

FAQ

24 August 2026

Benefits and risks of micronutrient supplements in older age

In 2024, there were around 19 million people in Germany aged 65 or over. This represents 23 per cent of the total population. Promoting and supporting healthy ageing and maintaining a good quality of life into old age are of great social importance.

However, the ageing process varies greatly from person to person. It is accompanied by changes in organ function and is influenced by diet, lifestyle and environmental factors. Consequently, older people differ – in some cases significantly – in terms of their nutritional and health status and their nutrient requirements, as well as in their nutrient intake.

Micronutrients – that is, vitamins and minerals – play an important role in this regard. They are involved in numerous vital processes within the human organism and contribute to the maintenance of health and body functions. As a general rule, healthy older people can, just like younger people, meet their nutritional requirements through a varied and balanced diet. However, certain health limitations, medical conditions or life circumstances can lead to an insufficient or even excessive intake of (individual) micronutrients. Therefore, for example, the indiscriminate use of food supplements can increase the risk of adverse effects on health.

The FAQs below explain which factors can influence micronutrient intake in older age, which groups of people are at increased risk of nutrient deficiencies or excess intake, and when a medical assessment may be advisable.

What should be borne in mind regarding micronutrient intake in older people?

The ageing process involves numerous biological changes at the molecular, cellular and organ levels; it varies from person to person and is influenced by dietary, lifestyle and environmental factors. The way in which these changes affect health, diet and nutrient intake also varies greatly from person to person.

Older people who live independently and are physically healthy can generally meet their vitamin and mineral requirements through a balanced diet. This also applies to the very elderly, i.e. people aged 85 and over.

However, as people get older, their physical activity levels decrease, and with them their energy requirements. Overall, older people often eat slightly less than younger people. Against this background, healthy older people should take particular care to consume food that is rich in vitamins and minerals. Fruit, vegetables, pulses, nuts, dairy produce and wholegrain products provide numerous vitamins and minerals and help ensure an adequate supply of micronutrients. The dietary reference values for nutrient intake set by the German Nutrition Society (DGE) can serve as a guide in this regard.

However, older people in particular – who, due to acute or chronic illnesses, physical limitations or a need for care, have little appetite and consequently eat less – face an increased risk of an inadequate intake of nutrients. This also applies to people whose intake of nutrients in the intestine is reduced or who experience increased excretion of nutrients. The use of medicines can also influence the intake, metabolism or requirements of individual nutrients.

There is a particularly high risk of inadequate energy and nutrient intake among people requiring care or those with significant mobility or cognitive limitations. In such cases, disease-specific dietary recommendations and guidelines for assessing nutritional requirements can be helpful. However, a fully personalised dietary history and counselling may also be necessary, in which other aspects, such as the individual's psychological and social situation, should be also taken into account.

People aged 65 and over do not, therefore, constitute a homogeneous population group. When assessing potential nutritional risks, it is therefore not so much chronological age that is decisive, but rather the individual's life circumstances and state of health. This also applies to the very elderly.

What are micronutrients?

Micronutrients are vitamins and minerals. They are involved in a wide range of vital processes and metabolic functions and are therefore of central importance to human health. For example, they are involved in the formation of cells, bones and teeth, support immune function, or are components of enzymes and hormones. As the body cannot produce most micronutrients itself, they must be taken up in sufficient amounts through the diet.

Vitamins are organic compounds produced by plants and microorganisms and are found in plant-based foods – such as fruit, vegetables and grain – as well as in animal food products such as meat, fish, eggs, milk and products derived from them. There are 13 vitamins in total: the fat-soluble vitamins A and its precursor provitamin A (beta-carotene), as well as vitamins D, E and K; and the water-soluble vitamins B1, B2, B6, B12, niacin, folate, pantothenic acid, biotin and vitamin C. Vitamin D occupies a special position, as it can be produced by the body itself when exposed to sunlight.

Minerals are inorganic dietary components that occur in plant- and animal-based foods. Since the organism requires them in varying amounts, they are classified as macrominerals.

and trace elements. Macrominerals include sodium, chloride, potassium, calcium, phosphorus and magnesium, whilst trace elements include iron, iodine, fluoride, zinc, selenium, copper, manganese, chromium and molybdenum.

What factors can increase the risk of an inadequate intake of micronutrients?

People who are physically healthy, eat a balanced diet and lead an active lifestyle with plenty of outdoor exercise can usually ensure their bodies receive sufficient vitamins and minerals even in old age. However, energy requirements decrease with age. In addition, older people often tend to eat slightly less overall. Against this background, they should take particular care to eat foods that are rich in vitamins and minerals. Furthermore, certain health conditions or life circumstances in older people can increase the risk of an inadequate intake of micronutrients. This applies in particular to the very elderly, aged 85 and over. However, these factors may also be present in younger people.

Chronic conditions: conditions affecting the gastrointestinal tract, metabolic disorders, chronic inflammatory processes or the long-term use of medicines can influence the intake, excretion, metabolism or requirements of individual nutrients. There is awareness that, for example, as people age, they are more likely to have a suboptimal intake of vitamin D or vitamin B12.

Use of medicines: Many older people take medicines. Some of these can affect the intake or bioavailability of certain micronutrients. Conversely, the efficacy of medicines can be unintentionally inhibited or enhanced by certain substances in food, as well as by the intake of food supplements. For example, grapefruit and grapefruit juice can affect the potency of various medicines, whilst various minerals such as iron, calcium or magnesium reduce the body's intake of certain medicines.

Reduced food intake: A persistently low food intake leads to reduced energy and nutrient intake, meaning that vitamins and minerals are no longer taken up in sufficient amounts. Causes of reduced food intake can include, for example, loss of appetite, difficulty chewing or swallowing, or a diminished sense of taste and smell. Mobility issues and limitations in daily living can also make shopping, preparing meals or eating itself more difficult.

People in need of care and residents of care homes: Older people in care homes are more likely to have risk factors that can make it difficult to ensure an adequate supply of energy and nutrients. These include, for example, multiple co-existing conditions (multimorbidity), mobility and daily living limitations, swallowing difficulties, reduced appetite or limited exposure to sunlight. The occurrence of similar challenges can also occur for people receiving care in hospitals or long-term care facilities.

Studies show that these people are comparatively likely to have deficiencies in vitamin D, vitamin E, folate and calcium. In women, the occurrence of deficiencies in vitamin B1 and vitamin C may also occur. In such cases, regular nutritional care and a diet tailored to individual needs are of particular importance.

How can an adequate intake of vitamin B12 be ensured, even in old age?

Vitamin B12 is found almost exclusively in animal food products and plays an important role in, amongst other things, blood formation and the functioning of the nervous system. In

order for the body to take up the vitamin, it must be bound to a specific protein produced in the stomach. In older people in particular, the stomach often does not produce an adequate amount of this protein. In such cases, a vitamin B12 deficiency may develop. Furthermore, the occurrence of too little stomach acid production is more common among older people, partly due to a chronic change in the stomach lining (atrophic gastritis). Various bowel conditions and the use of certain medicines or proton pump inhibitors ('stomach acid inhibitors') can also impair the intake of vitamin B12. Older people should therefore have their vitamin B12 status checked – and, following consultation with a doctor, take vitamin B12 supplements in a suitable form if necessary.

Important to know: The occurrence of a vitamin B12 deficiency often occurs after years of insufficient intake, because the body is able to store around 2 to 5 milligrams (mg) of the vitamin, thereby ensuring an adequate supply over a long period. After around one to four years on a diet lacking in vitamin B12, the vitamin B12 stores in the liver are usually still about half full; it is only when these stores have fallen to a concentration of 5-10 per cent that the first clinical symptoms appear.

A vitamin B12 deficiency initially leads to disorders of blood formation; a severe vitamin B12 deficiency results in what is known as pernicious anaemia – a form of anaemia – which can be accompanied by neurological and cognitive disturbances, such as tiredness, nervousness, as well as numbness and depression.

Detailed information on vitamin B12 can be found in a [separate FAQ](#) (German only).

Is the body's own production of vitamin D still sufficient in old age, and how can an adequate supply be ensured?

Vitamin D occupies a special position amongst vitamins, as it is produced in the skin through exposure to sunlight (UV-B radiation). The vitamin regulates calcium and phosphate metabolism and is therefore important for bone health. It also influences muscle strength and contributes to a well-functioning immune system.

A typical diet generally only takes up very small amounts of vitamin D, as the vitamin is found in significant quantities in only a few foods (e.g. fatty fish such as salmon or herring). However, some foods are fortified with vitamin D, such as drinks and dairy produce, as well as alternatives such as oat or soya drinks. There is also a wide range of vitamin D food supplements available.

There is a particularly high risk of an inadequate vitamin D intake among (older) people who spend little time outdoors and therefore have limited exposure of their skin to sunlight, as well as among people with chronic illnesses or those in need of care who have limited mobility and/or live in care homes. Furthermore, the body's ability to produce vitamin D declines with age and can be reduced to less than half of what it was in younger years.

The groups at risk of insufficient vitamin D intake therefore include, in particular, older people with limited mobility, those with chronic illnesses and those in need of care. In the BfR's view, it may be advisable for these individuals to take vitamin D supplements, particularly during the winter months, following consultation with their doctor.

Vitamin D deficiency is particularly widespread amongst residents of care homes. The BfR therefore recommends that a general vitamin D supplementation of up to 20 micrograms

(µg) (800 International Units; IU) per day should be considered for this at-risk group. A daily intake of 20 µg (800 IU) of vitamin D generally ensures an adequate supply without any exposure of the skin to sunlight.

Particularly in older age, a vitamin D deficiency can also contribute to the formation of osteoporosis. However, osteoporosis is considered a multifactorial condition, with numerous other factors playing a role in its formation.

Detailed information on vitamin D can be found in a [separate FAQ](#) and on the information portal microco.info run by the German Federal Institute for Risk Assessment (BfR).

How can micronutrient status be assessed?

If necessary, a doctor can assess whether the intake of vitamins and minerals is sufficient. Depending on the specific issue, blood or urine tests can be used to evaluate intake. In addition, a survey of dietary habits can provide insights into the intake of individual nutrients.

On this basis, the doctor can assess whether there is a risk of an insufficient intake or, conversely, an excessive intake of a specific micronutrient, and whether measures such as a change in diet, targeted supplementation or discontinuing a supplement might be advisable.

What are food supplements?

Food supplements are foods intended to supplement the general diet. They contain vitamins, minerals or other substances with nutritional or physiological effects. These may include, for example, amino acids, fatty acids, dietary fibre or plant extracts. These products contain these substances either individually or in combination, and in concentrated form.

Food supplements are available in measured doses, such as tablets, capsules or coated tablets, but also as powders or liquids for intake in small, measured amounts.

Legally, food supplements are classified as food. Unlike other foods, they come with recommended intake guidelines and carry further specific information for consumers, such as the fact that they should not be used as a substitute for a varied diet.

By definition, food supplements must not have any medicinal effects. Nor may these products be advertised as curing, alleviating or preventing diseases.

Unlike medicines, which undergo an authorisation procedure, food supplements are subject only to a notification requirement with the German Federal Office of Consumer Protection and Food Safety (BVL). Manufacturers are responsible for the safety of their products. The monitoring of food supplements available on the market and of the manufacturing facilities is the responsibility of the food control authorities in the German federal states.

Further information on food supplements can be found in the [FAQs of the BfR](#) and the [BVL](#) (German only, specifically regarding legal and regulatory aspects).

Is it advisable for older people to take food supplements?

A balanced and varied diet can meet the vitamin and mineral requirements of healthy older people just as effectively as it does for younger people. For healthy older people who spend a lot of time outdoors and are physically active, taking a food supplement is therefore not necessary in most cases.

However, in certain life situations and in the case of certain medical conditions, the risk of an inadequate intake of individual micronutrients may be increased.

Whether taking vitamin and/or mineral supplements is advisable should, where possible, be decided on the basis of the individual's specific nutritional status. For people who are already well-nourished, the intake of vitamins and/or minerals beyond their requirements generally offers no health benefits. On the contrary, long-term use of high-dose food supplements may even pose health risks. This applies in particular to people who are already well supplied with the relevant substances. The BfR therefore recommends that food supplements should generally not be taken on one's own initiative, but that the necessity and appropriate dosage should be clarified with a doctor before taking them. Any existing (chronic) medical conditions and necessary medication should also be taken into account.

What health risks may be associated with a long-term high intake of micronutrients, e.g. through the use of food supplements?

Taking food supplements without a proven need and in high doses may pose a health risk. This is because, for people with an adequate intake, additional intake of vitamins and minerals generally offers no health benefits but instead increases the risk of an excess intake.

There are only a few vitamins for which no adverse health effects have been observed to date, even with long-term high intakes via food supplements. These are: vitamin B1, vitamin B2, pantothenic acid and biotin. With most other vitamins and minerals, however, caution is advised, as long-term excess intake through high-dose food supplements increases the risk of adverse health effects.

To limit the risk of excessive intake of vitamins and minerals, the BfR has drawn up recommendations for maximum levels in food supplements and enriched foods. These maximum levels are designed to enable nutritionally sound supplementation with individual micronutrients where necessary, whilst at the same time protecting the majority of the population, who are already well-supplied, from excessive nutrient intake.

Caution is advised, particularly for older people, regarding long-term high intake of the following micronutrients and other substances in food supplements:

Vitamin D: An excessively high chronic intake of vitamin D via high-dose supplements leads to elevated calcium levels in the blood (hypercalcaemia). This, in turn, can increase the risk of kidney stones, renal calcification and impaired kidney function. As kidney function may already be impaired in older people, vitamin D supplementation should not be undertaken without consulting a doctor.

According to studies, long-term additional intake (via supplements) of 100 micrograms (µg) (4,000 International Units; IU) or more of vitamin D per daily dose may be associated with

an increased risk of adverse health effects – such as a decrease in bone density in older women, an increased risk of falls and a deterioration in heart function in people with heart disease.

By contrast, the body's own production of vitamin D does not result in dangerously high vitamin D levels. Furthermore, the additional intake of up to 20 µg (or 800 IU) of vitamin D per day via food supplements is considered safe.

Calcium: If excessive amounts of calcium are taken up via supplements over the long term, this can also lead to increased concentration of calcium in the blood (hypercalcaemia), with the associated risks mentioned above. Furthermore, there is evidence to suggest that taking food supplements containing high doses of calcium could increase the risk of heart disease. The BfR therefore recommends no more than 500 milligrams (mg) of calcium per day via food supplements in addition to one's usual diet.

Iron: There is ongoing debate regarding the risks of cardiovascular disease, cancer and type 2 diabetes mellitus associated with high additional iron intake. In particular, post-menopausal women and healthy men – including older men – who have a lower iron requirement and generally take up sufficient amounts of iron through their diet should only take iron via food supplements after consulting a doctor.

Vitamin E: High additional intakes of vitamin E can affect blood clotting and thereby increase the risk of bleeding. Some studies suggest that supplementation with high amounts of vitamin E may increase the risk of haemorrhagic strokes; this has been observed in particular in people with cardiovascular disease and/or those being treated with antiplatelet agents. As the available scientific data do not allow any benefit of vitamin E supplementation to be derived for a healthy population with adequate intake, people taking anticoagulants or antiplatelet agents in particular should only take vitamin E after consulting a doctor.

Magnesium: Taking magnesium supplements can lead to diarrhoea. Mild diarrhoea has been observed in adults even at a dose of 300 mg per day. The BfR therefore recommends a maximum daily intake of 250 mg for food supplements. Anyone wishing to take magnesium supplements should ideally spread the daily dose over two or more portions.

Vitamin B6: Long-term high intake of vitamin B6, particularly via food supplements, can lead to neurotoxic effects such as tingling, numbness, a burning sensation or pain in the hands and feet, as well as disorders in motor coordination. The BfR recommends a maximum intake of 0.9 mg of vitamin B6 per daily dose of a product taken as a food supplement.

Omega-3 fatty acids: Long-chain omega-3 fatty acids such as DHA (docosahexaenoic acid) and EPA (eicosapentaenoic acid) are said to have health-promoting properties. However, taking high amounts of DHA and EPA via food supplements (for example, as 'fish oil capsules' available in shops) may be associated with an increased risk of atrial fibrillation (a heart rhythm disorder) in people with existing or impending heart disease. This effect was most pronounced at doses of around 4 g per day; however, it was already evident when taking around 2 g per day over a period of two years.

For healthy people, supplementation with omega-3 fatty acids is not necessary, particularly if they eat fish regularly. In particular, people with existing cardiovascular diseases or relevant risk factors should only take such supplements after consulting a doctor. Detailed information is provided in a separate [FAQ](#).

What should be borne in mind when taking food supplements and medicines?

Careless use of food supplements can lead to undesirable interactions with medicines. This can either enhance or reduce the effect of certain medicines. It is important to note that the ingredients in food supplements are usually taken up in an isolated form and often in a significantly more concentrated form than in foods consumed as part of a normal diet. This increases the probability of interactions occurring. Below are some examples of possible interactions:

Biotin: Awareness exists that taking high-dose biotin supplements (150 micrograms (µg) or more per daily dose) can distort the results of certain laboratory tests and, as a result, may lead to problems in medical diagnosis – for example, of a heart attack – or in the interpretation of thyroid hormone levels. Anyone taking biotin supplements regularly should therefore discuss this with their doctor or laboratory staff before undergoing any laboratory diagnostic tests. Detailed information on this is available in a [separate FAQ](#).

Piperine is an ingredient found in various types of pepper that is added to some food supplements – amongst other things, with the aim of improving the bioavailability of other ingredients. Unlike in a normal diet, piperine is isolated in specific food supplements and taken up in high doses as a 'bolus'. In human studies, interactions with medicines have been observed even at relatively low doses of piperine. For example, piperine has been shown to enhance the effect of various active substances in the body.

High amounts of magnesium or calcium, as well as zinc and iron, can cause impairment in the intake of various medicines, such as certain antibiotics and thyroid medicines.

Vitamin K can reduce the effectiveness of certain anticoagulant medicines (coumarin-type anticoagulants), which are frequently taken by older people in particular to prevent thrombosis. The BfR therefore advises that people taking anticoagulants should seek medical advice before taking food supplements containing vitamin K.

Food supplements containing glucosamine or vitamin E, on the other hand, can enhance the effect of certain anticoagulant medicines (coumarin-type anticoagulants) and thereby increase the risk of bleeding, which can have serious health consequences. Anyone taking anticoagulant medicines should therefore not use food supplements containing glucosamine.

Caution is also advised with vitamin E supplements, particularly as taking additional food supplements containing vitamin E does not appear necessary for healthy older people.

The overview provided here lists only a few common examples of interactions between food supplements and medicines. However, there are numerous other interactions. As a general rule of thumb, therefore, anyone taking medication regularly should, where possible, avoid using food supplements without consulting a doctor or pharmacist.

Further information on micronutrients and on health in older age

Information on health risk assessment in older people

<https://www.bfr.bund.de/en/about-us/risk-assessment/older-people/>

General information on micronutrients

<https://www.microco.info/>

FAQ on food supplements

<https://www.bfr.bund.de/en/service/frequently-asked-questions/topic/frequently-asked-questions-on-food-supplements/>

About the BfR

The German Federal Institute for Risk Assessment (BfR) is a scientifically independent institution within the portfolio of the German Federal Ministry of Agriculture, Food and Regional Identity (BMLEH). It protects people's health preventively in the fields of public health and veterinary public health. The BfR provides advice to the Federal Government as well as the Federal States ('Laender') on questions related to food, feed, chemical and product safety. The BfR conducts its own research on topics closely related to its assessment tasks.

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

Legal notice

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



valid for texts produced by the BfR

images/photos/graphics are excluded unless otherwise indicated

BfR | Identifying Risks –
Protecting Health