Ministry of Environment
and Food of Denmark
Danish Veterinary and
Food Administration

Ban on fluorinated substances in paper and board food contact materials (FCM)

Fact sheet, June 2020

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 make the surface of food contact materials (FCM) of paper and board fat and water resistant (e.g. cookie sheets, food paper and fast food packaging). Only a few of the substances have been risk assessed by the European Food Safety Authority (EFSA). There are no specific EU limit values for the migration of chemical substances from paper and board to food.

What is covered by the ban?

In Denmark, from July 1, is it prohibited to place on the market paper and board food contact materials in which per- and polyfluoroalkyl substances (PFAS) have been used, unless a functional barrier which prevents the substances from migrating to food is included in the product.

An informative translation of the Order on Food Contact Materials can be found on the website of the Danish Food Administration. In any case of misinterpretation between the translated version and the Danish version, the Danish version has legal force.

Use of PFAS can be direct and indirect. Direct use is the addition of these substances to make the material water and grease resistant. Indirect use is, for example, the addition of these substances to paper and board from inks or the use of recycled paper and board in the material.

The ban includes PFAS in paper and board FCM (ie. the empty packaging material) and pre-packaged food where PFAS have been used in the paper and board packaging.

When a functional barrier is used in paper and board FCM, it is the responsibility of the companies to ensure that the barrier used is sufficient to avoid migration in the intended use of the packaging (type of food, time and temperature).

Indicator value

The Danish Veterinary and Food Administration has introduced an indicator value that can help the industry assess whether organic fluorinated substances have been added to paper and board. The indicator value is 20 microgram organic fluorine per gram of paper. This corresponds to 10 microgram organic fluorine per square decimeter of paper, when the paper has a weight of 0.5 gram per square decimeter. Content below the indicator value is considered as unintentional

background pollution. So, companies can use the value to ensure that organic fluorinated substances have not been added to the paper.

Control of fluorinated substances in food contact materials

In Denmark, all types of FCM, including paper and board, 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 and other relevant regulations, including the Danish order on FCM. The Danish Veterinary and Food Administration inspects FCM companies and the use of FCM in food businesses. The inspection will focus on the documentation provided by the companies. This must prove that the rules are being complied with.

In control projects, the Danish Veterinary and Food Administration takes samples of paper and board FCM for chemical analysis for content of PFAS. If an analysis shows that there is a content of PFAS in the material that is considered higher than the unintended background level, then the Danish Veterinary and Food Administration will, as a starting point, require the use of a functional barrier in the material that excludes migration to food. This may be, for example, if the use of PFAS originates from ink or recycled paper.

Analytical methods

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