German Federal Institute for Risk Assessment

FAQ

16 March 2026

Vitamin C is not only found in fruit and vegetables

Vitamin C is a water-soluble vitamin; its chemical name is ascorbic acid. The body cannot produce this vitamin on its own, so it must be taken up from food. Fresh fruit and vegetables are particularly rich in vitamin C. However, vitamin C is also found in processed foods such as tinned food, bread and salami. In these cases, it is added for technological purposes, for example as a preservative or stabiliser. When vitamin C is used as an additive, it is listed in the ingredients list as "ascorbic acid" or with the corresponding E number E 300.

Vitamin C is involved in a variety of metabolic processes in the body and is needed, for example, for the formation of connective tissue (collagen) and wound healing. A good supply of vitamin C is also important for the normal functioning of the immune system. Despite its involvement in the immune system, however, scientific studies have not been able to demonstrate that a high intake of vitamin C – far exceeding the requirements, for example through food supplements – protects the general population from colds.

The population in Germany is well supplied with vitamin C. Most people actually take up more than is recommended by the German Nutrition Society (DGE). Vitamin C deficiency is therefore extremely rare in healthy people in this Germany.

What is vitamin C?

Vitamin C is a water-soluble vitamin; its chemical name is ascorbic acid. Of the four chemical forms of ascorbic acid, only L-ascorbic acid is biologically active. Chemical derivatives of L-ascorbic acid can be converted into L-ascorbic acid in the body. These also fall under the collective term vitamin C.

Unlike most animals, humans cannot produce vitamin C themselves, but must take it up from food. The vitamin is essential for life and is involved in numerous metabolic processes. For example, it is needed for the formation of connective tissue (collagen), wound healing and the immune system.

What is vitamin C needed for in the body?

Vitamin C is involved in numerous metabolic processes. It is probably best known for its role in immune defence – an adequate supply of this vitamin is essential for the normal functioning of the immune system.

As vitamin C has antioxidant properties, together with the other antioxidant vitamins E and A, as well as carotenoids, it is involved in the reduction of reactive oxygen species in the body, thereby protecting cells and molecules from oxidative damage.

Vitamin C also plays a central role in wound healing and the formation of connective tissue, or more precisely, in the formation of collagen, an important protein in connective tissue. In this function, it is also essential for healthy teeth and bones. Finally, vitamin C supports the intake of iron from plant-based foods.

Which foods are good sources of vitamin C?

Vitamin C is found in many foods; data from the National Food Consumption Survey II show that the population in Germany obtains most of its vitamin C from fruit. Non-alcoholic beverages and vegetables follow in second and third place. According to the German Nutrition Society (DGE), red peppers and blackcurrants are among the foods with very high content of vitamin C: 100 grams (g) of red peppers contain 140 milligrams (mg) of vitamin C – more than an adult's daily requirement. It should be noted that the content of vitamin C in food decreases when exposed to light during storage or when heated to high temperatures.

Vitamin C or ascorbic acid is also found in many processed foods: it is added to these as an antioxidant, for example to preserve vegetables, jam, meat or sausages, or as a stabiliser, e. g. to refine the properties of flour. In sausages such as salami or cooked sausages, ascorbic acid is added to preserve the product and to support reddening – a technological process used to maintain the red colour of the meat. Vitamin C added to food for technological purposes is listed in the ingredient lists of packaged foods as "ascorbic acid" or E 300.

In addition to foods that naturally contain vitamin C or to which it is added for technological purposes, there are also foods to which vitamin C is added for nutritional purposes. These so-called fortified foods include juices, for example. There are also many food supplements containing vitamin C.

In the European Union and also in Germany, there are currently no regulations stipulating maximum amounts of vitamin C that may be used in food supplements or for the fortification of foods. The German Federal Institute for Risk Assessment (BfR) has proposed maximum amounts for the addition of vitamin C, as well as all other vitamins and minerals, to food supplements and for fortified foods.

Is there a difference between vitamin C naturally present in food and ascorbic acid used for technological purposes?

Ascorbic acid used in food for technological or nutritional purposes performs the same functions in the body as naturally occurring vitamin C.

However, vitamin C supplements and processed or fortified foods generally lack the numerous other substances that normally occur together with vitamin C in plant-based foods and are also important for healthy nutrition, such as secondary plant substances or enzymes.

Why do many cosmetics contain vitamin C?

Vitamin C is not only found in food, but also in many cosmetic products, such as lotions, serums and hair dyes. Among other things, it is said to stimulate connective tissue metabolism and thus counteract skin ageing. This is because vitamin C is involved in the synthesis of collagen, an important protein in connective tissue.

Vitamin C also acts as an antioxidant in the body. This means that it acts as a scavenger for harmful compounds such as reactive oxygen species. This protects cells and molecules and also helps maintain healthy skin. Finally, it is said to brighten the skin and help reduce pigmentation spots. This effect is due to the ability of vitamin C to inhibit the enzyme tyrosinase, which in turn is involved in the formation of the skin pigment melanin.

When vitamin C is added as an ingredient to cosmetic products, it is subject to the safety assessment required for cosmetics. Consumers can therefore assume that cosmetics containing vitamin C are not harmful to health. Most of the vitamin C in cosmetics is not taken up by the body but is metabolised in the skin.

How much vitamin C should you take up?

How much vitamin C a person needs, depends on age and gender. According to the German and Austrian Societies for Nutrition, adult men and women should take up 110 and 95 mg per day respectively. The requirement increases during pregnancy and breastfeeding. The intake recommendations for all (age) groups can be found at the DGE.

How much vitamin C is taken up in Germany through food?

Consumption studies show that vitamin C intake in Germany exceeds the intake recommendations of the German Nutrition Society (DGE) and the Austrian Nutrition Society (ÖGE) in all age groups of the population: According to the Food Consumption Survey II, the median of adult men and women (aged 19 to 80) take up around 130 mg of vitamin C per day through their diet. The median intake in children and adolescents is also above the reference values, which shows that the recommended intake levels are easily achieved through the dietary habits typical in Germany.

According to the DGE, smokers, for example, have an increased requirement: they should take up 135 mg (women) or 155 mg (men) of vitamin C per day. Vitamin C requirements are also increased during pregnancy because the growing unborn child utilises parts of the maternal vitamin C reserves. During breastfeeding, the mother passes on vitamin C through her breast milk. For these reasons, pregnant women should take up 105 mg daily from the fourth month of pregnancy onwards, and breastfeeding women 125 mg daily. These recommendations are also easy to achieve through a balanced diet.

What is known about health risks of vitamin C deficiency?

Well into the 19th century, sailors often suffered from scurvy, a disease caused by severe deficiency of vitamin C, because fresh fruit and vegetables were not available on long sea voyages. Nowadays, scurvy and such a pronounced vitamin C deficiency are virtually non-existent in industrialised countries. At most, people who have a very unbalanced diet and eat little or no fruit and vegetables and/or are smokers may be insufficiently supplied with vitamin C. This initially manifests itself in fatigue, a weakened immune system or muscle pain. Later, it can lead to bleeding gums, wound healing disorders and joint pain, among other things. However, vitamin C deficiency is extremely rare in Germany.

What ist known about the health risks of vitamin C overdoses?

Based on current knowledge, vitamin C is generally considered to be a vitamin with low toxicity, as excess amounts are excreted. However, the intake of very high doses (more than three grams) can, however, cause gastrointestinal discomfort and diarrhoea. Some people are at increased risk of adverse effects from long-term high vitamin C intake, especially those who have a higher risk of developing kidney stones due to due to medical conditions.

With regard to the intake of vitamin C via food supplements, based on the available data, the European Food Safety Authority (EFSA) assumes that an additional intake – i.e. beyond the amount obtained from food – of up to 1,000 mg (equivalent to 1 g) of vitamin C per day has no adverse effects on the gastrointestinal tract. However, larger amounts increase the risk of adverse gastrointestinal effects. According to EFSA, even a habitual intake of 1,500 mg of vitamin C per day does not increase the risk of kidney stones.

Since vitamin C promotes iron absorption in the intestine, people with haemochromatosis – a genetic disorder that leads to undesirably high iron absorption and storage – have an increased risk of iron overload when taking high-dose vitamin C supplements.

However, in cases of iron overload or when metal ions are released locally due to cell lesions (e.g. as a result of atherosclerosis or rheumatoid arthritis), vitamin C can also have a pro-oxidative effect. This can lead to damage to tissue components. The risk of this is increased in people who already have a good supply of vitamin C in their nutrition and also take high-dose vitamin C supplements.

The BfR is therefore of the opinion that the amount of vitamin C, as with most other vitamins, should be limited in food supplements and fortified foods (see the BfR's updated maximum levels for vitamins and minerals in food supplements and fortified foods).

Is vitamin C supplementation recommended?

As a rule of thumb, a balanced and varied diet provides healthy people with sufficient amounts of essential nutrients. Food supplements are therefore generally unnecessary for healthy individuals who follow a balanced diet. Conversely, an unbalanced diet cannot be compensated for by taking food supplements. For vitamin C, the data available for Germany show that the population as a whole takes up sufficient amounts through food.

According to current knowledge, increased intake of vitamin C beyond requirements does not confer any health benefits. Furthermore, scientific studies have not yet been able to

prove that additional vitamin C intake, e.g. via food supplements, protects the well-nourished and otherwise healthy general population from colds.

Are there binding maximum amounts for vitamin C in food?

Given that excessive intake of vitamins and minerals can have adverse effects on health, Regulation (EC) No 1925/2006 (Regulation on the addition of vitamins and minerals and of certain other substances to foods) and Directive 2002/46/EC (on the approximation of the laws of the Member States relating to food supplements) provide for the establishment of maximum amounts for vitamins and minerals in these products. These amounts are intended to ensure that the normal consumption of these foods is safe for consumers. However, no binding maximum levels have been set at either national or European level to date. This also applies to vitamin C.

The BfR had already proposed maximum levels for vitamins and minerals in food supplements and fortified foods in 2004, which were updated in 2021. The maximum levels proposed by the BfR are intended to serve as a basis for setting up maximum amounts at EU level.

The BfR's recommendations for maximum levels can be viewed here. They aim to limit the nutrient intake via food supplements and fortified foods in such a way that the consumption of these products provides a significant additional intake while at the same time protecting the majority of the well-nourished population from excessive intake. You can also find more information on food supplements in our FAQ.

What maximum amounts does the BfR recommend for vitamin C?

In order to enable consumers to obtain additional nutrients via food supplements, if necessary, while at the same time protecting well-nourished people from excessive intake, the BfR recommends a maximum amount of 250 mg of vitamin C per daily dose of a food supplement.

The BfR has also derived maximum amounts for vitamin C in fortified foods: Assuming that consumers obtain 30 per cent of their daily energy intake from fortified foods, the BfR recommends maximum amounts of 60 mg of vitamin C per 100 g for solid foods and 16 mg per 100 millilitres (ml) for beverages.

Further information on vitamin C and food supplements is available on the BfR website

Information on Vitamin C on microco.info
https://www.microco.info/vitamins/vitamin-c/

Frequently Asked Questions on food supplements
https://www.bfr.bund.de/en/service/frequently-asked-questions/topic/frequently-asked-questions-on-food-supplements/

Proposed maximum levels for the addition of vitamin C to foods including food supplements
https://www.bfr.bund.de/en/release/proposed-maximum-levels-for-the-addition-of-vitamin-c-to-foods-including-food-supplements/

About the BfR

The German Federal Institute for Risk Assessment (BfR) is a scientifically independent public health institution within the portfolio of the German Federal Ministry of Agriculture, Food and Regional Identity (BMLEH). The BfR advises the Federal Government and the States ('Laender') on questions of food, feed, chemical and product safety. The BfR conducts independent research on topics that are closely linked to its assessment tasks.

About microco.info

The internet portal www.microco.info provides information on vitamins, minerals and numerous other substances that we ingest with food or that are offered as food supplements. In addition, the individual pages contain the maximum levels of vitamins and minerals in food supplements and in fortified foods as recommended by the German Federal Institute for Risk Assessment (BfR).

This text version is a translation of the original German text which is the only legally binding version.

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Publisher:
German Federal Institute for Risk Assessment
Max-Dohrn-Straße 8-10
10589 Berlin, Germany
T +49 30 18412-0
F +49 30 18412-99099
bfr@bfr.bund.de
bfr.bund.de/en

Institution under public law
Represented by the President Professor Dr Dr Dr h. c. Andreas Hensel
Supervisory Authority: Federal Ministry of Agriculture, Food and Regional Identity
VAT ID No. DE 165 893 448
Responsible according to the German Press Law: Dr Suzan Fiack

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