

April 1999

NITRATES IN DRINKING WATER

NITRATES AND DIET

Nitrate (NO₃) is a compound of nitrogen and oxygen found in many food items in your everyday diet. Generally, the concentration in the ground water is low. The major adult human intake of nitrate is from food rather than from water. Vegetables such as spinach, lettuce, beets and carrots contain significant amounts of nitrate. Drinking water normally contributes only a small percentage of the total nitrate intake.

NITRATES IN DRINKING WATER

Although low levels of nitrates may occur naturally in water, sometimes higher levels, which are potentially dangerous to infants, are found. Illinois has adopted a drinking water standard for nitrate of 10 milligrams per liter (10 mg/l) as N (nitrogen). This standard is mandatory for public water supplies and is used as a guide for private water supplies. The U.S. Environmental Protection Agency also uses 10 mg/l as N as a mandatory national standard for public supplies under the Safe Drinking Water Act. The 10 mg/l standard expressed as nitrogen (N) is equivalent to 45 mg/l expressed as nitrate.

SOURCES OF HIGH NITRATES

It is often difficult to pinpoint sources of nitrates because there are so many possibilities. Sources of nitrogen and nitrates may include runoff or seepage from fertilized agricultural lands, municipal and industrial waste water, refuse dumps, animal feedlots, septic tanks and private sewage disposal systems, urban drainage and decaying plant debris. Geologic formations and direction of ground water flow also may influence nitrate concentration.

HEALTH PROBLEMS

High nitrate levels in drinking water pose a risk to infants because they may cause methemoglobinemia, a condition known as “blue baby.”

High nitrate levels interrupt the normal body processes of some infants. Nitrate becomes toxic when it is reduced to nitrite, a process that can occur in the stomach as well as in the saliva. Infants are especially susceptible because their stomach juices are less acidic and therefore are conducive to the growth of nitrate-reducing bacteria. (Adults can consume large quantities of nitrates in drinking water or food with no known ill effects; their stomachs produce strong acids that do not promote the growth of bacteria that convert nitrate to nitrite.) Nitrite in the blood combines with hemoglobin to form methemoglobin, which reduces the capability of the blood to carry oxygen to all parts of the body. This results in the “blue” condition of the baby’s skin.

Infants younger than 6 months of age are most susceptible. However, because of individual differences in infants, some may not be affected. If an infant is affected, the skin turns a blue color, similar to the color of the blood vessels located close to the skin. If a parent or other caregiver observes this condition, medical help should be sought immediately. The infant is

being asphyxiated because oxygen cannot be transported by the blood. Prompt medical attention normally results in quick recovery of the infant.

In all cases where drinking water contains more than 10 mg/l of nitrate as nitrogen, an alternative source of water should be found for the infant. Boiling the water will not reduce the nitrate concentration; in fact, it actually INCREASES the concentration by evaporating off the water. Water that is high in nitrates should not be used for preparing infant formula or in any other way that could result in consumption by a baby.

TESTING FOR NITRATE

Federal and state regulations require the testing of public water systems for nitrates; however, high nitrate concentrations can occur in private water wells. If infants will be consuming water from a private water well, the water should be tested for nitrates as well as for bacteria. To arrange for bacteriological and nitrate analyses of your drinking water or if you have questions concerning safe drinking water, contact your local health department or the nearest Illinois Department of Public Health regional office.

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4302 N. Main St.
Rockford, IL 61103
815-987-7511

MARION REGION

2309 W. Main - Ste. 106
Marion, IL 62959
618-993-7010

PEORIA REGION

5415 N. University
Peoria, IL 61614
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EDWARDSVILLE REGION

#22 Kettle River Drive
Glen Carbon, IL 62034
618-656-6680

CHAMPAIGN REGION

2125 S. First St.
Champaign, IL 61820
217-333-6914

WEST CHICAGO REGION

245 W. Roosevelt Rd., Bldg. 5
West Chicago, IL 6018
630-293-6800

Illinois Department of Public Health, Division of Environmental Health, 525 W. Jefferson St., Springfield, IL 62761, 217-782-5830, TTY (hearing impaired use only) 800-547-0466. Questions may be directed to your local health department, to one of the Illinois Department of Public Health's regional offices or to the Department's central office in Springfield.

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[Questions or Comments](#)