

Copper Exposure Sources

Copper enters the environment through a number of routes. It happens naturally from decaying vegetation, volcanic eruptions, forest fires, and other sources. Then, there are the man-made causes like mining, manufacturing, and farming. While copper compounds break down in the open environment, the pure copper particles do not break down and remain behind in our air, food, and water. Copper is an essential element for all living organisms, therefore it is present in the food we eat — whether plant or animal — and in human tissue. However, too much copper may also be a problem. You may be exposed to copper from breathing air, drinking water, eating foods, or having skin contact with copper or copper-containing compounds.

Food Sources

- Apples
- Apricot kernels
- Avocado
- Bananas
- Bee pollen
- Beetroot
- Buckwheat
- Butter
- Chicken
- Chickweed
- Chocolate
- Corn oil
- Crab
- Eggs
- Grapes
- Kelp
- Lobster
- Margarine
- Mushrooms
- Nuts
- Oats
- Olives
- Oranges
- Organ meats
- Peaches
- Prunes
- Raisins
- Salmon
- Shellfish
- Soya beans
- Tomato puree
- Wheat bran
- Wheat germ and bran
- Yeast

Water Sources

- The greatest potential source of excessive copper exposure in humans is from drinking water transferred through copper pipes and brass sink fixtures. Drinking water may have high levels of copper if your house has copper pipes and acidic water, especially in water that is first drawn in the morning after sitting in copper piping and brass faucets overnight. To reduce copper in drinking water, run the water for at least 15-30 seconds before drinking from it or drawing cooking water.
- Lakes and rivers that have been treated with copper compounds to control algae, or that receive cooling water from power plants, can have high levels of copper.
- Water coolers and ice-makers in refrigerators also use copper tubing
- Some areas of the United States have high amounts of naturally occurring copper in their water supply. Also, copper sulfate is added to some municipal drinking water supplies to kill yeast and fungi.

Industry Sources

- You may be exposed to copper if you work in copper mines or if you grind metals containing copper.
- You may be exposed to copper by ingesting copper-containing fungicides, or if you live near a copper mine or where copper is processed into bronze or brass.
- Copper compounds are most commonly used in agriculture to treat plant diseases, like mildew, or for water treatment and as preservatives for wood, leather, and fabrics.
- Workers in, or people living near mines, foundries, smelters, power stations, incinerators and other combustion sources, metal fabrication and manufacturing plants, wood treatment plants, phosphate fertilizer plants, and waste water plants may also experience excessive copper exposure.
- Plumbers, welders, machinists, and others who work with copper are at risk for copper toxicity.

Other Sources

- Copper cookware
- Soils can also contain high levels of copper, especially if they are near copper smelting plants. Children may also be exposed to this copper by hand to mouth contact and eating the contaminated dirt and dust.
- Dental materials (Copper is used in dental alloys in fillings, crowns and other appliances.)
- Vitamin pills (Copper is frequently added to vitamin supplements, particularly prenatal vitamins.)
- Fungicide and pesticide residues on food
- Copper intra-uterine devices (Several hundred milligrams of copper a year can easily be absorbed from a copper IUD.)
- Birth control pills (One of the side effects of the pill is that it tends to raise copper levels in the body. This is due to the close association between the hormone estrogen and copper levels.)
- Deficiencies of manganese, iron, B-vitamins and vitamin C can cause copper to accumulate.
- Stress from any cause contributes to copper imbalance. Stress depletes the adrenal glands and lowers the zinc level in the body. Whenever zinc becomes deficient, copper tends to accumulate.
- Copper sulfate is added to swimming pools and may be sprayed on fruits and vegetables to retard growth of algae and fungus.

Intake References and Limitations

Copper: **Dietary Reference Intake** * :

	mcg/day	Tolerable Upper Limit (UL)
Infants		
0 to 6 months	200*	ND
7 to 12 months	220*	ND
Children		
1 to 3 years	340	1,000
4 to 8 years	440	3,000
Males		
9 to 13 years	700	5,000
14 to 18 years	890	8,000
19+ years	900	10,000
Females		
9 to 13 years	700	5,000
14 to 18 years	890	8,000
19+ years	900	10,000
Pregnancy		
< = 18 years	1,000	6,000
19 to 50 years	1,000	10,000
Lactation		
< = 18 years	1,300	6,000
19 to 50 years	1,300	10,000

* Values are Adequate Intakes (AI), others are RDA. ND: Not determinable due to lack of data of adverse effects in this age group and concern with regard to lack of ability to handle excess amounts.

The Environmental Protection Agency (EPA) has set an action level of 1.3 mg/l in drinking water. Above that level, the water utility must put in place, a corrosion control program comprising fixture/pipe replacement, pipe passivation with phosphate- or silica-based corrosion inhibitors, or pH, calcium, and alkalinity adjustment.

The Occupational Safety and Health Administration (OSHA) has set a limit of 0.1 mg/m³ of copper fumes (vapor generated from heating copper) and 1 mg/m³ of copper dusts (fine metallic copper particles) and mists (aerosol of soluble copper) in workroom air during an 8-hour work shift, 40-hour workweek.