



Fluorinated substances in paper and cardboard food contact materials (FCM)

Fact sheet, May 2018

Fluorinated substances constitute a large group of chemical substances that are persistent and some of them accumulate in humans and animals. Several of the substances are suspected of being carcinogenic, harmful to the immune system and endocrine disrupters. They can be used to treat the surface of food contact materials (FCM) of paper and board (e.g. cookie sheets, food paper and fast food packaging). There are for these substances no specific EU limit values for the migration from paper and board to food.

The Danish Veterinary and Food Administration discourages the use of organic fluorinated substances in paper and cardboard food contact materials.

New indicator value

In April 2018, the Danish Veterinary and Food Administration introduced a new indicator value that can help the industry assess whether organic fluorinated substances have been added to paper and cardboard. The indicator value is 10 microgram organic fluorine per square decimeter paper. Content below the new indicator value is considered as background pollution. So, companies can use the value to ensure that paper is not treated with organic fluorinated substances.

It is important to emphasize that the indicator value is not the same as a legal limit value. It is still permitted to use or manufacture cardboard and paper containing organic fluorine above the indicator value. However, as with all other substances in food contact materials, the content must not cause migration to food in amounts that can endanger human health.

Control of fluorinated substances in food contact materials

In Denmark, all types of FCM, including paper and cardboard, must be accompanied by a declaration of compliance. This declaration must document that the product is in compliance with the requirements for FCM in regulation 1935/2004. This includes the requirement that no FCM must release taste, odour or substances in harmful amounts to food (article 3).

The companies must ensure compliance with regulation 1935/2004 (article 3). For the organic fluorinated substances, it can be done by documenting: 1) that these substances have not been added, 2) compliance with the indicator value or 3) that a possible content of fluorinated substances above the indicator value does not cause migration to food in amounts that can endanger human health.

Analytical methods

There are several methods, if a company wants to test the content of organic fluorine in paper and cardboard FCM.

The determination of total organic fluorine (TOF), which includes all fluorinated substances in the material, can for instance be carried out with a method developed from the European standard DIN EN ISO 10304-1 (D20). In the analysis the paper is burned. This process converts the organic fluorine to hydrogen fluoride, which is collected in a liquid and analysed for fluoride with an analysis method that uses ion chromatography.

The content of organic fluorine can also be determined as extractable organic fluorine (EOF). By this method, the organic fluorinated substances are extracted from the paper material using ethanol. Then the extract is transferred to a suitable matrix (e.g. microcrystalline cellulose), which is analysed by the method for total organic fluorine (TOF).

For both methods it is important that companies ensure that inorganic fluorine is subtracted from the result, since inorganic fluorine can cause an error in the analysis methods for total organic fluorine and extractable organic fluorine.

Claim of FCM

The claim 'not treated with fluorinated substances' or a similar phrase can be used if the measured content is below the indicator value or if there is documentation that fluorinated substances have not been used at all in the production of the material. The Danish Veterinary and Food Administration will as a starting point consider this claim as misleading, if organic fluorinated substances are used in the production.

Special attention should be given to claims of recycled paper and cardboard, as these may contain organic fluorinated substances due to content of inks and surface coating agents in the recycled material.

Difference between the new indicator value and the old recommended limit

In August 2015, the Danish Food and Veterinary Administration set a recommended limit for the content of total organic fluorine in paper and cardboard of 0.35 microgram per square decimeter paper. The value should be used as a tool to exclude paper treated with organic fluorinated substances to make the paper grease and water resistant.

Subsequent findings from the Danish Food and Veterinary Administration's control and the industry's own analyses showed that the recommended limit did not work as intended. The measured values were in all cases above the recommended limit value – also for paper that had not been treated with organic fluorinated substances.

Therefore, the Ministry of Environment and Food of Denmark initiated a research project at the National Food Institute, DTU Food, which should form the basis for a revision of the recommended limit. The purpose was to find a tool that can distinguish between paper treated with organic fluorinated substances and paper containing an unintended background content of organic fluorine.

The new indicator value has been based on DTU Foods work.