

IRON

FACTSHEET

Every living cell, whether plant or animal, contains iron. Iron is essential to most life forms and to normal human physiology. Iron is an integral part of many proteins and enzymes that maintain good health. In humans, iron is an essential component of proteins involved in oxygen transport. It is also essential for the regulation of cell growth and differentiation. A deficiency of iron limits oxygen delivery to cells, resulting in fatigue, poor work performance, and decreased immunity. On the other hand, excess amounts of iron can result in toxicity and even death

Iron deficiency is the most often recognized nutrient deficiency in the USA

A balanced intake of iron along with calcium has the best benefit in terms of bone health. For maximum iron absorption, eat meat, other iron sources, and vitamin C together.

Food sources of Iron:

Meat, poultry, fish, and some vegetables (such as spinach).

Food Sources of Iron ranked by milligrams of iron per standard amount; also calories in the standard amount. (All are $\geq 10\%$ of RDA for teen and adult females, which is 18 mg/day.)

Food, Standard Amount	Iron (mg)	Calories
Clams, canned, drained, 3 oz	23.8	126
Fortified ready-to-eat cereals (various), ~ 1 oz	1.8 -21.1	54-127
Oysters, eastern, wild, cooked, moist heat, 3 oz	10.2	116
Organ meats (liver, giblets), various, cooked, 3 oz a	5.2-9.9	134-235
Fortified instant cooked cereals (various), 1 packet	4.9-8.1	Varies
Soybeans, mature, cooked, ½ cup	4.4	149
Pumpkin and squash seed kernels, roasted, 1 oz	4.2	148
White beans, canned, ½ cup	3.9	153
Blackstrap molasses, 1 Tbsp	3.5	47
Lentils, cooked, ½ cup	3.3	115
Spinach, cooked from fresh, ½ cup	3.2	21
Beef, chuck, blade roast, lean, cooked, 3 oz	3.1	215
Beef, bottom round, lean, 0" fat, all grades, cooked, 3 oz	2.8	182
Kidney beans, cooked, ½ cup	2.6	112
Sardines, canned in oil, drained, 3 oz	2.5	177
Beef, rib, lean, ¼" fat, all grades, 3 oz	2.4	195
Chickpeas, cooked, ½ cup	2.4	134
Duck, meat only, roasted, 3 oz	2.3	171
Lamb, shoulder, arm, lean, ¼ " fat, choice, cooked, 3 oz	2.3	237
Prune juice, ¾ cup	2.3	136
Shrimp, canned, 3 oz	2.3	102
Cowpeas, cooked, ½ cup	2.2	100
Ground beef, 15% fat, cooked, 3 oz	2.2	212
Tomato puree, ½ cup	2.2	48
Lima beans, cooked, ½ cup	2.2	108

Soybeans, green, cooked, ½ cup	2.2	127
Navy beans, cooked, ½ cup	2.1	127
Refried beans, ½ cup	2.1	118
Beef, top sirloin, lean, 0" fat, all grades, cooked, 3 oz	2.0	156
Tomato paste, ¼ cup	2.0	54

-Organic vs. Inorganic Iron

Organic or Heme Iron:

- 20% absorbed
- Absorption of organic iron is not affected by the presence or absence of certain other substances in foods the way plant iron is
- Meats of all kinds contain iron in an especially absorbable form called "heme" iron
- The organic iron supplement is called "heme iron polypeptide"
- In addition to being a generous source of absorbable iron, meat also has a special property of causing increased absorption of iron from the inorganic iron sources in the meal. In other words, the iron in chili beans will be much more easily absorbed if there is meat in the chili. This is called the "Meat Protein Factor" effect
- Red meat is the highest in absorbable iron

Inorganic or nonheme iron:

- 2% or less absorbed
- Found in plants
- Inorganic iron supplements are those with the word "ferrous" or "ferric" in them
- Ferrous sulfate, a very commonly used iron supplement product, is less than 2% absorbed.
- Some plant forms of iron in foods like spinach that naturally contain "oxalates" are only 0.025% absorbed
- Any acid substance, including vinegar, citric acid and vitamin C (ascorbic acid) can enhance iron absorption from sources of inorganic iron
- As described above, the presence of acid and/or meat will contribute to improved absorption of inorganic iron.

Foods that decrease Inorganic iron absorption

- Dairy foods are notoriously poor sources of iron that also decrease absorption of the iron in plants and pills. The presence of milk does not impair absorption of the generous organic iron in meat.
- Tea contains "tannins," a plant substance that binds iron very well in the intestines and significantly reduces its absorbability.
- Leafy greens with "oxalates" that bind up iron in the intestinal tract and make it too big a molecule to be absorbed well.
- The bran is the fibrous coating on grains. Bran contains "phytates" which impair iron absorption.
- The foods that decrease inorganic iron absorption have little affect on absorption of organic iron

Why is iron essential?

- In humans, iron is an essential component of proteins involved in oxygen transport
- It is also essential for the regulation of cell growth and differentiation
- A deficiency of iron limits oxygen delivery to cells, resulting in fatigue, poor work performance, and decreased immunity

Caution with iron

- Iron deficiency is uncommon among adult men and postmenopausal women. These individuals should only take iron supplements when prescribed by a physician because of their greater risk of iron overload.
- Iron overload is a condition in which excess iron is found in the blood and stored in organs such as the liver and heart.
- Iron overload is associated with several genetic diseases including hemochromatosis. Individuals with hemochromatosis absorb iron very efficiently, which can result in a build up of excess iron and can cause organ damage such as cirrhosis of the liver and heart failure.
- Hemochromatosis is often not diagnosed until excess iron stores have damaged an organ. Iron supplementation may accelerate the effects of hemochromatosis, an important reason why adult men and postmenopausal women who are not iron deficient should avoid iron supplements.
- Individuals with blood disorders that require frequent blood transfusions are also at risk of iron overload and are usually advised to avoid iron supplements.
- There is considerable potential for iron toxicity because very little iron is excreted from the body. Thus, iron can accumulate in body tissues and organs when normal storage sites are full

Recommended Dietary Allowances for Iron

Age	Males (mg/day)	Females (mg/day)	Pregnancy (mg/day)	Lactation (mg/day)
7 to 12 months	11	11	N/A	N/A
1 to 3 years	7	7	N/A	N/A
4 to 8 years	10	10	N/A	N/A
9 to 13 years	8	8	N/A	N/A
14 to 18 years	11	15	27	10
19 to 50 years	8	18	27	9
51+ years	8	8	N/A	N/A

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