



## Opinion 09-2023 of the Scientific Committee established at the FASFC on the evaluation of a request for derogation for deep-frying meat products in oil with a temperature higher than 180 °C

### Background & Terms of reference

A food chain operator submitted an application to the FASFC for a derogation for deep-frying meat products in oil with a temperature higher than 180 °C. The legal maximum temperature is 180 °C and a tolerance of 2 °C is permitted by the FASFC. During the deep-frying process of meat products in sunflower oil, the operator allows accidental exceedances of 182 °C. However, these exceedances are monitored and associated with corrective measures.

In accordance with the legislation and circular PCCB/S3/VVN/1148069, the FASFC may grant a derogation for the deep-frying process applied by the manufacturer or processor at the justified request of a manufacturer or processor and on the advice of the Scientific Committee. For this reason, the Scientific Committee is asked to provide an answer to the following question: "Is there a risk associated with the use of oil with a temperature higher than 180 °C for deep-frying meat products?"

### Method

The opinion is based on literature review and expert opinion, documents from the operator and an estimation of the formation of process contaminants (heterocyclic aromatic amines) in meatballs by applying a kinetic model from the literature.

### Conclusions

The Scientific Committee has no objections if the FASFC responds favourably to the operator's request for a derogation for deep-frying meatballs in sunflower oil with a temperature higher than 180 °C but limited to 186 °C. However, corrective measures must be applied from the excess of 183 °C (action temperature chosen by the operator) onwards. The corrective measures involve destroying the deep-fried meatballs and changing the frying oil immediately. This must be done if (i) the oil temperature exceeds 183 °C during six minutes and this is accompanied by a content of polar compounds higher than 25% (legal norm according to royal decree of 22 January 1988) or if (ii) the oil temperature exceeds 186 °C. It should be noted that the oil temperature tolerance allowed by the FASFC is 182°C. However, the operator's deep-frying process (electric fryer and batch process) is inherently sensitive to temperature fluctuations. Because of temperature recording data over a longer period (with only a few exceedances of 182 °C), the Scientific Committee can state that it is acceptable that the corrective measures described above are only taken from a temperature of 183 °C onwards.

One reason for the Scientific Committee's opinion is that the analytical data of the frying oil (free fatty acids, dimeric and polymeric triglycerides, polar substances on the fat and peroxide number) meet the legal standards. This shows that the operator is in control of his process.

In addition, based on expert opinion and literature review, six hazards were considered:

- 1) oxidation of sunflower oil;
- 2) formation of polycyclic aromatic hydrocarbons in sunflower oil;
- 3) formation of polycyclic aromatic hydrocarbons in deep-fried meat products;
- 4) oxidative stability during preservation of deep-fried meat products;
- 5) formation of N-nitrosamines in deep-fried meat products; and
- 6) formation of heterocyclic aromatic amines in deep-fried meat products.

The Scientific Committee considers that the formation of heterocyclic aromatic amines in deep-fried meat products is the only pertinent risk. A simulation of the formation of heterocyclic aromatic amines was therefore performed for the operator's most critical product, a meatball with a diameter of 2.5 cm. Based on kinetic parameters from the literature, the formation of heterocyclic aromatic amines in the meatball was simulated for the application of a deep-frying process for two minutes at 182 °C (FASFC maximum tolerance) on the one hand and 187 °C (1 °C higher than the temperature at which the operator immediately destroys the meatballs) on the other hand. It can be concluded from the simulation that the increase in the formation of heterocyclic aromatic amines at 187 °C compared to 182 °C is very limited. On the basis of this simulation, the Scientific Committee is of the opinion that there is no risk associated with the consumption of the deep-fried meatballs produced by this operator when accidental exceedances of the maximum oil temperature of 180 °C occur during the deep-frying process, with the proviso that the operator's corrective measures are consistently applied.

### **Recommendations**

The Scientific Committee recommends regularly calibrating the thermostat of the electric fryer.

The Scientific Committee recommends that rather than the determination of free fatty acids, the polar fraction should be measured as a routine check of sunflower oil. This is because the polar fraction takes into account more degradation products than just free fatty acids and is therefore a more accurate method for determining the degradation status of frying oil.

In addition, the Scientific Committee recommends using an oil with a lower content of polyunsaturated fatty acids and a higher content of monounsaturated fatty acids instead of the sunflower oil currently used by the operator, as the former offers better oxidative stability.

The full text is available on this website in dutch and in french.