LOWER ENDOCRINE DISRUPTERS EXPOSURE: POLYCYCLIC AROMATIC HYDROCARBONS IN FOOD.

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Polycyclic Aromatic Hydrocarbons (PAHs) are a group of chemicals that are formed during various domestic and industrial combustion processes. PAHs are found in the environment as complex mixtures that may include many compounds of which 15 (especially benzofluoranthene and benzopyrene) are considered critical from a toxicological standpoint (EFSA, 2008).

Conventional approach to the PAHs risk analysis is based on genotoxic and carcinogenic effects; however, PAHs are also aryl hydrocarbon receptor’s (AhR) antagonists with effects on target genes expression analogous to dioxins (Shimada et al., 2006; de Waard et al., 2008). The possible PAHs in vivo impact on endocrine balance (mainly in critical developmental stages) through AhR modulation has to be fully evaluated. Anyway, association between PAHs exposure through food contamination and CYP enzymes (e.g., CYP1A1) induction regulated by AhR has been observed (Fontana et al., 1999). Moreover, high PAHs intake may increase the risk of tumors with a significant endocrine regulation such as postmenopausal mammary cancer (Steck et al., 2007) and prostate cancer (Koutros et al., 2008).

Dietary and lifestyle (cigarette smoking) habits hold a primary role in PAHs exposure (EFSA 2008). PAHs can be found in significant concentrations in smoked, grilled and baked foods, in particular where overdone, burned parts are present. The relevance of individual food commodities differs from geographic areas: in Estonia smoked foods are particularly relevant (Reinik et al., 2007), in other Countries are grilled meats (barbecue), while in Italy oven-baked pizza is particularly important (Lodovici et al., 1995).

Since there’s a possible health risk, it is important to adopt habits and practices in order to lower PAHs exposure. In addition to lowering smoking habit, the use of cooking processes that minimize the presence of burned parts and PAH’s formation are an healthy practice easy to adopt at home as well as in canteens and restaurants.

It’s important to notice how recent papers (Chatonnet et Escobessa, 2007; Gallinaro et al., 2007; Simko, 2005) examined the control over PAHs formation through correct food processing according to an approach that should be widely considered by the HACCP system.

References


• Simko P. Factors affecting elimination of polycyclic aromatic hydrocarbons from smoked meat foods and liquid smoke flavorings. Mol Nutr Food Res. 2005 Jul;49(7):637-47.