

SuperNutrition Fact Sheet: Iron Carbonyl

(February, 2003)

Iron Supplementation: Is It Necessary, Safe Or Toxic?

There is much discussion about iron supplements and iron's role as an essential nutrient for overall health, energy, brain function, and immune metabolism. The published medical literature shows that iron supplementation may be necessary for some men and women, although iron has been shown to be a supplemental nutrient to be used with some caution.

In fact, appropriate body stores of iron are necessary for optimum immune health, energy production, and brain function. However, iron overdose has a potential to cause damage to cells in the body, primarily because iron can promote oxidation. (Note: the minimum toxic dose has been calculated to be 100 mg, while lethal doses of most forms of iron are typically over 3,000 mg.)

Studies show that iron's potential for harm decreases considerably when the natural antioxidants that keep it from promoting oxidation are present. These include Vitamin E, Vitamin C, and beta carotene.

Careful study of the medical literature shows that the calculated risks of problems related to iron supplementation are sometimes exaggerated, and that there can be significant benefits from iron supplementation for those who are iron deficient.

Iron Deficiency Is Common

The United States Centers For Disease Control states that iron deficiency is the number one nutrient deficiency in the United States. Therefore, correct iron status can be critically important to overall health and longevity. The easiest way to determine whether you are deficient and should supplement with iron is to have your doctor give you a ferritin (stored iron) blood test. Another less commonly available test called transferrin saturation may be more useful in detecting high body stores of iron. Then your doctor will be able to determine whether you need to reduce your intake of iron or take an iron supplement.

Supplemental forms of iron and vegetable iron only absorb about 1/10 as well as the heme iron found in red meat. Studies show that supplemental iron and vegetable iron have less potential to be involved in iron overload, so meat eaters may have more reason to be concerned about the possibility of iron overload.

While cautions about supplementation with iron are often directed at men or senior women (who no longer lose blood from menstruation) we suggest that you

do not assume that you should or should not take supplemental iron without a doctor's advice, as iron deficiency is also very dangerous and should be avoided.

Iron Carbonyl: The Safest Form of Iron

There is one form of iron that published studies verify to have much less potential for toxicity called iron carbonyl. In the Federal Register, dated January 15, 1997, the very conservative United States Food and Drug Administration considered iron carbonyl's safety and gave consideration to not requiring that iron carbonyl supplements employ child-proof packaging.

Two Studies Explain Why Iron Carbonyl Is Safer

Huebbers HA, et al. Absorption of carbonyl iron. J Lab Clin Med, 108(5):473-8 1986 Nov

Comment: The mechanism of iron carbonyl absorption has been studied in rats. Solubilization by stomach acid is necessary for absorption. **The slow rate of solubilization of iron carbonyl results in a more prolonged absorption, responsible for the low toxicity of iron carbonyl.** Large doses of iron carbonyl were held for several days by the gastric mucosa of iron-deficient animals. Once it had been solubilized, the subsequent pathway of absorption by the intestinal mucosa and ***the amount absorbed was similar to that of other forms of iron.***

The authors said, ***“Slower solubilization and utilization, and slower absorption of iron carbonyl greatly reduce its potential for toxicity.”***

Nielsen P, et al. Chronic feeding of carbonyl-iron and TMH-ferrocene in rats. Comparison of two iron-overload models with different iron absorption. Comp Biochem Physiol C, 106(2):429-36 1993 Oct

Comment: The use of iron carbonyl was investigated in rats. The intestinal absorption of iron carbonyl was dependent upon the dosage and it was down-regulated in rats that had adequate body stores of iron.

The reason iron carbonyl is safer than other forms of iron appears to be because its absorption is strongly down-regulated depending on dosage and whether the body already has enough stored iron.

SuperNutrition offers you choices by making vitamin formulas with iron and without iron. In the formulas that contain iron we use iron carbonyl.

While typical iron forms like iron fumerate, glycinate, and sulfate can lethal to humans at doses between about 3,000 and 4000 mg, iron carbonyl is basically non-toxic at these doses.

Gordeuk VR, et al. Carbonyl iron therapy for iron deficiency anemia. Blood, 67(3):745-52 1986 Mar

Comment: To determine if iron carbonyl is a safe and effective therapy for iron deficiency anemia, 20 normally healthy and 32 anemic volunteers were studied. *Single doses of 1,000 to 10,000 mg of iron carbonyl were tolerated by normal volunteers with no evidence of toxicity and only minor gastrointestinal side effects.* (These doses are 15 to 150 times greater than the 65 mg of iron in the typical doctor-prescribed dose of iron sulfate.)

Anemic volunteers (menstruating women who had previously donated blood) were treated with several regimens providing 1,000 to 3,000 mg of iron carbonyl daily in one to three doses for 8 to 28 days. After 12 weeks anemia was corrected in 29 of 32 patients (90 percent), and serum ferritin was normal in 14 patients. The authors said, *“Red blood cell regeneration was similar to other types of iron supplements and injectable iron dextran. There was no evidence of blood, liver, or kidney toxicity, but mild gastrointestinal side effects occurred in a majority of anemic volunteers at these very high doses. Iron carbonyl is an effective, inexpensive treatment for iron deficiency anemia, is accompanied by tolerable side effects and **may have an advantage over other types of iron by substantially reducing or eliminating the risk of iron poisoning in children.**”*

Insight: Toxicity was not seen for iron carbonyl even at doses that would be lethal with other forms of iron. Absorption is similar to standard (non-heme) supplemental forms of iron, which generally absorb at about 3 percent.

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