

Nitrate & Nitrite in Drinking Water FAQ's

Q: What are nitrate and nitrite?

A: Nitrate (NO_3) and nitrite (NO_2) are inorganic chemicals composed of nitrogen and oxygen. Nitrite is the reduced form of nitrate, and is usually found in nature at much lower levels than nitrate.

During heavy rains, drinking water sources may be contaminated by these chemicals when nitrogen fertilizers run off farm fields and enter streams, rivers, lakes, and wells. Contamination may also occur from septic systems and livestock feedlots.

Public drinking water supplies are required to monitor the level of nitrate and nitrite in the water because of the potential health threat to infants under six months of age.

Q: What are the health effects?

A: Nitrate is essentially harmless. However, certain kinds of bacteria in the digestive tract change the nitrate into nitrite, a much more harmful substance. The nitrite then enters the bloodstream, where it can restrict the blood's ability to provide oxygen to the body, causing blueness of the skin. This potentially fatal condition, known as methemoglobinemia, is also called "blue baby syndrome" because of the increased susceptibility of infants under six months of age. Infants under six months of age are at a higher risk than others because their digestive tract is not fully developed. The stomach of an infant under six months of age has a higher alkalinity, which permits more of these bacteria to be present. By six months of age, the hydrochloric acid in an infant's stomach increases to a level that kills most of the bacteria that change nitrate to nitrite, significantly reducing the risk of methemoglobinemia. Healthy adults and older children can consume higher levels of nitrates more safely than infants because of their fully developed digestive systems.

Q: What are the symptoms?

A: The most obvious symptom of methemoglobinemia is a bluish skin coloring, especially around the eyes and mouth. An infant with bluish skin should immediately be taken to a medical facility for treatment. Other symptoms can include shortness of breath, nausea, vomiting, and dizziness.

Q: What level of nitrate or nitrite is considered “unsafe”?

A: Elevated levels of nitrate or nitrite in drinking water pose no threat to the majority of people.

However, when the average of two analyses shows concentrations of nitrate that exceed 10 milligrams per liter (parts per million), or nitrite concentrations that exceed 1 milligram per liter, public drinking water suppliers are required to notify their customers to provide an alternate source of drinking water for all liquids or foods prepared for infants under six months of age.

Consumption of water with elevated levels of nitrate by nursing mothers is not as likely to be harmful to infants as direct consumption. It is recommended that women who are pregnant or nursing consult with their physicians about limiting nitrate consumption. Persons with medical conditions that may make them more susceptible to methemoglobinemia, such as reduced stomach acidity, also should consult their physicians.

Q: What precautions should be taken by someone at risk?

A: Substitute distilled bottled water for tap water until the nitrate or nitrite advisory is lifted. Boiling tap water will not get rid of the nitrate or nitrite; it only concentrates them. It is safe to bathe or shower in tap water, however.

Q: Can drinking water be treated to remove nitrate or nitrite?

A: Some treatments such as reverse osmosis, ion exchange, or distillation can be effective. However, these processes may be very expensive and are usually not practical for a homeowner to install.

If you use any of these types of home treatment units, check if the unit has a NSF mark for removing nitrate or nitrite. You can obtain this information by calling 1-800-NSF-MARK ext. 5296, or by accessing the Web site at www.nsf.org. NSF is an organization which certifies that products have been independently tested for effectiveness according to manufacturer claims.