

## Questions and Answers about Furan

FAQ of 24 August 2011

Furan occurs in heated foods, just like acrylamide. Particularly high concentrations are found in roasted foodstuffs, such as coffee, and in foods exposed to high temperatures in closed containers, such as baby food. How exactly the substance is formed during food processing has not been fully clarified.

In experiments with animals, higher doses of furan result in cancer. It is not clear whether the long-term intake of small quantities of furan in foodstuffs can lead to cancer in humans. The BfR does not currently have any findings which would implicate that furan intake through food constitutes a potential health hazard for consumers. Accordingly, a change to the nutrition and eating habits of consumers is not necessary in the view of the BfR.

### What is furan?

Furan is a colourless, volatile liquid which e.g. occurs naturally in oil originating from conifer resin. The substance is also produced artificially and is used in the chemical industry for the manufacture of other chemicals, as well as resins and varnishes.

As long ago as 1979, furan was also detected in the formation of various flavour-active substances during the browning process (Maillard reaction). It is known that furan occurs in heated foods. Particularly high concentrations are found in roasted foods (e.g. coffee) and in products exposed to high temperatures in closed containers (e.g. baby food). How exactly furan is formed during food processing has not yet been clarified.

### Are “furans” the same as “furan”? Does furan have dioxin-like properties?

The term “furans” is used as an abbreviation for chlorinated dibenzofurans, which are environmental contaminants with dioxin-like properties. In contrast, furan does not have any dioxin-like properties.

### In which foods is furan found?

Up to now furan has been found in boiled and fried meat, coffee, cocoa, bread, roasted hazelnuts, smoked products, breakfast cereals, dried fruits and popcorn. The occurrence of furan was particularly conspicuous in foods that were roasted or heated in closed containers, such as convenience foods (meat preserves, canned soups and vegetables etc.) and food prepared in little jars (e.g. baby food).

Children take in furan mainly through breakfast cereals, dried fruits and snacks such as popcorn. Coffee is regarded as the main source of furan for adults.

### Does furan in foods constitute a risk?

In experiments with animals, higher doses of furan result in cancer. It is not clear whether the long-term intake of small quantities of furan in foodstuffs can lead to cancer in humans. To date, a limited number of foodstuffs have been tested for their furan concentration. The data obtained up to now is not yet sufficient to comprehensively assess furan intake in humans through food. A possible risk for the consumer cannot be finally assessed on the basis of the study findings obtained to date. According to present knowledge, there are no definite indications of a health hazard.

### **Furan has also been detected in baby food. Are babies particularly endangered by furan?**

On the basis of the data currently available, it must be assumed that no health hazard exists for babies. A reduction of the furan concentration in jars of baby food can be achieved by stirring the contents of the open jar for several minutes after heating. The volatile furan can escape under these conditions. Storage in a refrigerator at 4 °C can also reduce the level of furan. Jars of food containing pasta, meat and vegetables usually have higher levels of furan than jars of baby food containing drinks, fruits and cereals. It has been proven that no furan occurs if baby food is prepared at home from the same ingredients.

### **Why is furan a cause for concern?**

Furan is a substance which causes cancer in laboratory animals. It was classified as possibly carcinogenic for humans by the World Health Organization (WHO) in 1995. The cause for concern is the possibility that contact with low concentrations of furan from foodstuffs over a longer period of time might cause cancer in humans. At present, however, it is only possible to transfer the findings of the animal experiments to humans to a limited extent.

### **Is the occurrence of furan in foods a new finding?**

The occurrence of furan in foods is not a new finding. Furan is formed when thermal processes, such as bottling and jarring, are used to preserve food. These methods have been used for a long time to preserve food. It must be assumed that furan has only been detected recently in several foods because new analytical methods of measuring furan concentrations are now available. The distinguishing feature of these new methods is that it is possible to detect a substance in very low concentrations.

### **How is furan formed in foods?**

The exact conditions and mechanisms for the formation of furan have not been completely clarified. Several possibilities are being considered for the formation of furan in foods, all of them different, depending on the composition of the food. All relevant formation pathways underlie a heating process, such as boiling or roasting. The results of various investigations indicate that the cleavage of amino acids and sugar during the heating process plays a decisive role in the formation of furan. This does not exclude the possibility, however, that other ingredients, such as vitamin C or polyunsaturated fatty acids, could also contribute to the formation of furan during their heat-induced degradation.

### **What can consumers do to reduce furan levels?**

Furan is an undesired substance detected mainly in heated foods. The data situation at present, however, is not sufficient to formulate unequivocal consumption recommendations. Various studies indicate that processing at lower temperatures reduces the furan content. Accordingly, the same recommendation applies for the minimization of furan as it does for acrylamide: "Don't burn it, lightly brown it". The furan content can also be reduced by preparing foods in an open vessel while stirring continuously. Because furan is a volatile substance, it tends to evaporate when the food is stirred.

### **Should consumers alter their eating habits?**

According to BfR assessments, no evidence is currently available which would justify declaring that furan concentrations in foods pose a danger to health. There are no indications at this time which give reason for consumers to change their nutrition and eating habits to avoid exposure to furan in particular. The risk assessments of the chronic toxicity of furan have not yet been completed and require a more comprehensive data base.