

Food supplements in sports:

Power packs or false promises?



Magnesium for muscle cramps or caffeine to improve performance? Many sports enthusiasts turn to food supplements to increase their fitness. However, risk assessment of individual supplements shows that negative effects may be possible. A balanced diet remains the best foundation.

Experts agree that sport is good for you. Physical activity is proven to have a positive effect on combating excess weight, high blood pressure and depression, for example. More and more sports enthusiasts are hoping to reinforce positive effects of physical training through targeted intake of specific substances in food supplements. To protect consumers from being misled or even exposed to possible health risks, the BfR is taking a closer look at such supplements.

Food supplements are classified as food and are therefore subject to the general provisions of food law. Like with other foods, manufacturers and distributors bear responsibility for the safety of their products and for compliance with the provisions of food law. In addition, consumers may not be misled by the information on packaging or in advertisements. The German regulation on food supplements stipulates which vitamins, minerals and specific vitamin or mineral compounds may be added. According to this regulation, additional nutrients and other “substances with nutritional or physiological effects” may be added to the supplements. Which “other substances” these may be is not specified in the regulation.

Herbal substances and preparations (botanicals)

“Other substances” as referred to above also include certain herbal ingredients. In addition to a wide range of nutrients such as vitamins, trace elements, minerals or amino acids, food supplements often also contain herbal ingredients or preparations referred to as botanicals. Unlike herbal medicines – known as phytopharmaceuticals – food supplements, including herbal food supplements, are not subjected to an official approval procedure before being placed on the market.



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Examples of undesired effects of plant substances

Undesired effects of quercetin

Quercetin is a secondary plant constituent found in many types of fruit and vegetables. It is added to specific food supplements, often with the aim of strengthening the immune system. The BfR would like to point out that interactions between quercetin and specific drugs may occur, depending on the dose. It is possible that quercetin may affect the bioavailability (and thus the efficacy) of certain drugs.

It's the dose that counts

In risk assessment of food supplement products with isolated plant substances, the dose plays an important role. Adequate levels of secondary plant substances are consumed through fruit, vegetables, herbs and spices as part of a balanced and varied diet. This can have a positive effect on health. Supplements consisting partly of secondary plant substances such as carotenoids, alkaloids or polyphenols often contain high doses in comparison to intake of such substances via a balanced diet. This increased intake could potentially be problematic. Currently, there are no binding maximum levels for herbal ingredients in food supplements, either at the German national or the European level. In addition, the effect of plant substances from traditional foods such as fruit, vegetables, herbs and spices cannot be compared exactly to preparations in food supplements. For example, the bioavailability of plant substances consumed in a concentrated form, e. g. through capsules, could be significantly higher due to a lack of interactions with other substances in foods.

Difficulties regarding risk assessment

Besides conducting risk assessments on individual plant constituents, the BfR also performs risk assessments on botanicals in food supplements. The scientists involved may encounter a number of difficulties here. Raw material to be examined in the form of herbal extracts or preparations frequently contains a complex mixture of different plant substances, very often in a variable ratio to one another in different batches. Furthermore, there is often insufficient information on the composition of the products. In addition, the safety of many of the herbal ingredients used has not yet been sufficiently investigated, so the basis of data for a health assessment is sparse.

No substitute for a balanced diet

It is already clear, however, that food supplements are no substitute for a balanced diet. Fitness enthusiasts can cover their nutritional requirements with an individually adapted diet suitable for sportspeople. It is important to understand that there is no superlative comparison of "healthy". The notion of "more is better" does not apply to the intake of food supplements. There are situations in professional and high-performance sports where, depending on sex, training level, time of year, type of sport and competitive stress, targeted intake of certain supplements may make sense. However, such use of supplements should take place under medical supervision after careful consideration of the risks and benefits for health and performance. ▣

More information:
www.bfr.bund.de/en > A-Z Index > Food supplements

Ideally, food supplements should only be taken in professional and high-performance sports on medical advice.



Undesired effects of caffeine

Caffeine is used in sport with the aim of improving endurance and performance. Depending on the dose and the individual sensitivity to caffeine, undesired effects such as nervousness, insomnia, gastrointestinal problems, increased blood pressure, heart palpitations and even cardiac arrhythmia are possible. From the perspective of the European Food Safety Authority (EFSA), which derived safe intake levels of caffeine in 2015, single doses of caffeine of up to 200 mg or the same amount consumed *within a short time* (corresponding to up to 3 mg/kg body weight) from all sources have been considered to be safe for healthy adults (not including pregnant women). For habitual caffeine consumption, EFSA derived a safe daily intake of up to 400 mg distributed *throughout the day* (equivalent to 5.7 mg/kg body weight per day) for healthy adults, not including expectant or nursing mothers.

Undesired effects of synephrine

Synephrine is a substance found in citrus fruits. Advertised as a weight loss promoting substance, it is added to certain food supplements, often in combination with caffeine and other stimulants. Clinical studies have shown that just a one-off intake of synephrine at doses that are found in some food supplements can cause increased blood pressure and heart rate. There have also been reports of serious effects such as arrhythmia, heart attacks, ventricular fibrillation and high blood pressure. Undesired effects occurred particularly in combination with caffeine during or after physical activity. Consumers ingest an average of 6.7 mg of this substance every day through conventional foods. According to the BfR, this level can be considered safe. Doses of synephrine many times higher than this have frequently been found in food supplements.