

Carry over of Mineral Oil Hydrocarbons during Frying

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Mineral oil hydrocarbons (MOH) have been detected in oils and fats as a contaminant. Their carry over from vegetable oil during frying to French fries has been studied. Vegetable oil free of MOH and interfering natural hydrocarbons was spiked at a level of about 200 mg/kg. Multiple analyses proved the homogeneity of the spiked oil. Frying operation was carried out with portions of 50 g French fries in a household electric fryer at 175 °C. French fries were fried every four hours until the legal limit of 24 g/kg for polar compounds or a frying time of 20 h was reached.

Determination of mineral oil hydrocarbons was achieved with an LC-GC system (Axel Semrau GmbH, Sprockhövel) with separation of MOSH and MOAH on a silica HPLC separation column delivering the two fractions each on a pre-column with an early vapor exit of a dual channel GC-FID apparatus. For the determination about 300 mg of oil was weighed accurately into a sample vial and placed on the sample tray after addition of 100 µl of an internal standard mixture solution.

The mineral oil content in the frying oil decreased from 120 mg/kg to 40 mg/kg during the whole course of the frying experiment. During the frying experiment the fraction with lower boiling point were diminished to a higher extent than the fraction with higher boiling substances.

On the other side mineral oil hydrocarbons were detected in the first French fries at a level of 180 mg/kg. This was at a significant higher level than the content of the corresponding frying oil. Especially the MOSH fraction of the first batch of French fries was about twice higher than in the frying oil. This high concentration of MOSH was in contrast to the low carry over of the MOAH fraction onto the French fries. Up to now there is no explanation for these differing data. The frozen French fries did not contain significant amounts of mineral oil hydrocarbons in the par-fried stage.

