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Typical Contaminants And Problems

Fluoride

Natural fluoride in drinking water was not considered a health concern until just recently. In fact, widespread fluoridation of drinking water has been practiced since the discovery that abnormally high concentrations of natural fluoride in the water supplies of certain cities in the western United States reduced the incidence of tooth decay. Many water systems now add small amounts of fluoride to bring the fluoride concentration up to about 1.0 mg/L because of its benefit in reducing tooth decay, especially in small children. The EPA has recommended a secondary standard of 2.0 mg/L. A primary standard of 4.0 mg/L has been set for fluoride levels in public drinking water supplies.

Much research is currently underway dealing with the toxicity of fluorides. Some people believe that it is a long-term carcinogen which increases the incidence of bone cancer and oral (mouth) tumor growth. Laboratory studies have failed to confirm these hypotheses thus far especially when fluoride is used at rates equivalent to those used for fluoridation.

While low levels of fluoride are known to be beneficial, excessive amounts can be harmful. Excessive fluorides in drinking water supplies may produce fluorosis (mottling of teeth), which increases as the optimum level of fluoride is exceeded. Because fluoride is removed from the body principally by the kidneys, people with reduced kidney function retain more fluoride and so have a greater risk of developing toxic effects.

Sources Of Fluoride

The most common source of fluoride in nature is the mineral fluorapatite which contains from 3 to 4 percent fluoride by weight. This fluorinated calcium phosphate rock is very valuable because it is mined as the primary source of phosphate fertilizer. The states with the biggest reserves of this mineral are Florida and North Carolina, but other states where it is mined include Tennessee, Idaho, Utah, Wyoming, and Mon-

tana. The highest levels of fluoride in groundwater occur where the rock is found in nature.

Another natural source of fluoride is seawater, which contains about 1.3 mg/L. This is very low in comparison to chloride (19,000 mg/L) and sodium (10,500 mg/L). However, fluoride salts may be left in areas where seawater was once trapped. This is the case in Alabama. Excessive levels of fluoride in groundwater are rare in Alabama, but it has been found in wells of a few western and southwestern counties such as Marengo where the water has other problems with high levels of sodium and chloride.

Fluoride is also used in many industries and may be a contaminant in industrial discharges to surface water supplies.

Treatment Of Fluoride

When To Treat. The optimum level of fluorides in water for reducing dental cavities is about 1 mg/L. Higher levels could cause mottling of the teeth.

How To Treat. Small, disposable cartridge units of activated alumina are the most cost effective way to remove fluoride from water in the home. Alumina is a form of aluminum oxide that has been heat treated to make it absorb fluoride very efficiently. The alumina removes other inorganic chemicals as well. Consequently, if other inorganic chemicals are present in large amounts, they can reduce the efficiency of fluoride removal. The cleaner the water, the better the alumina will work.

Compact under-the-sink reverse osmosis drinking water systems and newly designed home distillation units can also furnish an adequate supply of defluoridated drinking and cooking water for the home. Some anion exchange units are effective in fluoride removal.

Fluoride At A Glance

Symptoms: Yellowish, mottled teeth; tests showing your water has more than 2.0 mg/L fluoride.

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Causes Of The Problem: Fluorides leaching from natural mineral sources or industrial wastes.

Suggested Treatments: Activated alumina filter, distillation, reverse osmosis, or anion exchange.

References

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