

SuperNutrition's Fact vs Fiction

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WHY FACT VS FICTION?

We are frequently asked why we use or do not use certain ingredients or forms of nutrients in our multi-vitamin formulas.

Fact Vs Fiction provides information on how we choose specific forms of nutrients.

Scientific references are cited and text from abstracts is included to provide research details.

We evaluate nutritional ingredients by the following criteria:

- 1) Is it natural and normal to the human body?
- 2) Has it had a long history of safe use in humans?
- 3) Is it supported by science and/or traditional herbal wisdom?
- 4) Is it nutritionally effective?
- 5) Is it cost-effective for our customers?
- 6) Is it concentrated enough that we can provide optimal levels to our customers in a reasonable amount of tablets?

We have no vested interest in any form of nutrient. Our selections are based on what is best for our customers' health and their pocketbook.

The Truth About

Copper Sulfate

Fiction: Copper sulfate is toxic.

Fact: There have been no reports of toxicity in 50 years of the use of copper sulfate at nutritional doses in dietary supplements.

At nutritional doses copper is only a beneficial nutrient.

INSIDE

- **Range of Safety**
- **Copper Sulfate Reduces Atherosclerosis**

Is Copper Sulfate in Dietary Supplements Toxic?

In response to an unsubstantiated rumor that copper sulfate in dietary supplements is toxic, we reviewed the world's scientific literature and the toxic and hazardous materials data files.

The results: We can find no reports in the National Library of Medicine or any of the medical databases that the recommended daily allowance (RDA) of copper sulfate, which is 2 mg, has ever been associated with side effects (toxicity). Below are two studies verifying safety.

Chierici R, et al. Dietary supplements for the lactating mother: influence on the trace element content of milk. *Acta Paediatr Suppl* 1999 Aug;88(430):7-13.

Comment: In this study, healthy lactating mothers were studied comparing their diet to a dietary supplement that provided 20 mg of zinc sulfate, 2 mg of copper sulfate, and 116 mcg of potassium iodide. No adverse effects were seen.

Rock E, et al. The effect of copper supplementation on red blood cell oxidizability and plasma antioxidants in healthy volunteers. *Free Radic Biol Med* 2000 Feb 1;28(3):3294-329.

Comment: Seniors, 50 to 70 years old, were studied for the effect of copper sulfate supplementation on red blood cell oxidation. Copper sulfate at doses up to 7 mg per day (3.5 times greater than the RDA) caused no damage to red blood cells, and the authors noted, "[copper sulfate] may rather result in protection of red blood cells against oxidation."

As a nutritional supplement, copper sulfate has an unblemished record of safety and effectiveness for well over 50 years.

Effectiveness of Copper Sulfate

Copper sulfate is one of the forms of copper that has been shown to provide the most benefit. For instance, the following question and answer appears at the web site of The Salt Institute, which provides scientific data related to animal nutrition. <http://www.saltinstitute.org/stmfags.html>

Question: *Do high levels of copper have the same growth promoting effects in poultry as in swine?*

Answer: Recent research in Egypt showed that feeding copper sulfate at 150 ppm improved daily weight gain and feed efficiency in broilers. However, when copper carbonate or copper oxide was fed at the same concentration there was no response. **Histological examination of the small intestine suggests that copper sulfate resulted in a healthier intestinal lining with a more absorptive surface. [Bold added.]**

Additionally, the study below found that copper sulfate reduced cardiovascular risk factors that can promote atherosclerosis (hardening of the arteries).

Vlad M, et al. Effect of copper sulfate on experimental atherosclerosis. *Biological Trace Element Research Magazine* 1993 Jul;38(1):47-54.

Comment: This study looked at two groups of rats with atherosclerosis who ate a high cholesterol diet over 100 days. **The group that was given copper sulfate experienced a decrease in serum cholesterol. Copper concentrations in the aorta of the heart increased as cell damage and the accumulation of cholesterol plaque decreased.**

The Hazardous Chemicals Desk Reference

There have been rumors about copper sulfate toxicity in dietary supplements based on a misunderstanding of a reference in the *Hazardous Chemicals Desk Reference*.

There are three very broad classifications for all the types of toxicity of the 5,050 entries in the *Hazardous Chemicals Desk Reference*. Copper sulfate is listed in Level 3. Level 3 specifies that toxicity has been reported at doses somewhere less than 2,800 mg. It is important to note that 2,800 mg is 1,400 times greater than the 2 mg RDA dose contained in daily vitamin formulas. The *Hazardous Chemicals Desk Reference* does not specify safe levels for the chemicals it covers.

The Level 3 classification in The *Hazardous Chemicals Desk Reference* lists a number of other nutrients commonly found in dietary supplements, even including several very safe essential nutrients: Coenzyme Q-10, Folic acid, Papain, Silica, Vitamin B-1, Vitamin B-6, Vitamin B-12, Vitamin B-2 Vitamin D² and Zinc Oxide.

All these nutrients have been used safely in dietary supplements for many years.

Extoxnet - Toxic Information Internet Data Base

We also performed an Internet search that located data at Extoxnet, which is the toxicology database for Cornell University, Michigan State University, Oregon State University, and the University of California at Davis. We found our answer on their web page:

<http://ace.orst.edu/cji-bin/mfs/01/pips/coppersu.htm?76#mfs>.

Copper Sulfate Begins To Be Toxic At 750 mg - 375 times The RDA Dose

The Extoxnet data show that copper sulfate will not exhibit toxicity until you reach a dose of 750 mg for a 150-pound person. That's 375 times higher than the 2 mg RDA dose that is contained in most multi-vitamin formulas sold throughout the United States.

Extoxnet states, "The lowest dose of copper sulfate that has been toxic when ingested by humans is 11 mg/kg (750 mg for a 150 pound person)," according to the National Research Council publication *Drinking Water and Health*, published by National Academy Press, Washington, DC, 1977, on pages 10-22.

While Extoxnet states that 750 mg is the approximate starting toxic dose for a 150 pound person, they also state that copper sulfate is not actually lethal until it is ingested in the 10,000 to 11,000 milligram range, which is about 5,000 times higher than the 2 mg RDA. At the 2 mg RDA dose, copper sulfate is simply an essential nutrient, not a toxin or poison.

Toxicity Levels

Anything can be toxic if you get enough of it. As to copper sulfate's potential for toxicity, the scientific literature shows that its "toxicity" is much like spring water, sea salt, cayenne pepper and olive oil. Any of these can be "toxic" if you ingest a high enough dose. Like copper sulfate, each of these healthy, harmless nutritional items are also highly beneficial at a nutritional dose.

Isn't Copper Sulfate Used As Snail Poison?

While copper sulfate is used as poison at very high doses relative to the physical size of these small creatures, saying it is poison to humans at the 2 mg RDA dose is like saying that you will drown swallowing a glass of water in your kitchen because you can drown if you are caught in the middle of the ocean.

Water can be "poison" to a swimmer in the middle of the ocean (who gets too tired to swim any longer), but it isn't to someone who's just having a glass of water in their kitchen.

Compared To Cayenne Pepper Or Water

If you ate 375 times the amount of cayenne pepper that you would normally use in a gourmet natural foods meal, you would probably experience extreme heat and side effects, such as stomach and intestinal problems or worse. At 5,000 times a nutritional dose, cayenne pepper could also be lethal.

However, at a nutritional dose, we all know that cayenne pepper can be highly beneficial to the circulatory system and overall health.

Like cayenne pepper or water, copper sulfate at a 2 mg nutritional dose has been shown to be a safe and valuable addition to a healthy diet.

Is copper sulfate acceptable in our dietary supplements? We rate copper sulfate in six evaluation categories as acceptable or not acceptable.	Score
1. Is it natural to the human body? Copper is an essential nutrient. Sulfate is found throughout the human body and has many roles in metabolism.	Acceptable
2. Has it had a long history of safe use in humans? Copper sulfate has been used for over 50 years in nutritional supplements with no reports of toxicity or side effects.	Acceptable
3. Is it supported by science and/or traditional herbal wisdom? See the studies cited.	Acceptable
4. Is it nutritionally effective? Studies indicate nutritional effectiveness.	Acceptable
5. Is it cost-effective for our customers? Copper sulfate is one of the least expensive forms of copper.	Acceptable
6. Is it a concentrated enough form that we can provide optimal levels to our customers in a reasonable amount of tablets? The amount of copper sulfate in our formulas (2 mg) occupies minimal space in a tablet	Acceptable
We find copper sulfate to be an excellent nutritional supplement with a top score.	Acceptable

The above statements have not been evaluated by the Food and Drug Administration. They are not intended to diagnose, cure or prevent any disease.

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