

Nitrate Fact Sheet

Nitrate is a negatively charged compound of nitrogen and oxygen, which is very soluble in water. Nitrate is not readily filtered or otherwise removed in the soil and can pass rapidly into ground water wells.

SOURCE: Nitrate is a major component of fertilizer and wastewater. Often the nitrate is in the form of ammonia or protein first, which through contact with oxygen and certain bacteria, converts to the oxidized form known as nitrate. Sources of nitrate from wastewater include urea, ammonia cleaners, food solids, and bacterial cells. It may also result from the breakdown of organic matter buried in the soil.

TOXICITY: Nitrate is generally not toxic to adults or children over the age of two or three years but is associated with a potentially fatal infant disease called methemoglobinemia. In the digestive system of young children, nitrate converts to nitrite, which can pass through the intestinal wall into the blood stream. There it combines with the hemoglobin and interferes with the ability of the blood to carry oxygen. For this reason, methemoglobinemia is referred to as “blue baby” disease. The EPA limits the concentration of nitrate in public drinking water supplies to 10 mg/L. The standard has been lowered from a previous level of 45 mg/L set by the US Public Health Service and the World Health Organization.

TREATMENT: due to its solubility in water and negative ionic charge, filtration and other common home water treatment systems such as softening, or iron filtration does not readily remove nitrate. The best method for limiting nitrate in well water is source control. This can include avoiding overdosing of fertilizer near the well and maintaining good separation distances between septic tank leach fields and the well. A special anion exchange filter that contains a media with a strong affinity for negatively charged ions in water, or by a reverse osmosis treatment system or distillation can remove nitrate.

TESTING: Nitrate analysis is usually done by one of the several “wet chemical” methods using a spectrophotometer to read the final color endpoint. Specific ion electrodes also can be used to detect the activity of nitrate in water. This laboratory uses several different wet chemical methods approved under the public water supply laboratory certification program. They also have test kits available, which the laboratory uses to perform an inexpensive “screening test”, and with which the homeowner can monitor the change in nitrate levels from their well. They recommend comparing the test kit results against a certified analysis from the lab occasionally to verify the accuracy of the kit. We recommend using a specially prepared bottle that has been rinsed in hydrochloric acid for collecting samples.

From Northern Testing Laboratories, Inc.