



The effects of thermal processes on the formation of polycyclic aromatic hydrocarbons in fish

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Abstract

Polycyclic aromatic hydrocarbons (PAHs) are organic compounds consisting of two or more fused aromatic rings that are formed by incomplete combustion of organic matter, including vegetation, fossil fuels and oil products. One of the main sources of exposure to PAHs is food. Different cooking methods such as frying, steaming, grilling (broiling) fish with intense heat over a direct flame results in fat dripping on the hot fire and yielding flames containing a number of PAHs. Factors affecting pollution levels include: time and temperature of the process (increasing the time and temperature of the process leads to an increase in PAHs), distance from the heat source (related to the amount of PAHs), type of process (grilling, roasting, smoking, drying, etc.) fuel type (coal produces less PAHs than wood), fat content (as the main source of PAHs). Research shows that unsaturated fats existent in heated fish tissue, during smoking, it decomposes thermally and it increases the amount of PAHs and finally, it settles on the smoked fish surface. Whereas PAHs are lipophilic compounds, therefore, increasing the amount of fatty acids in the tissue of fish causes more absorption of these compounds during smoking. As a result, among the thermal processes, grilling (with or without skin) and smoking have a more more effective on increasing the amount of PAHs than roasting, steaming and frying methods.

Keywords: PAHs, Food, Cooking methods, Fish, Smoking