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# Furan in Food

since 1989

Furan is a colorless, odorless, and highly volatile fluid with a boiling point of 31 °C and is not water-soluble. Although it occurs naturally in oils from conifers containing resin, in the chemical industry it is known as an intermediate product of various organic syntheses. However, it can also be produced by artificial means and utilized in the production of other chemicals.

Furan is also very important for the food industry, because, like acrylamide, it can occur during food processing if the food product is heated strongly during its production or preparation. The exact circumstances and mechanisms of furan generation have not been fully elucidated. Depending on the composition of the food product, several different mechanisms can be taken into consideration. However, there is a heating process such as cooking or roasting at the root of all the significant potential causes. The results of various tests indicate that the splitting of amino acids and sugar during the heating process is highly relevant for the formation of furan. Additionally, furan can be formed from many other ingredients, such as vitamin C, carbohydrates, amino acids, unsaturated fatty acids, and carotenoids.[1'2]

Furan can be contained in a wide variety of food products, ranging from coffee (especially espresso), cocoa, dried fruits, and nuts to a diverse range of cereal products. Particularly high amounts have been detected in food products which were roasted or heated in closed containers during their production, e.g. canned goods and instant meals. In the case of instant meals, generally baby food products consisting of noodles, meat, and vegetables display elevated levels of furan. Children primarily consume furan by means of roasted or puffed breakfast cereal products, dried fruits, and snack items such as popcorn.

For adults, coffee represents the largest source.[1'2] In order to estimate the potential health risks of furan, animal tests have been carried out. Evidence emerged from these tests that an elevated furan intake could cause cancer in these animals. It has not yet been fully researched exactly how cancer was triggered in these animals. Similarly, whether or not long-term intake of low levels of furan in the human diet can also cause cancer or lead to other adverse health effects is not yet known either. Since there is not enough data currently available to estimate the impact of furan intake in the human diet on a comprehensive level,

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the World Health Organization (WHO) has classified furan as being potentially carcinogenic for humans. Based on the current dataset, no safe maximum level (e.g. a tolerable daily intake) has been able to be determined, which is why the "margin of exposure" has been calculated instead. This margin indicates that exposure to furan in the human diet at that magnitude could give rise to potential health concerns.[1'2'3]

Various measures can be taken in order to reduce furan intake. On the one hand, people should consume more freshly prepared dishes (the same goes for baby food). On the other hand, consumption of instant meals and canned food should be kept to a minimum. However, if these products are indeed consumed, then the food, especially baby food, should be warmed in an open container while being stirred continuously, so that this highly volatile substance can escape. The same goes for the preparation of coff ee (e.g. filter coffee) – open containers or systems should be favored. Furthermore, as is the case with acrylamide, the furan content increases with the level of browning. So the motto "browned but not burned" is just as valid for furan.[2]

The GBA Group is capable of testing furan in food products, including coffee, by means of gas chromatography coupled with mass spectrometry. Furthermore, we can provide you with comprehensive consulting on this topic.

### LITERATURE


[1] German Federal Institute for risk Assessment (Bfr), FAQ vom 24. August 2011, Fragen und Antworten zu Furan

[2] German Federal Ministry of Food and Agriculture (BMEL), unerwünschte Stoff e, die beim Erhitzen von Lebensmitteln entstehen: Acrylamid & Co. https://www.bmel.de/SharedDocs/Downloads/Broschueren/Kontaminanten_Acrylamidetc.pdf?__blob=publicationFile, accessed on 5 July 2018

[3] European Food and Safety Authority, risks for public health related to the presence of furan and methylfurans in food, 25 october 2017


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