Polycyclic aromatic hydrocarbons (PAH)

„PAH4“ replace benzo[a]pyrene as sole marker substance

PAH are a group of organic compounds consisting of at least two condensated aromatic rings. Many PAH are supposed to be cancerogenic and mutagenic. Due to their toxicity, persistence and distribution, PAH play a major role amongst harmful substances.

In August 2011, new maximum levels for polycyclic aromatic hydrocarbons (PAH) in food were published in Regulation (EU) 835/2011 amending Regulation (EC) 1881/2006. The limit values for the marker substance benzo[a]pyrene were revised, new maximum levels were established for the sum of the so-called „PAH4“.

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Formation of PAH

PAH develop especially during incomplete combustion of organic materials. They are fat soluble, nonvolatile, extremely persistent and occur in exhaust fumes from motor vehicles, coal furnaces and mineral oil heatings.

PAH in Food

Food may be contaminated via air, soil, water and sediments. The products mainly concerned are sea food as well as harvested goods depending on the environment (traffic, heat and power stations, industrial areas and others).
Additionally, PAH may form during food processing and preparing through smoking, drying, frying, grilling, roasting and baking. The contamination of vegetable oils with PAH may result from the contact of oil seeds with combustion fumes during the process of drying.

Food Law

Based on a statement of the earlier EU Scientific Committee on Food (SCF), benzo[a]pyrene was the sole marker substance for the occurrence of PAH in food.

In 2008, an expert's opinion from the European Food Safety Authority (EFSA) has questioned this statement and proposed the sum of the 4 PAH (benzo[a]pyrene, benz[a]anthracene, benzo[b]fluoranthene and chrysene) as a more suitable indicator for the occurrence of PAH in food.

Next to the already existing maximum levels for benzo[a]pyrene, Regulation (EU) No.835/2011 amending Regulation (EU) No. 1881/2006 has published maximum levels for the so-called PAH4. The Regulation is effective since September 2012. It concerns the gradual lowering of maximum levels in some of the existing food groups. Additionally, limit values for heat treated meat and meat products as well as cocoa beans and products thereof were established (Supplemental Customer Information on limit values is available).

Furthermore, EU Regulation 2065/2003 fixes maximum levels for benzo[a]pyrene and benz[a]anthracene (BaA) in smoke flavourings.

Analysis

Our experts from the Competence Centre for Organic Contaminants have longterm experience with the analysis of PAH in food. Our offer includes:

- benzo[a]pyrene
- PAH4
- 16 EU-PAH
- 13 EPA-PAH
- 26 PAH

Even the separation of critical pairs such as chrysene/triphenylene and the benzofluoranthenes is ensured using a novel selective gas chromatographic phase. The combination of solid phase extraction and gas chromatography-mass spectrometry (online-SPE-GC-MS) renders short turn-around-times possible.