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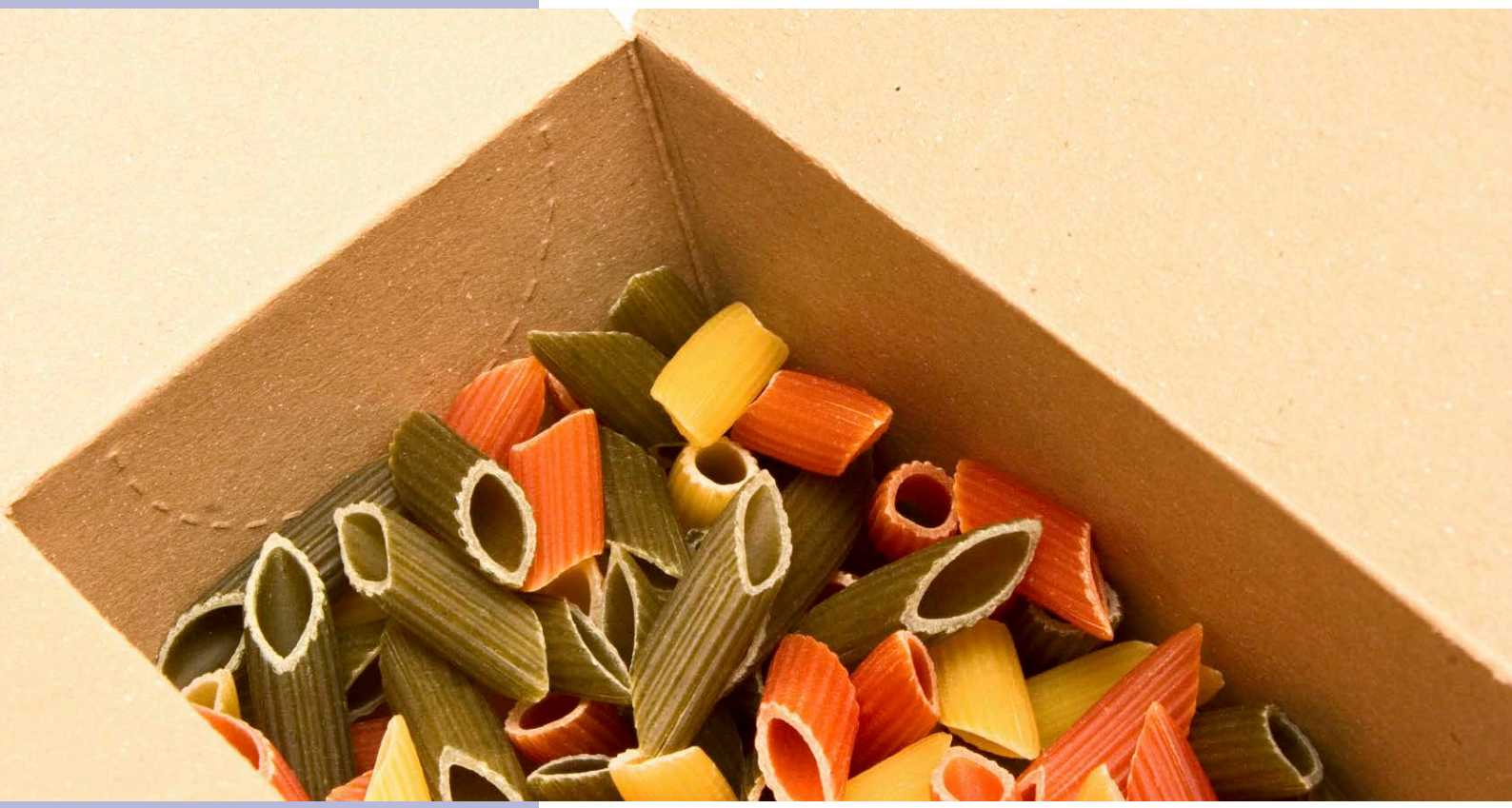
WEJ Contaminants

Mineral Oils in Food

Innovative online-HPLC-GC technique allows for the separation of MOSH and MOAH fractions

Currently, the main constituent of cardboard is recycled paper. During the process of recycling, mineral oils originating from printing inks used in newspaper printing may find their way into the cardboard. If food is packaged into cardboard boxes, such mineral oils can migrate into the food in relatively large quantities. Relevant food groups include rice, cereal flours, cereals, muesli, pasta, baking mixes, dried potato products and custard powder.



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MOSH/MOAH, POSH

The mineral oil fraction of concern consists mainly of low molecular weight compounds (C16 up to C24) with the major portion being Mineral Oil Saturated Hydrocarbons (MOSH). About 15-20 % of the mineral oil fraction can be composed of Mineral Oil Aromatic Hydrocarbons (MOAH).
Contrary to the structurally related and cancerogenic PAH, MOAH are a complex mixture of compounds with differing and mainly unknown toxicities. According to animal testing studies, mixtures of low-viscosity mineral oils are stored within the body, leading to accumulation and damages within the liver, the heart valves and lymph nodes.
In addition to the mineral oil fractions MOSH and MOAH, branched hydrocarbons, the so called POSH (polyolefin oligomeric saturated hydrocarbons) move more and more into the spotlight. These are oligomeric substances which potentially migrate from PE or PP-packagings.

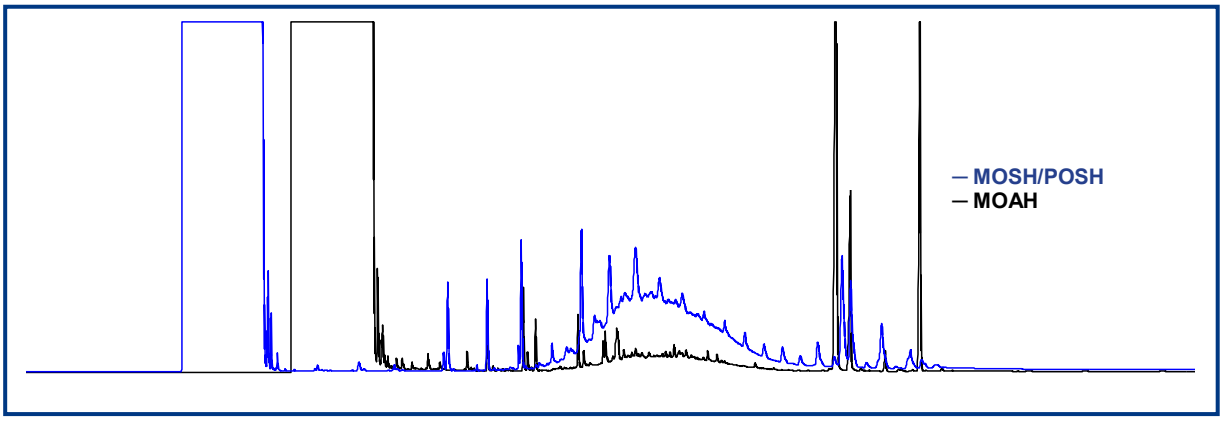
Assessments and Measures

In 2009, the BfR has issued a warning regarding the direct contact of large surface dry foods with recycling cardboard. As short term options, the changeover to virgin fibre products or the use of inner bags effectively blocking migration such as aluminium, PET or PP bags are recommended.

In June 2012, the European Food Safety Authority (EFSA) published a Scientific Opinion questioning the relevance of previous toxicological animal studies for humans. Concurrent with this report, the Joint Expert Committee on Food Additives (JECFA) withdrew the temporary acceptable daily intake (ADI) of 0.01 mg/kg body weight.
Food packagings are subject to EU-Regulation 1935/2004 and may not be harmful to consumer health. The implementation of maximum levels for the migration of MOSH and MOAH from food packagings manufactured by using recycled waste paper is currently under discussion in Germany.

Analysis

Our experts from the Competence Centre for Organic Contaminants have long-term experience with the analysis of mineral oils from food matrices.
A new online-HPLC-GC technique enables now the separate quantification of MOSH/POSH and MOAH within one chromatographic run. Separation and clean-up of MOSH/POSH- and MOAH-fractions is achieved using normal-phase HPLC. Subsequently, the simultaneous transfer of both fractions to a dual-channel gaschromatographic system with flame ionisation detection (GC-FID) allows for the separate quantification of MOSH/POSH and MOAH (see fig. 1). Separation of MOSH- and POSH-fractions is impossible due to their structural resemblance.



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