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Effects of Seasoning with Annatto (*Bixa orellana* L.) seeds on the Formation of Polycyclic Aromatic Hydrocarbons in Barbecued Beef Patties

Abstract

Polycyclic aromatic hydrocarbons (PAH) are ubiquitous compounds, however the highest PAH concentration in foods is usually described when grilled and/or barbecued, mainly when charred, which contribute significantly to the intake of these compounds[1]. In view of their carcinogenic potential, mitigation strategies have been investigated, among them the use of condiments rich in bioactive compounds that could, owing to potential to modulate the oxidative system, suppress the reactive species involved in the formation of PAH[2]. Despite this, no studies were found concerning the effect of annatto (*Bixa orellana* L.) seeds, a product of Brazilian biodiversity, source of bioactive compounds and used as a food coloring[3], on PAH formation. Therefore, this study aimed to evaluate the effect of annatto seeds on the formation of PAH in barbecued beef patties.

Beef patties (80g) seasoned with annatto seeds (0.5%, w/w), and unseasoned (control) were barbecued (n = 2), at well-done level, and 14 PAH were analyzed using an acetonitrile based-extraction followed by high-performance liquid chromatography with fluorescence detection (HPLC-FLD)[4].

The unseasoned samples showed a total Σ PAH of 140.1 ± 1.2 ng g⁻¹, and a significant reduction (p < 0.05) were observed in patties with annatto (Σ PAH 106.2 ± 0.2 ng g⁻¹). In relation to the EFSA most suitable indicator for the occurrence and carcinogenic potency of PAH in foods[1], Σ PAH4 (benz[a]anthracene, chrysene, benzo[b]fluoranthene and benzo[a]pyrene), the same trend was observed (Σ PAH4 1.88 ± 0.01 ng g⁻¹ in unseasoned vs Σ PAH4 1.29 ± 0.01 ng g⁻¹). In addition to the known natural coloring and antioxidant properties of annatto seeds, this study demonstrates its potential as a seasoning in meat to reduce dietary exposure to PAH from charcoal grilled meat. Other cooking methods and conditions, as well as other food processing contaminants, deserve to be evaluated in further studies.

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Keywords

Polycyclic Aromatic Hydrocarbons, Bixaceae, Spices, Cooking techniques, HPLC.

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Biography

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