

Polycyclic Aromatic Hydrocarbons in Danish smoked Fish and Meat Products

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Polycyclic aromatic hydrocarbons (PAH) are formed by incomplete combustion of organic material like wood, coal, or oil, and are widespread in complex mixtures throughout the environment. For non-smokers, human exposure to PAH occurs mainly by food consumption. Normally, raw food does not contain high levels of PAH, but PAH are formed during processing, roasting, baking or frying. PAH are easily deposited on food and can penetrate the surface during traditional smoking. The present study was undertaken to examine the PAH levels in smoked fish and meat products produced in Denmark. In 45 selected smoked food samples including mackerel (n = 12), herring (n = 8), trout (n = 5), salami (n = 5), bacon (n = 10) and small sausages (n = 5) 27 PAH were identified. The total PAH concentration in smoked meat products ranged from 24 mg/kg for salami to 64 mg/kg in bacon while those in fish products ranged from 22 mg/kg in smoked mackerel prepared in an electric oven to 1387 mg/kg in herring smoked by direct heating.

These results indicate that the actual level of individual PAH in fish products is dependent on several variables in the smoking process such as type of smoke generator and type of wood used. It is known that the level of individual PAH in food after smoking is also dependent on other parameters, including combustion temperature and degree of smoking.

In 2002 the EU Scientific Committee on Food (SCF) evaluated 33 PAH. Fifteen of these showed clear evidence of genotoxicity and 14 were evaluated as carcinogenic in animals. In addition, the SCF recommended that the risk assessment of the carcinogenicity of PAH in food could be based on the level of benzo[a]pyren (B[a]P), one of the most potent PAH.

Results of this limited survey revealed that the level of Benzo[a]Pyren (B[a]P) for all sample types were below 1 mg/kg except for one herring smoked by direct heating that was found to contain 3.9 mg B[a]P/kg. The use of B[a]P as an indicator for the total amount of PAH in these types of smoked foods will be discussed.