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PERCHLORATE

AND OUR HEALTH



Where can I get more information regarding perchlorates?

- <http://www.epa.gov/IRIS/subst/1007.htm>
- <http://www.atsdr.cdc.gov/tfacts162.html>
- <http://www.epa.gov/safewater/contaminants/unregulated/perchlorate.html>

U.S. - Mexico Binational Center



for Environmental Sciences and Toxicology

www.binational.pharmacy.arizona.edu

The mission of the Binational Center is to resolve environmental and human health challenges along the US – Mexico Border by:

Providing and supporting environmental science and toxicology training, research, and policy development.

Facilitating a binational dialogue between investigators and stakeholders concerning risk assessment and remediation problems.

What is perchlorate?

Perchlorate is a naturally occurring and manmade contaminant of concern to human health and the environment. Perchlorate compounds are colorless, odorless salts derived from perchloric acid (HClO_4). Perchlorate (ClO_4^-) is the anion originated from the dissolution of these salts. Commonly used perchlorate salts include ammonium and potassium perchlorate. Perchlorate based chemicals are used in solid fuel for rockets and missiles, safety flares, explosives, batteries, automobile airbag systems, fertilizers, and others.



Perchlorates in the environment

Because perchlorate salts are very soluble in water, when dissolved (e.g., rain) this contaminant rapidly moves through the soil and potentially to groundwater. Most perchlorate contaminated water has been found in lakes, rivers, and wells near hazardous waste sites where perchlorate-containing chemicals have been disposed. The unregulated discharge of ammonium and potassium perchlorate from rocket fuel manufacturing plants and demilitarization of missiles are the main causes of the perchlorate contamination problem in some states (e.g., California, Nevada). According to the United States Environmental Protection Agency (US EPA), perchlorate has been found in drinking water and groundwater in 35 states.



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Perchlorate and Your Health

How can I be exposed to perchlorate?



You might be exposed by breathing, eating, or drinking the substance, or by skin contact. The effects of exposure to any hazardous substance depend on different factors such as the dose (how much), duration (how long), and the person's traits and habits (e.g., age, gender, lifestyle, general health). The primary exposure pathway of concern for perchlorate is ingestion. Uptake by the skin is minimal, or negligible, since it is found in very low concentrations (low parts per billion [ppb]) even in contaminated waters. Because perchlorate has a low vapor pressure (very high boiling point), inhalation hazard is negligible as well. Exposure to perchlorate (salts) dust or particles could be a problem only in an occupational setting (work environment). You may be exposed to perchlorate if you live near a waste site, a rocket manufacturing or testing facility, or



a factory that produces perchlorate-based chemicals or uses them in their manufactured products (e.g., fireworks, flares). Perchlorate has also been found in milk (e.g., cow's milk, breast milk), wine, beer, and food (e.g., lettuce, melons, tomatoes, peppers, cucumbers). The ingestion of drinking water and foods contaminated with perchlorate constitutes the main route of exposure.



How can perchlorate affect my health?

Perchlorate can inhibit the ability of the thyroid gland to absorb iodine. Iodine is needed to make thyroid hormones. Low levels of thyroid hormone (hypothyroidism) can alter the function of many systems in the body (e.g., cardiovascular system, pulmonary system, nervous system, male and female reproductive systems, etc.). Children and the unborn can be specifically susceptible to perchlorate because thyroid hormones are essential for development and growth.

How can I reduce my exposure to perchlorate?

Water treatment technologies are being developed to remove/reduce perchlorate from drinking water. Some water treatments being used are biological treatments and anion exchange systems. For home use, presently the only readily available water treatment process that can significantly reduce perchlorate levels in drinking water is reverse osmosis (RO).



If you are interested in finding out more about the quality of your drinking water, you can refer to your water systems' annual consumer confidence reports (CCRs). Many CCRs for different state's water systems are available through the US EPA's website. If you have concerns or questions regarding the presence of perchlorate in your tap water, you can



contact your local water provider, local and state health agencies, or the US EPA regional offices. If you live near a waste site or in an area where perchlorate contamination has been found, prevent

children from playing in dirt or eating dirt. Make sure that your children wash their hands often and before eating. Discourage them from putting their hands in their mouths or doing other hand-to-mouth activities.

What are the government policies concerning perchlorate?

The US EPA and other federal agencies are currently evaluating the need to regulate perchlorate levels in drinking water to reduce the risk to human health. Up to now, the EPA has not established a nationwide regulation on the amount that should be allowed in drinking water. However, California (2007) and Massachusetts (2006) have established their own MCLs (maximum contaminant levels) of 6 ppb and 2 ppb, respectively. These MCLs are legally enforceable state standards. Several other states have issued their own health-based guidance levels (not legally enforceable) for perchlorate in drinking water ranging from 1 ppb in Maryland and New Mexico to 18 ppb in New York and Nevada.

