

NITRATE AND NITRITE

What are nitrate and nitrite?

Nitrate and nitrite are naturally occurring, inorganic ions present in many places in the environment. The decomposition of organic materials in soils releases ammonia, which oxidizes to form nitrate and nitrite. Nitrate is more common.

Where are nitrate and nitrite found and how are they used?

Both compounds can be found in groundwater, soils, and many other places. Nitrate and nitrite are introduced through the application of fertilizer containing nitrogen compounds; through decomposing animal wastes; and through septic systems and sewage treatment facilities. Nitrate is found naturally in vegetables including broccoli, cauliflower, collard greens, and root vegetables. The human body can convert nitrate into nitrite.

How can people be exposed to nitrate and nitrite?

You could be exposed to nitrate and/or nitrite through:

- **Drinking** water containing nitrates. Wells with high levels of nitrates can contribute to significant exposure. **This is of particular concern for households with infants consuming formula prepared with this water.**
- **Eating** foods containing nitrates or nitrites as preservatives, such as processed meats.

How can nitrate and nitrite affect my health?

Nitrates can change normal hemoglobin (the chemical in the blood responsible for oxygen transport) to methemoglobin. Normally, methemoglobin levels are less than 2.5 percent of the body's total hemoglobin. Nitrates increase the methemoglobin, which reduces the blood's ability to transport oxygen to cells. This oxygen starvation can lead to a bluish tint of the lips, ears, and nose in slight cases (known as blue-baby syndrome in infants). In severe cases, it can lead to respiratory and heart problems, and death.

Infants are especially susceptible to nitrates in the drinking water used to prepare their formula. Pregnant women are also at more risk from nitrate exposure as their methemoglobin levels are typically as high as 10 percent.

How are nitrate and nitrite poisoning treated?

Mild and moderate cases of nitrate and nitrite poisoning typically do not require treatment because they naturally leave the body in most healthy people over 6 months of age. Hospitals treat extreme cases of exposure to nitrates and nitrites by applying 100 percent oxygen and methylene blue. The most important step in treating persons with nitrate poisoning is to determine and remove the source of the nitrate.

Poison Control Center 24/7 Emergency Contact Number: 1-800-222-1222
DHSS 24/7 Contact Number: 1-888-295-5156



Frequently Asked Questions

What should I do if exposed to nitrates or nitrites?

Most individuals exposed to nitrates will see little or no effect of exposure. The human body is exposed to nitrates and nitrites every day from a wide variety of sources, including its own systems. Children over 6 months of age, older children, and adults have sufficient internal mechanisms to remove nitrate and nitrite from the body. Most healthy people can counteract the typical negative effects of nitrate and nitrite exposure before any negative health effects are observed.

Persons suffering acute symptoms, such as labored breathing or bluish discoloration of the lips, should immediately seek medical assistance.

What factors limit use or exposure to nitrates or nitrites?

The most important step in limiting exposure to these compounds is knowing the quality of your drinking water. Municipal water systems send this information in the mail and it is posted annually in the Office of Drinking Water's Annual Compliance Report. Individuals with private wells can request information on testing from the Division of Public Health Office of Drinking Water at 302-741-8630 or at [Private Drinking Water - Delaware Health and Social Services - State of Delaware](#).

Is there a medical test to show whether I was exposed to nitrates or nitrites?

Nitrate levels can be detected through urine and blood tests. After professionals determine that a toxic exposure occurred due to nitrate, the source can be removed.

Technical Information

CAS number: Nitrate - 14797-55-8 Nitrite - 14797-65-0

Chemical Formula: Nitrate - NO_3 Nitrite - NO_2

Carcinogenicity (EPA): Not classifiable as to human carcinogenicity.

MCL (Drinking Water): Nitrate - 10 mg/L (measured as Nitrogen)

Nitrite - 1 mg/L (measured as Nitrogen)

OSHA Standards: Not Available

NIOSH Standards: Not Available

Resources

Agency for Toxic Substances and Disease Registry, Department of Health and Human Services, Public Health Service. *Toxicological Profile for Nitrites and Nitrates*, Atlanta, GA, July 2017, <https://wwwn.cdc.gov/TSP/ToxProfiles/ToxProfiles.aspx?id=1452&tid=258>

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