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ABSTRACTS

5TH MEETING  
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IJUP'12

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# CREDITS

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# Influence of charcoal type on polycyclic aromatic hydrocarbon formation in barbecued muscle foods

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Polycyclic aromatic hydrocarbons (PAHs) are an important class of toxicological compounds formed during incomplete combustion of organic matter. They are widely spread in the environment and human exposure to PAHs is unavoidable. Their presence in the environment contribute to accidental contamination of many raw foods, additionally, the traditional preservation practice of food with wood smoke or food cooked over an open flame induces PAHs generation and their presence in foodstuffs. Consequently, the major source of human exposure is attributable to the diet. The presence of PAHs in food is a matter of concern and requires continuous monitoring. Studies concerning the levels of grilled or barbecued food are scarce or quantified only Benzo[*a*]Pyrene alone or few PAHs [1].

The main objective of this study was to select the safer charcoal, concerning PAHs formation in grilled muscle foods. With this propose 15 PAHs, selected from the 16 US-EPA were quantified in meat and fish samples grilled with two different types of charcoal under standard temperature conditions.

Two similar garden-type (35 cm width, 52 cm length, and 15 cm height) grills were fuelled with two different types of charcoal: the traditional “wood charcoal”, and another called “ecological charcoal” from 100% coconut shell. Aiming to keep the temperature next to the grid at 200 ° C the distance to the heat source was selected depending on the type of charcoal. The grilling time was 18 min for beef and 23 min for salmon until well-done cooked, golden colour for salmon and moderately browned for beef. Samples were turned once during grilling at half the total cooking time.

PAHs were extracted with n-hexane and sonication, followed by solid-phase extraction (SPE) and separated by HPLC with fluorescence detection. Method validation included study of linear range, limits of detection and limits of quantification, precision and accuracy [2].

The results indicate significant differences concerning PAHs formation in salmon samples. Higher levels were quantified in salmon samples grilled with traditional charcoal. Apparently, the flameless characteristic of ecological charcoal is responsible for lower level of PAHs, despite of the high lipid content of salmon. Concerning beef samples lower levels of PAHs were quantified and no significant differences were observed between composition of samples grilled with traditional and ecological charcoal.

## References:

[1] Phillips, D.H. (1999), *Polycyclic aromatic hydrocarbons in the diet*, Mutation Research, 443, 139-147.

[2] O. Viegas, P. Novo, O. Pinho, I.M.P.L.V.O. Ferreira: *A comparison of the extraction procedures and quantification methods for the chromatographic determination of polycyclic aromatic hydrocarbons in charcoal grilled meat and fish*. Talanta (in press)