COMMUNITY WATER CENTER
EL CENTRO COMUNITARIO POR EL AGUA

Nitrate

- Legal Limit (Maximum Contaminant Level, MCL): 10 mg/L (as N)[a]
- Public Health Goal (PHG): same as the MCL

Common sources of the contaminant in the Central Valley and Central Coast[b]

The main source of nitrate contamination, both in ground and surface water, comes from the use of fertilizers that contain nitrogen. Additional sources include animal and human waste, including dairies, septic tanks and sewer systems.

Possible health effects of short-term exposure[c]

- Methemoglobinemia or Blue Baby Syndrome (symptoms include shortness of breath and blueness or darkening of skin, especially around the mouth, particularly in infants). Without immediate treatment, this can be fatal.
- Diarrhea and vomiting
- Spontaneous abortions, stillbirths or Sudden Infant Death Syndrome (SIDS)

Possible health effects of long-term exposure[d]

- Diuresis, increased starchy deposits and hemorrhaging of the spleen
- In pregnant women: preeclampsia, anemia, or premature births
- Hypotension (low blood pressure)
- Potential Cancer Risk[e]

Sensitive populations[f]

The most sensitive population is infants younger than six months, particularly premature infants, and pregnant women, particularly after the 30th week. People with low gastric acidity, iodine deficiencies, or low vitamin C are also more susceptible. Drinking water with both nitrate and bacterial contamination may lead to higher risk of nitrate health impacts.

Pathways of exposure[g]

The main pathways of exposure are through drinking water that has high levels of nitrates. Infants can be exposed when contaminated water is mixed with their formula or when nursing mothers drink water with high nitrate levels. Inhaling steam from water containing nitrate is not a route of exposure.

Tips for reducing exposure at home[h]

- Do not boil water to try to remove the contaminant. Boiling actually increases the concentration because some of the water evaporates while boiling, leaving all of the nitrate in less water.
- Breast feed infants, and do not mix formula with contaminated water.
- Buy bottled water or use a certified treatment device in your home. Certified home treatment systems for nitrate primarily include reverse osmosis and ion exchange units. Under-the-sink units typically range from $150 - $400. Pitcher filters (*e.g.*, Brita) or chlorination do not remove nitrate. A full list of certified home filtration devices is available at https://www.waterboards.ca.gov/drinking_water/certlic/device/watertreatmentdevices.html or by calling the State Water Resource Control Board, Residential Water Treatment Device Registration unit at (916) 449-5635.

Warning: **Boiling water does not remove nitrate, but can concentrate levels of nitrate in the water!**

Nitrate References

a. The State Water Resources Control Board originally set the state MCL at 45 mg/L for nitrate measured as NO3. The current MCL of 10 mg/L for nitrate measured as N is essentially the same limit, just measured in a different way (different chemical structures).

b. SWB (2018), "Nitrates and Nitrites in Drinking Water," available at https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/Nitrate.html (last visited July 2, 2018).

c. SWB (2018), "Nitrates and Nitrites in Drinking Water," available at https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/Nitrate.html (last visited July 2, 2018); OEHHA (1997), "Public Health Goals for Nitrate and Nitrite in Drinking Water," available at https://oehha.ca.gov/ water/public-health-goal/summary-public-health-goals-nitrate-and-nitrite (last visited July 2, 2018); WHO (2007), "Nitrate and Nitrite in Drinking Water," available at http://www.who.int/water_sanitation_health/dwq/chemicals/nitratenitrite2ndadd.pdf (last visited July 2, 2018); ATSDR (2007) "Case Studies in Environmental Medicine, Nitrate/Nitrite Toxicity," available at http://www.atsdr.cdc.gov/csem/nitrate_2013/docs/nitrite.pdf (last visited July 2, 2018).

d. SWB (2018), "Nitrates and Nitrites in Drinking Water," available at https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/Nitrate.html (last visited July 2, 2018); ATSDR (2007) "Case Studies in Environmental Medicine, Nitrate/Nitrite Toxicity,"available at http://www.atsdr.cdc.gov/csem/nitrate_2013/docs/nitrite.pdf (last visited July 2, 2018).

e. Many studies showed that nitrates can also cause some types of cancer, available at https://dceg.cancer.gov/research/what-we-study/drinking-water-contaminants.

f. OEHHA (1997), "Public Health Goals for Nitrate and Nitrite in Drinking Water," available at https://oehha.ca.gov/water/public-health-goal/summary-public-health-goals-nitrate-and-nitrite (last visited July 2, 2018); WHO (2007), "Nitrate and Nitrite in Drinking Water," available at http://www.who.int/water_sanitation_health/dwq/chemicals/nitratenitrite2ndadd.pdf (last visited July 2, 2018).

g. SWB (2018), "Nitrates and Nitrites in Drinking Water," available at https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/Nitrate.html (last visited July 2, 2018).

h. SWB (2018), "Nitrates and Nitrites in Drinking Water," available at https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/Nitrate.html (last visited July 2, 2018); OEHHA (1997), "Public Health Goals for Nitrate and Nitrite in Drinking Water," available at https://oehha.ca.gov/ water/public-health-goal/summary-public-health-goals-nitrate-and-nitrite (last visited July 2, 2018); SWB (2017), "Devices Certified for the Reduction of Nitrate," available at https://www.waterboards.ca.gov/drinking_water/certlic/device/watertreatmentdevices.html (last visited July 2, 2018).