

NITRATE

is found in the

Honolulu Board of Water Supply REGION 3 (Ewa-Waianae-Waipahu System).

Here are the **EPA's Health Effects** for **this contaminant**, as reported in the **EPA Reports**, & **Honolulu Board of Water Supply "Water Quality Report"**.



NITRATE: EPA Health Effects:

Blue baby syndrome: It is a rare but sometimes fatal disease that occurs primarily during the first four months of life. Symptoms include a blue discoloration of the lips, nose, and ears. Other symptoms include crying, vomiting and diarrhea.

It can be caused by a chemical called nitrate sometimes found at unsafe levels in tap water that is used to mix powdered formula.



NOTE

U.S. mcl Standard for Nitrate: 10 ppm (Maximum Contaminant Level)

Germany mcl Standard for Nitrate: 4.4 ppm (Maximum Contaminant Level)

S. Africa mcl Standard for Nitrate: 4.4 ppm (Maximum Contaminant Level)

European Economic Community mcl Standard for Nitrate: 5.6 ppm (Maximum Contaminant Level)

The U.S. STANDARD is Half as Protective ≥
As Other Countries' Standards!!!!

Nitrate is ingested when drinking water, or beverages prepared with water.

The solution to this problem and concern is the

Ali'i 5-TECH+ Pure Water Quality System™

with our Reverse Osmosis System MEMBRANE

***Removes Nitrate and other Inorganic Contaminants
from your Drinking Water, Ice Cubes, & Food Preparation Water!***

Call AAA BestWater Co.: 454-2666

Group says unsafe U.S. water causing 'blue baby syndrome'

February 22, 1996

Web posted at: 11:40 p.m. EST

From Correspondent Eugena Hals

WASHINGTON (CNN) An environmental group says **federal drinking water standards are too loose to protect newborns from a chemical that may cause something called "blue baby syndrome."**

Blue baby syndrome is a rare but sometimes fatal disease that occurs primarily during the first four months of life. Symptoms include a blue discoloration of the lips, nose, and ears. Other symptoms include crying, vomiting and diarrhea.



Powdered baby formula mixed with tap water could contain nitrate

It can be caused by a chemical called nitrate sometimes found at unsafe levels in tap water that is used to mix powdered formula.

Nitrate is widely used in fertilizer applied to crops in the corn belt, Texas, and California, and it can run off into water supplies.

A research group called the Environmental Working Group says federal standards for nitrate in drinking water should be tougher. "We don't want to become a nation of bottled water, and we are rapidly becoming that," says Ken Cook of EWG.

The group says the U.S. standard for nitrate should be twice as protective as it is now. That would put it in line with Germany, Denmark, and South Africa.



Sullivan

But spokesmen for the Environmental Protection Agency and the nation's water systems say the current standard is sufficient to protect infants. The standard is really not in question, and to cast aspersions on it is misleading," says Jack Sullivan with the American Water Works Association.

Sullivan agrees that more steps are needed to prevent pollution by farmers but says there is no widespread public health threat.

The Environmental Working Group says that in 1994, about 500,000 people, many of them in the Midwest, drank tap water from systems that exceeded the federal standard for nitrate.

Water systems experts say when violations occur, they notify the public so pregnant women and infants will switch to bottled water. They say nitrate contamination is generally a bigger problem in drinking water from private wells.



Paulson

Pediatricians say parents who are worried should check with their local water company or get their water tested. "If parents have kids under a year of age and live in part of the country where the water system has been contaminated and is at risk, then they ought to consider use of bottled water," says Dr. Jerome Paulson with the [George Washington University](#) Medical center.

Boiling tap water does not eliminate the problem because nitrate is a chemical, not a form of bacteria.



Nitrate (as nitrogen) occurs naturally in groundwater. According to EPA, nitrates may come from runoff from fertilizer use or leaching from septic tanks, sewage, or erosion of natural deposits. **Nitrate in drinking water at levels above 10 parts per million (ppm) is a health risk for infants of less than six months of age. High nitrate levels in drinking water can cause blue baby syndrome.** Nitrate levels may rise quickly for short periods of time because of rainfall or agricultural activity. **If you are caring for an infant, you should ask advice from your health care provider if the nitrate level is between 5 to 10 ppm.**



Technical Fact Sheet on: NITRATE/NITRITE

[List of Contaminants](#)

As part of the Drinking Water and Health pages, this fact sheet is part of a larger publication:
National Primary Drinking Water Regulations

Drinking Water Standards (in mg/L)

Nitrate- MCLG: 10; MCL: 10; 10-day HAL: 10
Nitrite- MCLG: 1; MCL: 1; 10-day HAL: 1
Total (Nitrate+Nitrite)- MCLG: 10; MCL: 10; 10-day HAL: 10

Health Effects Summary

Acute: **Excessive levels of nitrate in drinking water have caused serious illness and sometimes death. The serious illness in infants is due to the conversion of nitrate to nitrite by the body, which can interfere with the oxygen-carrying capacity of the child's blood. This can bear acute condition in which health deteriorates rapidly over a period of days. Symptoms include shortness of breath and blueness of the skin.**

Drinking water levels which are considered "safe" for short-term exposures: For a 10-kg (22 lb.) child consuming 1 liter of water per day a ten-day exposure to 10 mg/L total nitrate/nitrite.

Chronic: Effects of chronic exposure to high levels of nitrate/nitrite include diuresis, increased starchy deposits and hemorrhaging of the spleen.

Cancer: There is inadequate evidence to state whether or not nitrates or nitrites have the potential to cause cancer from lifetime exposures in drinking water.

**Washington State Dept of Health
Division of Environmental Health
Office of Drinking Water**

What is nitrate?

Nitrate is a chemical found in most fertilizers, in manure, and in the liquid waste discharged from septic tanks. Natural bacteria in soil can convert nitrogen into nitrate.

How can nitrate get into my well water?

Nitrate can be carried by rain or irrigation water down through the soil and into the groundwater. If your well draws water from this groundwater, your well water may contain nitrate.

Why is nitrate in drinking water a problem?

Nitrate can affect red blood cells and reduce their ability to carry oxygen to the body. In most adults and children these affected blood cells rapidly return back to normal. **However, the blood cells of infants who are given water with high levels of nitrate (or foods made with nitrate contaminated water) may develop a serious health condition due to the lack of oxygen.** This condition is called methemoglobinemia or “blue baby syndrome.” Some scientists think that diarrhea can make this problem even worse.

How is nitrate in drinking water regulated?

The U.S. Environmental Protection Agency has established a federal drinking water standard, called a Maximum Contaminant Level of 10 milligrams per liter (mg/L), or 10 parts per million (ppm) for nitrate. Washington State’s drinking water quality standard is also 10 mg/L. Public water systems are required to sample for various contaminants, including nitrate, on a regular basis. There is no required sampling of private individual wells. However, private well owners are encouraged to test their well for nitrate on a regular basis.

Signs of “blue baby syndrome”

An infant with moderate to serious “blue baby syndrome” may have a brownish-blue color due to the lack of oxygen. **This condition may be hard to detect in infants with dark skin.** In mild to moderate cases babies may have the same symptoms as when they have a cold or another infection (fussy, tired, diarrhea, or vomiting). While there is a simple blood test to see if an infant has “blue baby syndrome,” doctors may not think to do this test for babies with mild to moderate symptoms.

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Now what do you think of the U.S. Government’s STANDARDS? ≥

**Washington State Dept of Health
Division of Environmental Health
Office of Drinking Water**

(Nitrate Continued)

What to do about “blue baby syndrome”

If your baby has a brownish-blue color, bring your baby to a hospital immediately. There is a medication (methylene blue) that will quickly return your baby’s blood to normal.

Prevention of “blue baby syndrome”

The best way to prevent “blue baby syndrome” is to avoid giving your baby water that may be contaminated with nitrate. Infants under one of age should not drink water exceeding the drinking water standard of 10 parts per million (ppm) of nitrate. Boiling water will kill bacteria that are in well water, but I will not reduce the level of nitrate.

Nitrate in water will not have a long-lasting effect on your baby. If your baby does not have any of the symptoms of “blue baby syndrome” you do not need to bring your baby to the doctor.

Will breast-feeding give my infant “blue baby syndrome”?

Although nitrate has been found in breast milk, there are no confirmed reports of “blue baby syndrome” being caused by a nursing mother who consumed well water that contained nitrate.

Can nitrate affect adults?

Most older children and adults will not be affected because their red blood cells will be quickly converted back to normal. **Some people have conditions that make them susceptible to having health problems from nitrate. This includes:**

- Individuals who don’t have enough stomach acids.
- Individuals with an inherited lack of the enzyme that converts affected red blood cells back to normal (methemoglobin reductase).

Some studies have found an increase risk of spontaneous abortion or certain birth defects if the mother drank water high in nitrate. Women who are pregnant or who are trying to become pregnant should not consume water that is high in nitrate.

**“There is no substitute for *Pure Water*”
Honolulu Board of Water Supply**

DRINKING WATER CONTAMINANTS AND THEIR CONTROL WITH REVERSE OSMOSIS WATER TREATMENT

TYPICAL — Nominal Rejection Performance for Reverse Osmosis
Membranes at 60 psi Net Pressure and 70°F.¹

<u>Inorganic Contaminant</u>	<u>CTA*</u> Rejection	<u>TFC*</u> Rejection
Sodium	85-90%	90-95%
Calcium	90-95%	93-98%
Magnesium	90-95%	93-98%
Potassium	85-90%	90-95%
Iron ²	90-95%	93-98%
Manganese ²	90-95%	93-98%
Aluminum	90-95%	93-98%
Copper	90-95%	93-98%
Nickel	90-95%	93-98%
Zinc	90-95%	93-98%
Strontium	90-95%	93-98%
Cadmium	90-95%	93-98%
Silver	90-95%	93-98%
Mercury	90-95%	93-98%
Barium	90-95%	93-98%
Chromium	90-95%	93-98%
Lead	90-95%	93-98%
Chloride	85-95%	90-95%
Bicarbonate	85-90%	90-95%
<u>Nitrate³</u>	40-50%	<u>85-90%</u>
Fluoride	85-90%	90-95%
Phosphate	90-95%	93-98%
Chromate	85-90%	90-95%
Cyanide	85-90%	90-95%
Sulfate	90-95%	93-98%
Boron	30-40%	55-60%
Arsenic ⁺³	60-70%	70-80%
Arsenic ⁺⁵	85-90%	93-98%
Selenium	90-95%	93-98%
Radioactivity	90-95%	93-98%

Biological & Particulate Contaminants⁴

Bacteria	▶99%	▶99%
Protozoa	▶99%	▶99%
Ameobic Cysts	▶99%	▶99%
Giardia	▶99%	▶99%
Asbestos	▶99%	▶99%
Sediment/Turbidity	▶99%	▶99%

Organic Contaminants

Organic molecules with a molecular weight <300	▶99%	▶99%
Organic molecules with a molecular weight <300 ⁵	0-99%	0-99%

*CTA — Celulosic Membrane

*TFC — Thin Film Composite Membrane

1. This table of nominal rejection performance is for the two types of membranes used in drinking water systems operating at a net pressure (feed pressure less back pressure and osmotic pressure) of 60 psi and 77°F water temperature.

The actual performance of systems incorporating these membranes may be less due to changes in feed pressure, temperature, water chemistry, contaminant level, net pressure on membrane, and individual membrane efficiency.

2. While iron and manganese are effectively removed by the membrane, they also can easily foul its surface with deposits even at low concentrations. Generally, iron and manganese should be removed by other water treatment methods prior to RO treatment.

3. Nitrate removal depends on factors such as pH, temperature, net pressure across membrane, and other contaminants present.

4. While reverse osmosis membranes theoretically remove virtually all known microorganisms, including virus, they cannot offer foolproof protection when incorporated into a consumer drinking water system. Potential seal leaks and manufacturing imperfections may allow some microorganisms to pass into the treated water.

Therefore, small home RO drinking water systems should never be used as a primary means of removing biological contamination to make a water supply fit for consumption.

5. The degree of rejection of organic molecules less than molecular weight (MW) 300 depends on the size and shape of the molecule. Activated carbon is always incorporated along with reverse osmosis to insure complete removal of these lower molecular weight organic contaminants.