

## Nitrates in Drinking Water

### Nitrates- Are they in your Tap Water?

Nitrate contamination occurs in surface water and groundwater, leaching into the soil and from there into the water supply from various sources. . Nitrates can reach both surface water and groundwater as a consequence of agricultural activity (including the excess application of inorganic nitrogenous fertilizers and manures), from wastewater treatment and oxidation of nitrogenous waste products in human and animal excreta, including septic tanks.

Although nitrates are a necessary nutrient for plants growth, high concentration of nitrates in drinking water may cause several health problems in humans such as respiratory and reproductive diseases, kidney, spleen, and thyroid in children and adults. It is particularly harmful to infants.

In California, nitrates are one of the most common groundwater contaminants. While 98 percent of the state's community water systems meet all primary drinking water standards, between 10 to 15 percent of the public wells exceed the state's standards for nitrates. They in turn have to be treated or blended with high-quality water.

There are some regulatory controls in place that address salinity, including nitrates, but it is generally agreed that a much more comprehensive approach is needed. Meanwhile, there are also local efforts focusing on the control and abatement of nitrates to surface and groundwater.

### What are nitrates and where does it come from?

Nitrates are a naturally occurring oxide of nitrogen that is found at a relatively low concentration in soil and water. It is an essential component of living things and required for plant growth. That is why nitrates are widely used in agricultural fields, farmland, lawns, and gardens as a fertilizer to enhance the growth of plants. Besides this, nitrate is also found in human sewage waste and manure. As a result, during certain weather conditions, the fertilizer can run off into streams and rivers or even percolate into groundwater, where it reacts with water to form nitrate.

### How to tell if my water has Nitrates

Testing is the most sure-fire way to confirm whether or not your water has nitrates. Most US towns and cities also have an annual water quality report (we often link to them on our city specific pages), which should tell you about the city's water test results. Poorly sealed, or improperly constructed wells that draw from shallow aquifers are at the greatest risk of nitrate contamination. Manure and septic tank waste may also contain disease-causing bacteria and viruses.

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It is highly recommended that if you own a private well, continuous monitoring of the well should be done through testing for basic water quality parameters. Your county health department can tell you where you can get your water tested and may have specific recommendations for testing. Many certified labs charge up to \$50 per test. If your nitrate test results are 5 mg/L or higher, you may want to re-sample in six months.

## When are Nitrates in drinking water a health concern?

Nitrates are measured in milligrams per liter (mg/L) (1 mg/L = 1 part per million (ppm)). Nitrates occur naturally in surface and groundwater at concentrations up to 1-2 mg/L. At these naturally occurring levels, nitrates are not harmful to health. When it exceeds this permissible limit and the contaminated water is consumed for a prolonged period, it may prove harmful to human health.

The U.S. Environmental Protection Agency (EPA) has established the safe drinking water standard (also called maximum contaminant level) for nitrates as 10 mg/L as measured nitrogen (NO<sub>3</sub>-N). If your water has nitrate levels above 10 mg/L, it is advisable to switch to bottled water or get a water filter. General information of EPA's programs for water-quality standards and criteria is available at: <http://www.epa.gov/waterscience/standards>

## What are the Health Risks of Nitrates in Drinking Water?

The drinking water standard for nitrate-N is 10.0 mg/L or 1 hundredth of a gram in one liter of water. The nitrite standard is 1 mg/L. These standards only regulate public water supplies but are a relevant guide for private well owners.

The major health risk from nitrates/nitrites is to infants under 6 months of age. At this early stage of development, nitrate in the body is transformed to nitrite, which reacts with hemoglobin (the oxygen carrier in the blood) and prevents the transport of oxygen. The result is a decreased oxygen supply to the body, often called blue baby syndrome (or methemoglobinemia). It gets this name because the skin often turns a blue or grayish color, especially around the mouth. If these symptoms are noticed, seek medical attention immediately.

Adults are at low risk from this syndrome. Adults with chronic health problems, such as heart or lung disease or enzyme deficiencies, may be at higher risk from elevated nitrate/nitrite levels. Pregnant and nursing mothers should also avoid drinking water high in nitrates/nitrites because of potential effects passed on to the fetus or infant. There have been a few studies suggesting high nitrate/nitrite may cause certain types of cancer, but this connection is not well understood.





## What are the signs of blue baby syndrome from nitrates?

Moderate to serious: Blue baby syndrome may cause brownish-blue skin tone due to lack of oxygen. This condition may be hard to detect in infants with dark skin. For infants with dark skin, look for a bluish color inside the nose and mouth, on the lips, or fingernail and toenail beds.

Mild to moderate: Blue baby syndrome may cause signs similar to a cold or other infection (fussy, tired, diarrhea, or vomiting). While there is a blood test to see if an infant has blue-baby syndrome, doctors may not think to do this test for babies with mild to moderate symptoms.

## What should I do if my infant has blue baby syndrome from nitrates in water?

Health care providers use a simple blood test to detect lead poisoning. A small blood sample is taken from a finger prick or from a vein. Lead levels in the blood are measured in micrograms per deciliter (µg/dL). An unsafe level is 10 µg/dL or higher, though there is no safe level of lead.

## Can nitrates in drinking water affect adults?

Although red blood cells quickly return to normal, some health conditions can make people more susceptible to health problems from nitrates. Individuals with the following health conditions should not drink water with more than 10 mg/L of nitrates:

Individuals who don't have enough stomach acids.

Individuals with an inherited lack of the enzyme that converts affected red blood cells back to normal (methemoglobin reductase).

Women who are pregnant or trying to become pregnant. High nitrate levels may increase the risk of spontaneous abortion or certain birth defects.

## Besides drinking, is it safe to bathe in water with elevated levels of nitrate?

Yes, it is safe for adults and infants to bathe in water that contains nitrate. Nitrate is only a concern for ingestion (eating and drinking). It is not absorbed through your skin. (Source: United States Environmental Protection Agency)



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## Can I wash my food with nitrate-contaminated water?

If the concentration of nitrate in your drinking water is above the permissible limit of US-EPA (10 mg/L) it is recommended to use bottled water or water from a safe source to wash, prepare and cook your food.

## Can I use water with nitrates to wash dishes, utensils, and food preparation areas?

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

## Can I use water with nitrates to wash cloths and clean my house?

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 can be safely used for general cleaning and washing of clothing, bedding, and linens.

How can I remove nitrates from drinking water?

Several treatment methods can remove nitrates from drinking water, including, distillation, chemical reduction, ion exchange and reverse osmosis. Ion exchange is the most common.

Treatment equipment must be carefully maintained in order to work properly and might not be effective if nitrate levels are very high. Treated and untreated water should be tested at least once a year.

## Where can I find information about nitrates my local drinking water supply?

The best way to learn about your local drinking water quality is to read the annual drinking water quality report/consumer confidence report that water suppliers send to their consumers each year. The reports often are sent out with water bills, but they may be sent separately. The reports tell where drinking water comes from, what contaminants are in it, and at what levels.

The U.S. Environmental Protection Agency offers information about local drinking water systems through their Local Drinking Water Information Web page. Many water suppliers are now posting their water-quality monitoring results on the Web, and these results can be accessed from this site. Another source of information is the EPA site Surf Your Watershed. This site answers questions such as, "Where does my drinking water come from?"

Source: tapsafe 2023

Note for end users: SwissMountain Premium Mineral Water contains virtually no nitrates.



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