

Water Contaminant of the Month

Copper (Chemical Symbol: Cu): Copper is a reddish, soft metal occurring naturally in rock, soil, water, plants, sediment and air. Copper is essential in small amounts as a catalyst for enzyme production for living organisms, including humans.

Copper is mined widely for many industrial uses including electrical wire, pipe and tubing, algae control and pesticides. Copper can occur naturally in surface and ground water, with a maximum concentration typically 4 parts per billion (micrograms per liter) or less. Drinking water can contain higher concentrations of dissolved copper, usually due to corrosion of copper pipes and plumbing fixtures. The concentration can increase with increasing corrosiveness of the water and increased contact time between water and copper components. Blue-green stains on sinks and fixtures are often an indicator of copper corrosion. Dissolved copper can be discharged from wastewater treatment plants and does not break down in the environment.

Excess copper can cause can cause gastrointestinal distress, including nausea and vomiting. Long-term exposure can lead to kidney disease and liver damage. Copper is necessary in the diet in small amounts. The United States Department of Agriculture (USDA) recommended daily amount (RDA) is 1.0-1.6 milligrams per day for adults. The USDA also recommends the maximum adult daily intake of copper not exceed 10 milligrams per day.

The US EPA Primary Drinking Water maximum contaminant level goal (MCLG) in the Safe Drinking Water Act (SDWA) is 1.3 parts per million for copper. The Secondary Guideline under the SDWA (recommended to avoid aesthetic problems related to metallic taste and staining) is 1.0 parts per million.

Copper concentrations can be controlled in water supplies by controlling corrosion. This is normally done by pH adjustment or polyphosphate injection. Point of use treatment for copper removal from drinking water can include reverse osmosis filtration and distillation. Flushing water that has had a long contact time with plumbing system components ("first flush water" in the morning or after several days of non-use) can eliminate much of the problem with high copper concentrations due to corrosive water.

(Source: *Water Technology*, 32:11, November, 2009)