

Marker substances for polycyclic aromatic hydrocarbons (PAHs) for food control purposes

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Polycyclic aromatic hydrocarbons (PAHs) are a category of organic compounds. They occur as result of the incomplete combustion of organic metals (e.g. coal, fuel, tobacco) and can enter foodstuffs through the environment. Furthermore, foodstuffs can contain PAH as a result of certain manufacturing methods. Especially smoked and barbecued meat and fish products are affected thus. Some PAHs are highly likely to have a mutagenic and carcinogenic effect on humans and could potentially cause reproductive and prenatal developmental damage. Because of their longevity, adverse health effects and worldwide prevalence, PAHs are highly relevant harmful substances.

In order to assess the PAH concentration in foodstuffs for the purpose of health control, benzo[*a*]pyrene has often been analysed as a marker representing the entire category of substances. In addition, maximum levels in foodstuffs were set only for benzo[*a*]pyrene.

The European Community is currently considering whether the current state of research would allow four individual substances, the group of the so-called PAH4 (benzo[*a*]pyrene, benzo[*a*]anthracene, chrysene and benzo[*b*]fluoranthene), would be better suited to represent the entire group of PAH substances rather than just benzo[*a*]pyrene exclusively since the use of PAH4 as marker would cover a large part of food samples containing PAH. The EC Scientific Panel on Contaminants in the Food Chain has proposed three models that could replace the use of benzo[*a*]pyrene as exclusive marker substance for the group of PAHs: Introduction of maximum levels 1) for each individual substance in the PAH4 group, 2) for the sum of PAH4 or 3) for benzo[*a*]pyrene and the sum of the PAH4 group. The Federal Institute for Risk Assessment (BfR) has assessed the safety level and the practical effectiveness of these three proposals for markers for the official control of PAHs in foodstuffs.

According to BfR, a maximum level for benzo[*a*]pyrene in foodstuffs should be retained since comprehensive data on this compound are already available, thus facilitating the comparison with past studies. At the same time the Institute supports the use of the sum of the PAH4 as marker in regulating PAH in foodstuffs in addition to setting a maximum level for benzo[*a*]pyrene (model 3).

BfR generally believes that the maximum levels for PAHs should be set as low as technologically feasible and the selection of marker compounds used should be continually adjusted in accordance with new findings especially in regard to carcinogenic effects in animal experiments.

The full version of this BfR Information is available in German on http://www.bfr.bund.de/cm/208/markersubstanzen_fuer_pak_zur_lebensmittelueberwachung.pdf