Food Contaminants and Human Health

Challenges in chemical mixtures

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benzo(b)fluoranthene and chrysene, being the recommended markers of the presence of carcinogenic and genotoxic PAHs in foodstuffs. The sampled octopus presented benzo(a)pyrene concentrations below 0.09 µg/kg ww; regarding the sum of the four recommended PAHs, concentrations ranged between 0.50-0.62 µg/kg ww. The mean levels reached were considerably lower than the established regulatory limits (12.0–35.0 µg/kg ww). The potential health risks through the non-carcinogenic (THQ) and carcinogenic risks (TR) risks were also estimated and ranged from 1.31×10-4 to 2.68×10-4 and 59×10-6 to 70×10-6, respectively.

Conclusions: Consumption of the characterized species is safe regarding non-carcinogenic and carcinogenic risks.

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1.3.15. Extraction and detection of mycotoxins in medicinal and aromatic plants: a case study with *Aloysia citrodora P.*

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Plants frequently suffer contaminations by toxigenic fungi, and their mycotoxins can be produced throughout growth, harvest, drying and storage periods. The objective of this work was to validate a method for detection of toxins in medicinal and aromatic plants, through a fast and highly sensitive method, optimizing the joint co-extraction of aflatoxins (AF: AFB_1, AFB_2, AFG_1 and AFG_2) and ochratoxin A (OTA) by using *Aloysia citrodora* P. (lemon verbena) as a case study. For optimization purposes, samples were spiked (n=3) with standard solutions of a mix of the four AFs and OTA at 10 ng/g for AFB_1, AFG_1 and OTA, and at 6 ng/g of AFB_2 and AFG_2. Several extraction procedures were tested: i) ultrasound-assisted extraction in sodium chloride and methanol/water (80:20, v/v) [(OTA+AFs)1]; ii) maceration in methanol/1% NaHCO3 (70:30, v/v) [(OTA+AFs)2]; iii) maceration in methanol/1% NaHCO3 (70:30, v/v) (OTA1); and iv) maceration in sodium chloride and methanol/water (80:20, v/v)

(AF1). AF and OTA were purified using the mycotoxin-specific immunoaffinity columns AflaTest WB and OchraTest WB (VICAM), respectively. Separation was performed with a Merck Chromolith Performance C18 column (100 x 4.6 mm) by reverse-phase HPLC coupled to a fluorescence detector (FLD) and a photochemical derivatization system (for AF). The recoveries obtained from the spiked samples showed that the single-extraction methods (OTA1 and AF1) performed better than co-extraction methods. For in-house validation of the selected methods OTA1 and AF1, recovery and precision were determined (n=6). The recovery of OTA for method OTA1 was 81%, and intermediate precision (RSDint) was 1.1%. The recoveries of AFB_1, AFB_2, AFG_1 and AFG_2 ranged from 64% to 110% for method AF1, with RSDint lower than 5%. Methods OTA1 and AF1 showed precision and recoveries within the legislated values and were found to be suitable for the extraction of OTA and AF for the matrix under study.

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1.3.16. Assessment of mixtures of mycotoxins in breakfast cereals available in Portuguese market

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Objective: Mycotoxins are secondary metabolites of fungi that cause toxic and carcinogenic outcomes in humans exposed to them [1]. Mycotoxins affect several commodities including cereal grains and their finished products, infant formula and baby foods [2]. This study aimed to determine the incidence and levels of 20 mycotoxins (AFB_1, AFB_2, AFG_1, AFG_2, AFM_1, OTA, NIV, NEO, DAS, FUS-X, DON, 15-AC-DON, 3-AC-DON, HT-2, T-2, VER, T-2 TETROL, T-2