

Polycyclic aromatic hydrocarbons (PAHs) and their bioaccessibility in meat: a tool for assessing human cancer risk

ABSTRACT

Polycyclic aromatic hydrocarbons (PAHs) are primarily formed as a result of thermal treatment of food, especially barbecuing or grilling. Contamination by PAHs is due to generation by direct pyrolysis of food nutrients and deposition from smoke produced through incomplete combustion of thermal agents. PAHs are ubiquitous compounds, well-known to be carcinogenic, which can reach the food in different ways. As an important human exposure pathway of contaminants, dietary intake of PAHs is of increasing concern for assessing cancer risk in the human body. In addition, the risks associated with consumption of barbecued meat may increase if consumers use cooking practices that enhance the concentrations of contaminants and their bioaccessibility. Since total PAHs always overestimate the actual amount that is available for absorption by the body, bioaccessibility of PAHs is to be preferred. Bioaccessibility of PAHs in food is the fraction of PAHs mobilized from food matrices during gastrointestinal digestion. An in vitro human digestion model was chosen for assessing the bioaccessibility of PAHs in food as it offers a simple, rapid, low cost alternative to human and animal studies; providing insights which may not be achievable in in vivo studies. Thus, this review aimed not only to provide an overview of general aspects of PAHs such as the formation, carcinogenicity, sources, occurrence, and factors affecting PAH concentrations, but also to enhance understanding of bioaccessibility assessment using an in vitro digestion model.

Keyword: Polycyclic Aromatic Hydrocarbons; Barbecued meat; Bioaccessibility; In vitro human digestion model