

# Nitrate and Nitrite - ToxFAQs™

## What are nitrate and nitrite?

Nitrate and nitrite are two nitrogen compounds that are needed by plants and animals to live and grow. They occur naturally in soil, water, and air. Nitrate and nitrite are also made in the body.

In industry, the majority of nitrate is used as fertilizers for crops or lawns. Nitrate and nitrite are also used in food preservation, some pharmaceutical drugs, and in the production of munitions and explosives.



## What happens to nitrate and nitrite in the environment?

Nitrate and nitrite are naturally present in soils, water, air, and plants. The use of fertilizers and waste from animals adds to the amount of nitrate in the environment.

Nitrate and nitrite dissolve easily in water and will therefore move quickly through the soil into surface water and groundwater. In the soil and water, these chemicals will usually remain until taken up by plants or changed into another chemical (such as nitrogen) by microorganisms. Nitrate and nitrite do not evaporate into the air.

## How can I be exposed to nitrate and nitrite?

Nitrate and nitrite are found in diets through vegetables (especially celery, lettuce, and spinach), fruits, cured meats, fish, dairy products, beers, and cereals. Some meats and meat products contain sodium nitrate and/or sodium nitrite as preservatives. In addition, your body naturally makes these chemicals.

Drinking water from wells containing nitrate from sources such as animal waste and/or fertilizer runoff and eating plants grown in contaminated soil will increase your exposure to these chemicals.

## How can nitrate and nitrite affect my health?

Most people are not exposed to levels that would cause health problems.

Some people who ate food or drank fluids that contained unusually high levels of nitrite experienced methemoglobinemia (decreased ability of the blood to carry oxygen to tissues). This was also seen in young infants (<6 months of age) who drank formula made with water having higher than recommended nitrate at levels. Symptoms people experienced included decreased blood pressure, increased heart rate, headaches, abdominal cramps, and vomiting; some people died. In animal studies, changes in thyroid function were seen in rats that were fed or drank high levels of nitrate or nitrite.

**Exposure to nitrate and nitrite mainly occurs through eating or drinking food and water that contain these chemicals. Most people are not exposed to high enough levels to cause health problems.**

# Nitrate and Nitrite

## Can nitrate and nitrite cause cancer?

A few studies in humans and mice have found cancers of the gastrointestinal tract.

The [U.S. Department of Health and Human Services \(DHHS\)](#) has not evaluated nitrate or nitrite for carcinogenicity (ability to cause cancer).

The [U.S. Environmental Protection Agency \(EPA\)](#) has not classified nitrate or nitrite for carcinogenicity.

The [International Agency for Research on Cancer \(IARC\)](#) noted that the presence of nitrite and some types of amines or amides in the acid environment of the stomach may result in the production of some cancer-causing N-nitroso compounds; under these conditions, IARC determined that ingested nitrate and nitrite is probably carcinogenic to humans.

## Can I get a medical test to check for nitrate and nitrite?

There are tests that can detect nitrate and nitrite in the blood and urine. However, since your body naturally makes these chemicals, these tests are not very useful to determine exposure.

## How can I protect myself and my family from nitrate and nitrite?

Consider eating less of those foods that contain high levels of nitrate or nitrite, especially infants and small children. If you live near an agricultural field and use well water, have your water tested for nitrate and nitrite and, if necessary, take the needed steps to protect yourself.

Keep children from playing in areas where fertilizers are applied.

### For more information:



Call **CDC-INFO** at 1-800-232-4636, or submit your question online at

<https://wwwn.cdc.gov/dcs/ContactUs/Form>

Go to ATSDR's Toxicological Profile for Nitrate and Nitrite:

<https://wwwn.cdc.gov/TSP/ToxProfiles/ToxProfiles.aspx?id=1452&tid=258>

Go to ATSDR's Toxic Substances Portal: <https://wwwn.cdc.gov/TSP/index.aspx>

Find & contact your ATSDR Regional Representative at [http://www.atsdr.cdc.gov/DRO/dro\\_org.html](http://www.atsdr.cdc.gov/DRO/dro_org.html)