

## Health Concerns of Nitrate/Nitrite in Ground Water

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### What are Nitrate and Nitrite?

Nitrate and nitrite are naturally occurring inorganic ions which make up part of the nitrogen cycle. Nitrate is one of the most widespread ground water contaminants in Idaho (Idaho Department of Environmental Quality, 2008). Nitrate in the environment may come from a number of sources. Those sources include: the atmosphere, decaying plants and other organic matter, livestock waste, nitrogen-based fertilizers, septic system effluent, and industrial wastewater. Nitrate and nitrite are also found in the foods we eat; particularly vegetables. Both nitrate and nitrite are also added to meat products as preservatives.

### What are the drinking water standards for nitrate and nitrite?

The U.S. Environmental Protection Agency (EPA) has set a Maximum Contaminant Level (MCL) for nitrate in drinking water at 10 milligrams per liter (mg/L) or 10 parts per million (ppm) and a Guidance level for nitrite in drinking water at 1 mg/L or 1 ppm. The Guidance for the combination of nitrate and nitrite in drinking water is 10 mg/L. These levels include a margin of safety to protect human health and should be regarded as guidelines. Idaho's drinking water standard for nitrate is also 10 mg/L. EPA believes that water containing nitrate or nitrite at or below these levels is acceptable for drinking every day over the course of one's lifetime, and does not pose any health concerns.

### What health effects might be caused by nitrate and nitrite in my water?

Non-Cancer Effects. Infants exposed to nitrate result in a blood condition called methemoglobinemia. Methemoglobinemia, also known as *blue baby syndrome*, is characterized

by a reduced ability of the blood to carry oxygen to organs and tissues causing shortness of breath, blueness of the skin and lips, rapid pulse and rapid breathing. Methemoglobinemia related to drinking water contamination has only been observed in infants up to the age of about 6 months. Immediate medical attention should be sought if an infant is experiencing any of these symptoms.

Cancer Risk. Data from laboratory studies are inadequate for EPA to determine if nitrate and nitrite can increase the risk of cancer in humans.

### How do I know if there is nitrate or nitrite in my drinking water?

If you own a private domestic well, you should periodically test your water for nitrate/nitrite. It is also recommended that you periodically sample for bacteria. In general, it is a good idea to have your well water tested if you have had a repair or problem with your water system, connections, or treatment system, or after installing a new well.

A certified analytical laboratory will test your water for a fee. You can find a laboratory by looking in the yellow pages under "Laboratories-Analytical" or "water analysis". When you call the laboratory, they will give you specifics about the costs of the nitrate/nitrite analysis and how to collect the water sample. If you have any trouble finding a laboratory, contact the Idaho State Department of Agriculture Water Program at 208-332-8500 for assistance.

### What actions should I take if my drinking water contains nitrate or nitrite?

Your first step should be to get the advice of your state or county health officials. They are likely to recommend that you retest your

well to get an accurate overall picture of the water quality.

Upon retesting, if nitrate is detected in your well at or below 10 mg/L or if nitrite is detected in your well at or below 1 mg/L, you should continue to retest your well periodically. If nitrate is detected in your well at a concentration greater than 10 mg/L and confirmed with retesting or if nitrite is detected in your water at a level greater than 1 mg/L, ISDA recommends that you do not drink the water and find an alternative drinking water supply, such as bottled or filtered water. In addition, it is recommended that you do not prepare foods with the water if the nitrate or nitrite concentration exceeds the MCL. You should contact your local health department, your doctor and/or ISDA to determine the best action to take.

Significant nitrite contamination is usually a sign of microbiological contamination resulting from human or animal waste. Thus, if there is significant nitrite contamination, a check for microbiological contamination should be made as well. Your local health department can refer you to a certified laboratory, advise you on the cost of testing, and recommend how often you should retest.

Treatment technologies currently used to remove nitrate and nitrite from water include ion exchange, distillation, and reverse osmosis. However, these techniques are not necessarily appropriate or available in every situation and they require careful maintenance and sampling to achieve effective operation. Your local health districts should be able to advise you on the best approach to follow.

### Where can I get more information?

The following are sources for additional information and guidance:

- EPA's toll-free Safe Drinking Water Hotline, Monday thru Friday, 8:30am to 4:30pm E.S.T. at (800) 426-4791.
- National Pesticide Information Center, toll-free, 24-hours a day at (800) 858-7378; or on online at [www.npic.orst.edu](http://www.npic.orst.edu).
- Idaho Department of Health and Welfare, Bureau of Community and Environmental Health: (208) 332-7328.
- Contact your local health district or the DEQ Regional Office in your area.

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Photos on fact sheet are from the United States Geological Survey drinking water website: <http://www.usgs.gov/themes/FS-047-97/>.

### References

1. Idaho Department of Environmental Quality. Degraded Ground Water: Nitrate, [http://www.deq.state.id.us/water/prog\\_issues/ground\\_water/nitrate.cfm](http://www.deq.state.id.us/water/prog_issues/ground_water/nitrate.cfm). Accessed: 2/22/2008.
2. U.S. Environmental Protection Agency. Health Advisory Summary, Nitrate/ Nitrite, January 1989.

### Idaho State Department of Agriculture Water Section Information

For more information about nitrate detections in the state of Idaho or any other agricultural ground water quality concerns, please contact a ground water staff member of the Idaho State Department of Agriculture Water Section:

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