BfR Opinions on Sweeteners

Communication No. 007/2023 of 7 February 2023

With the “National Reduction and Innovation Strategy for Sugar, Fats and Salt in Processed Foods” (NRI), the German Federal Government is pursuing the goal of promoting a healthy lifestyle and reducing the prevalence of obesity and diet-related diseases. In addition to fats and salts, the amount of sugar used in processed foods should be reduced. To maintain a comparable sweet taste despite the reduction in sugar, food manufacturers use sweeteners in certain cases. These calorie-free or calorie-reduced sugar alternatives are included – often also in combinations of several sweeteners – in many processed foods, such as soft drinks, confectionery and dairy products. They are classified as food additives and are subject to an approval process within the European Union (EU). Also, they have to be indicated on the food packaging.

Since the adoption of the NRI in December 2018, the BfR has elaborated various opinions on the risk assessment of sweeteners.

In the EU, a number of sweeteners have been authorised for different food categories under Regulation (EC) No 1333/2008. Prior to their authorisation, all sweeteners – just like all other food additives – were subject to a health risk assessment by an international panel of experts. Until 2003, these assessments were carried out by the Scientific Committee on Food (SCF) of the European Commission. Since then, food additives have been evaluated by the European Food Safety Authority (EFSA). As part of the programme for the re-evaluation of authorised food additives, sweeteners are currently being re-assessed by EFSA. This includes a review of the acceptable daily intake levels (ADI values), some of which were derived by the SCF or EFSA more than 20 years ago. An acceptable daily intake is the amount that can be consumed daily for a lifetime without any adverse health effects being expected.

Difference between sugar substitutes (polyols) and non-nutritive sweeteners

In Regulation (EC) No 1333/2008, the seven sugar alcohols sorbitol, mannitol, isomalt, maltitol, lactitol, xylitol and erythritol are grouped together as “Group IV: Polyols”. Polyols are sugar substitutes. This also includes polyglycitol syrup (E 964). The other sweeteners mentioned in Regulation (EC) No 1333/2008 are often referred to as non-nutritive sweeteners. The terms “sugar substitutes” and “non-nutritive sweeteners” are not defined in this Regulation. Sugar substitutes (polyols) are sugar-like substances with usually less sweetness and a lower calorific value (expressed in calories or joules) than sugar, which cause little or no caries. However, the group of non-nutritive sweeteners, on the other hand, includes very different chemical substances that have no or insignificant calorific value and taste substantially sweeter than sugar. Some non-nutritive sweeteners, such as steviol glycosides, are extracted from the leaves of the stevia plant.

Since the adoption of the NRI in December 2018, the BfR has issued various opinions on the topic of sweeteners. The individual documents can be accessed below:

1. **Sweeteners: majority of studies confirm no adverse health effects – however, the study situation is insufficient**
   (https://www.bfr.bund.de/cm/349/sugar-alternatives-how-much-sweetener-is-there-in-soft-drinks.pdf)

BfR Opinion No. 004/2023 of 7 February 2023 (assessment status 23 September 2019).

The BfR has evaluated the data situation on the health effects of non-nutritive sweeteners. As far as it was evident from the human studies considered which non-nutritive sweeteners were investigated, the focus of the BfR Opinion was on the five synthetic non-nutritive sweeteners sucralose, aspartame, saccharin, cyclamate and acesulfame K. These are among the currently most commonly used sweeteners. The BfR particularly evaluated whether an increased use of sweeteners might have an effect on the risk of obesity and metabolic diseases. Furthermore, it was investigated whether there are sensitive groups of the population, such as pregnant women or children, who should avoid or limit the intake of sweeteners. The BfR concluded that the data situation is heterogeneous and very limited for some of the population groups considered (e.g. children and pregnant women) as well as for certain endpoints, and emphasised the need for further research to be able to derive substantiated conclusions, especially on the long-term effects of sweeteners for different population groups. In addition, the BfR also highlighted a need for research on the health effects of combinations of sweeteners since studies available thus far have mainly focused on individual sweeteners.

2. **Do Mixtures of Several Sweeteners Pose Risks for Human Health?**
(https://www.bfr.bund.de/cm/349/do-mixtures-of-several-sweeteners-pose-risks-for-human-health.pdf)
BfR Opinion No. 005/2023 of 7 February 2023 (assessment status 30 October 2021)

   In the European Union, assessments performed by the Scientific Committee on Food of the European Commission (SCF) and the European Food Safety Authority (EFSA) form the basis for the authorisation of sweeteners as food additives. Within the framework of individual substance evaluations, an acceptable daily intake (ADI) was derived for certain sweeteners from experimental animal data. However, reliable experimental animal data on the potential effects of combinations of sweeteners, such as those found in non-alcoholic soft drinks, are not yet available. Hence, so far this aspect has not been considered in the toxicological assessment by international expert panels. The BfR has investigated whether the available data, especially from animal studies, indicate health risks from the combined use of relevant sweeteners. The investigations were carried out based on the example of the combined use of individual sweeteners that are found in non-alcoholic soft drinks.

   The model calculation showed that combination effects could theoretically occur as adverse effects in the kidneys and efferent urinary tract. The extent to which the findings can be transferred to humans cannot be assessed at present, due to the limited data available on the combined effects of sweeteners.

3. **Sugar Alternatives: How Much Sweetener Is there in Soft Drinks?**
(https://www.bfr.bund.de/cm/349/sugar-alternatives-how-much-sweetener-is-there-in-soft-drinks.pdf)
Opinion No. 006/2023 of 7 January 2023 (assessment status 30 November 2022)

The product monitoring of the Max Rubner-Institute (MRI) shows that the sugar content in soft drinks decreased slightly between the years of 2018 and 2019, while the number of soft drinks sweetened exclusively with sweeteners increased slightly. The BfR investigated the concentrations of sweeteners in soft drinks as part of the MEAL Study (Meals for Exposure Assessment and Analysis of Foods). For this purpose, the content of nine sweeteners, including aspartame, cyclamate and steviol glycosides, were analysed in 92 calorie-reduced or sugar-free market-relevant soft drinks. The result: measured concentrations of the sweeteners partly displayed wide ranges. In total, 87 of the 92 soft drinks analysed contained more than one sweetener.

Further information on the subject of sweeteners is available on the BfR website

A-Z index: Sweeteners:
https://www.bfr.bund.de/en/a-z_index/sweeteners-130251.htmll

BfR “Opinions app”

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 Food and Agriculture (BMEL). The BfR advises the Federal Government and the federal states (“Länder”) on questions of food, chemicals, and product safety. The BfR conducts independent research on topics that are closely linked to its assessment tasks.

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