having more than 10 mg/L of nitrate may be safely used to wash and sanitize dishes, tables and eating utensils.

General cleaning and laundry:

Very little water remains on washed surfaces and in laundered fabrics. Because these articles are not placed in the mouth, water having more than 10 mg/L of nitrate may be safely used for general cleaning and washing of clothing, bedding and linens.

What about my pets?

Animals should not drink water that is above 10 mg/L.

Learning about nitrate levels in your drinking water

For people on municipal or public water systems:

Public drinking water providers are required to monitor for nitrate and ensure levels remain below the drinking water standard of 10 mg/L. They are also required to make those results public. If your water comes from a public water system, you can find results on the Oregon Health Authority (OHA) Drinking Water Service's website (<http://170.104.63.9/>). Your drinking water provider is also required to mail a "Consumer Confidence Report" to its customers every year. This report contains the most recent nitrate test results.

For private well owners:

If your drinking water comes from your own well, you will have to find a laboratory that does water testing for private property owners. These labs can provide information and instructions for getting your well water tested. For a list of accredited laboratories in Oregon, call the OHA Laboratory Accreditation Program at 503-693-4122 or visit: <http://public.health.oregon.gov/LaboratoryServices/EnvironmentalLaboratoryAccreditation/Documents/acclab.pdf>.

Water containing 5-10 mg/L nitrate as nitrogen should be tested every quarter for at least one year to determine if levels are increasing or vary seasonally. Since nitrate levels can vary over time, annual testing is recommended at a minimum for all drinking water sources.

Removing nitrate from drinking water

For Public Drinking Water System Operators:

Nitrate can be reduced or removed entirely from drinking water, but treatment processes are expensive and require careful maintenance and monitoring. Current treatments include ion exchange resins, reverse osmosis, electro dialysis and either biological or chemical denitrification. If treatment is not possible for your system, you should consider developing a different water source, blending with a different source or connecting to another safe water source in the area. Water that is to be used for drinking, beverage-making or food preparation may be obtained from a known safe source and used on a temporary basis. Non-ingestion uses of water pose much less hazard, but are not entirely safe if nitrate levels are significantly above the drinking water limit. Before deciding on treatment equipment, call for information and advice from the OHA's, Drinking Water Services at 971-673-0405.

For Private Well Owners:

Don't boil the water!

Boiling contaminated water does not remove nitrate; it can increase nitrate levels.

Private well treatment options:

First, make sure that you are not contributing to the problem. Take action to prevent nitrate sources on your property from contaminating your own groundwater (e.g., properly maintain your septic system, reduce fertilizer use within 100 feet of the well and move livestock or manure piles away from the well area). Non-treatment options would include developing a different water source, blending in water from another source or connecting to another safe water source in the area.

Several treatment methods can remove nitrate from drinking water, including ion exchange and reverse osmosis; ion exchange is the most common. Treatment equipment must be carefully maintained in order to work properly and may not be effective if nitrate levels are very high. Treated water should be tested at least once a year. Untreated water should be tested at least every 3 years.

Check to be sure that any treatment system is certified by a recognized, third-party testing organization that meets strict testing procedures established by the American National Standards Institute (ANSI) and National Sanitation Foundation (NSF) International.

For more information:

- Private well owners that have questions and concerns about nitrate in their water may contact the Center for Health Protection at 971-673-0400, or by email at general.toxicology@state.or.us. or refer to the following;
- U.S. EPA – Nitrate in Drinking Water webpage at: <http://water.epa.gov/drink/contaminants/basicinformation/nitrate.cfm>.