

Iron on a Plant-Based Diet



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Rohini Bajekal Nutritionist

Iron is an essential mineral that is abundant in the soil, mostly in the form of **ferric oxide** which gives soil a **red-yellow** colour.

70% of iron is found in **haemoglobin** (a protein found in red blood cells), and the rest as **myoglobin** in muscle cells or stored as **ferritin** and **haemosiderin** in the liver and bone marrow.

fe
(Iron)

Animals get iron by eating grass and other plants



...however, **factory-farmed** animals often have iron supplements added to their feeds.



Our bodies cannot produce iron themselves, therefore we need to get it through our diet.



Plants absorb iron in its **different forms**

Plants absorb Iron

Why do we need iron?

Iron is an essential nutrient in the body.

1 **Oxygen transport.** Haemoglobin transports **oxygen** from our **lungs** to our **tissues**, and **myoglobin** supplies **oxygen** to our **muscle cells** (skeletal and heart muscles).

Its two main roles are as follows:

2 A component of many important **enzymes**, **proteins** and **hormones** that are involved in **metabolism**, **physical growth**, **neurological development**, and **immune system function**.

How much iron do we need?

The following is based on UK guidelines.

Infants

0-3 months 1.7mg/day
4-6 months 4.3mg/day
7-12 months 7.8mg/day

Children

1-2 years 6.9mg/day
4-6 years 6.1mg/day
7-10 years 8.7mg/day

Adolescents

11-18 years
girls 14.8mg/day
boys 11.3mg/day

Pregnancy

During the latter half of pregnancy, recommend **27g - 30mg** (due to increased requirements)[1]

Adults 19-50 years

Men 8.7mg/day
Women and anyone who is menstruating 14.8mg/day

Adults 50+ years

8.7mg/day



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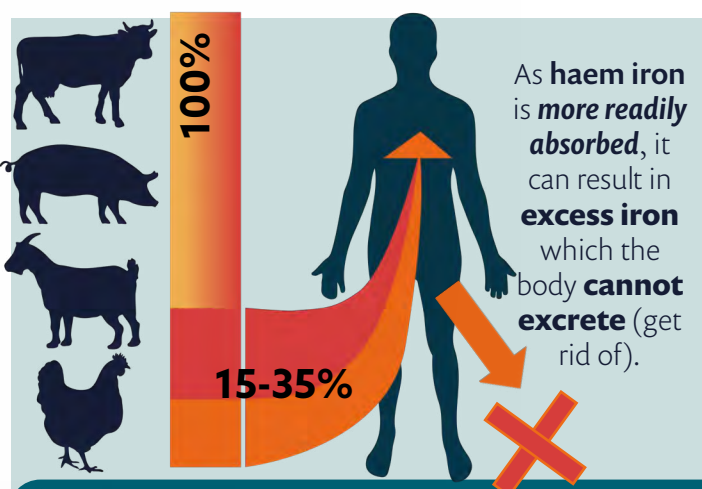
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Dietary iron

There are two forms of dietary iron:

haem iron

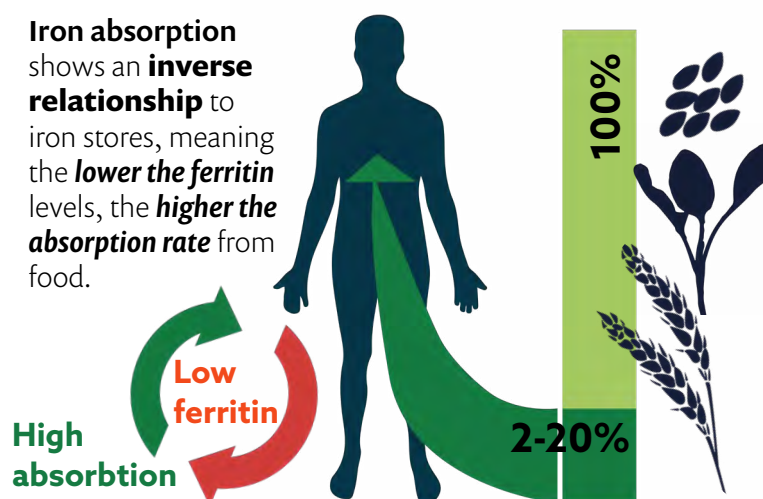
Haem iron makes up **40-45%** of iron in **animal-based sources** and is more **bioavailable** and generally **better absorbed** by the body (**15-35%**).



non-haem iron

Non-haem iron is found in **plant foods** and has an absorption rate of **2-20%**.

Iron absorption shows an **inverse relationship** to iron stores, meaning the **lower the ferritin** levels, the **higher the absorption rate** from food.



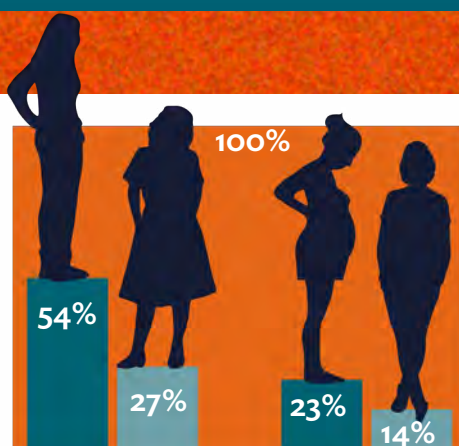
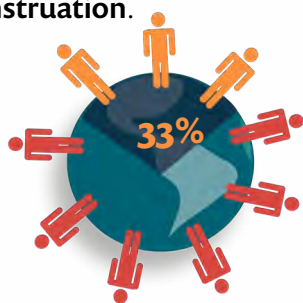
This self-regulating mechanism **prevents iron toxicity** and offers an **advantage** to those following a **plant-based diet**.



Studies suggest that haem iron consumption may **increase the risk** of cardiovascular disease, type 2 diabetes, stroke, and some cancers (colorectal, pancreatic, lung).

Iron Deficiency

Iron deficiency is the **most common nutritional deficiency worldwide** and over **50%** of cases of anaemia are due to **nutritional iron deficiency**, with **global levels** of iron deficiency estimated to be as high as **33%**. There is a **higher incidence** of iron deficiency anaemia in anyone who menstruates due to **blood loss** during **menstruation**.



In the UK, **54%** of girls and **27%** of women have iron intakes **below the lower reference nutrient intake (RNI)**, that is, **below the minimal required amount**.

In the UK, **23%** of pregnant women and **14%** of non-pregnant women are affected by **iron-deficiency anaemia**.

How to diagnose iron deficiency?

Iron deficiency anaemia can be diagnosed by **checking the levels of haemoglobin (Hb) and ferritin**. Low serum ferritin levels generally indicate low iron stores. Plant-based eaters such as vegans and vegetarians tend to have ferritin levels at the lower end of the normal range when compared to omnivores. **However, adverse health effects have not been demonstrated with varied plant-based diets in developed countries.**

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Who is at risk of iron deficiency?

- **Infants and children.** Cow's milk consumption increases the risk of iron deficiency in children.
- **Pregnant people**, those that are **breastfeeding** or who have recently given birth.
- **Women and anyone** who is **menstruating**
- Anyone with **cancer**, **heart failure** or **gastrointestinal disorders** such as **inflammatory bowel disease** or **coeliac disease**.
- People with **eating disorders** such as **anorexia nervosa** are also at risk.



Causes of iron Deficiency

Blood loss: heavy menstrual periods; bleeding during childbirth; chronic loss from peptic ulcer; a colon polyp or colorectal cancer; chronic gastrointestinal bleeding (of which those regularly taking non-steroidal anti-inflammatory drug (NSAID) or aspirin are at risk); frequent blood donations, people who have undergone major surgery.

A lack of iron in one's diet - eating disorders, people with alcohol addiction, fad diets.

Inability to absorb iron, e.g., lupus, coeliac disease, post gastric bypass surgery, inflammatory bowel syndrome (IBS), anaemia of chronic disorders.

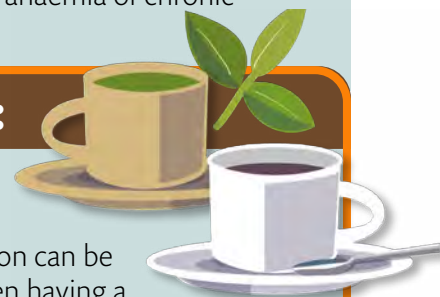
Symptoms of iron Deficiency

- **Unexplained fatigue**
- **Pallor** (can be harder to identify in black or brown skin, checking inner eyelids and mucous membrane is one way to do this)
- **Lack of concentration**
- **Increased susceptibility to infection**
- **Weakness and/or dizziness**
- **Cold extremities**
- **Sensitivity to the cold**
- **Breathlessness**
- **Heart palpitations**
- **Rapid heart rate**
- **Brittle nails**
- **Thinning hair**

Iron inhibitors:

Tannins found in tea and coffee.

Research shows iron absorption can be **inhibited by up to 80%** when having a tea or coffee with or directly after a meal containing iron. Leave **at least a one hour gap** between drinking tea and coffee and eating iron-rich meals **to avoid this**.



Zinc and calcium supplements.

If you take calcium supplements, for example, space them at least **30 minutes** before or after a meal **to avoid inhibiting iron absorption**.

Phytates found in legumes, nuts and grains.

Soaking, fermenting, and sprouting can significantly **reduce phytate levels** and **aid absorption** of iron and other micronutrients such as zinc.



Oxalates found in spinach.

High temperatures break oxalates down so **cooking spinach improves iron absorption**.



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Iron supplements

The most common forms of iron in supplements include ferrous and ferric iron salts, such as ferrous sulfate, ferrous gluconate, ferric citrate, and ferric sulfate.

Iron can be considered a double-edged sword.

Many people think if they feel tired, they can simply take an iron supplement as they 'might' be low in iron, but it's **important to know** that **too much iron can be just as harmful, even toxic**.

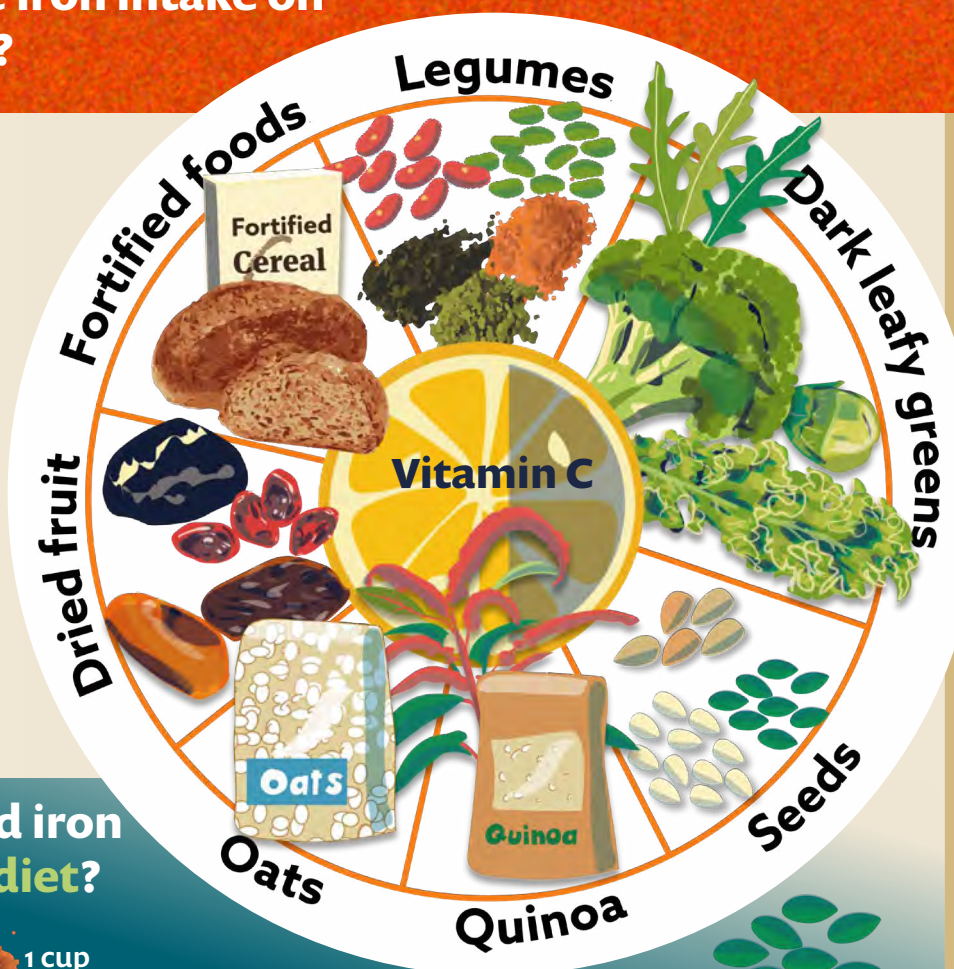
Dosages of **even 20mg** may cause **constipation and nausea** in those who are sensitive.

It is important to follow your doctor's recommendations as iron supplements may be needed if you have **heavy menstrual bleeding** and often in **pregnancy**.

How can I improve iron intake on a plant-based diet?

With a bit of consideration, it can be straightforward to get all the iron you need on a plant-based diet.

Good sources of **non-haem** iron include legumes, seeds, dark leafy greens, dried fruit, oats, quinoa and some fortified foods, and should be consumed ideally with sources of **Vitamin C** to enhance absorption.



Where can we find iron on a plant-based diet?



Cereal grains
(e.g oatmeal)
40g and fortified
cereals = **1.5mg**



**1 cup
cooked quinoa
= 2.8mg**

**1 cup
cooked lentils
= 6.6mg**



**1 cup
cooked broccoli
= 1mg**



**2 slices
wholemeal bread
= 1.5mg**

**28g pumpkins seeds
= 4.2mg**



**Sesame seeds/Tahini
(tablespoon(19mg) = 2mg**

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What are some practical tips to get enough iron on a plant-based diet?

For good sources of iron include



Tofu



Blackstrap molasses



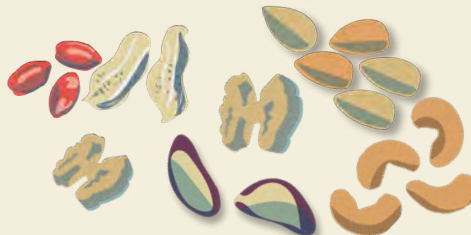
Whole grains (such as **oats** and **quinoa**)



Dried fruits (such as **raisins** and **apricots**)



Seeds (such as **pumpkin** and **sunflower seeds**)



Nuts (such as **cashews**, **almonds**, and **pistachios**)

Adding garlic and onion to cooked and uncooked grains and legumes increases zinc and iron absorption.



Eat **baked potatoes with the skin**, as the skin is where most of the iron (and several other nutrients) is **concentrated**.



Cook in a cast iron pan

Make sure to get enough vitamin C

Make sure to get **enough vitamin C**, as it **helps the body absorb iron better**. Eat **vitamin C-rich foods** such as:



Broccoli

Peppers



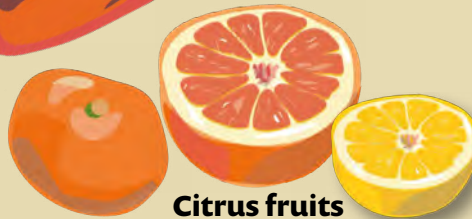
Kiwi



Cabbage



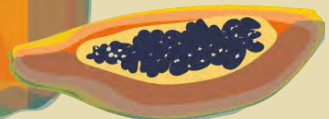
Strawberries



Citrus fruits



Papaya



Waiting 30-60 minutes after meals or iron supplements to eat/drink foods which may reduce iron absorption, such as:



Tea

Coffee



Dairy

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Food pairings for optimal iron absorption

Pair iron-rich foods with vitamin C-rich foods to enhance iron absorption. Some examples:



Tempeh with broccoli



Bean or lentil chili with tomatoes



Chickpeas with tomatoes and fresh herbs



Tofu stir-fry with broccoli



Squeeze lemon juice on your dal



Fortified breakfast cereal with strawberries



Green smoothie made with kale and lemon



Dried figs with oranges



Porridge with ground flaxseed and raisins, and serve with 150ml orange juice

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