

Mycotoxin Analysis and Occurrence in Oat, Almond, Soya, Coconut and Hazel Beverages in Greek Market using UHPLC–ESI-MS/MS

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Plant-based beverages have seen a significant increase in market share due to rising consumer demand for vegan, lactose-free, and environmentally sustainable alternatives to dairy milk. However, the presence of mycotoxins in these products poses a serious risk to consumer health. Mycotoxins are toxic secondary metabolites produced by fungi, which can contaminate food products and cause adverse health effects, including liver damage and carcinogenicity. If mycotoxins are present in the raw material, it is likely that the resulting beverage will also contain these toxins. To detect and analyze mycotoxins in beverages during production, it is crucial to consider that the composition of the raw material can vary significantly, leading to distinct differences in the beverages produced. These variations can result in different interferences between matrices when identifying the target analytes. Due to these complexities, devising a universal method to detect various mycotoxins in different types of beverages poses a significant challenge.

The purpose of this work was to study the simultaneous determination and occurrence of 13 mycotoxins (Aflatoxin B1, Aflatoxin B2, Aflatoxin G1, Aflatoxin G2, Ochratoxin A, Alternariol, Alternariol methyl ether, Zearalenone, Deoxynivalenol, Fumonisin B1, Fumonisin B2, T2-toxin, HT-2 toxin) in almond, oat, hazelnut, soya and coconut plant-based beverages, using QuEChERS extraction followed by UHPLC–(ESI)MS/MS analysis. A newly developed and validated method was applied for the qualitative and quantitative determination of these contaminants in products purchased from local markets in Athens, Greece. The results indicated that almond and coconut beverages were mostly contaminated with Fumonisins, oat beverages with Alternariol methyl ether and Deoxynivalenol, while when it comes to soya drinks, Fumonisins and Deoxynivalenol were the main contaminants. No presence of mycotoxin was detected in hazelnut substrate.

This abstract is part of the project FunShiled4Med funded by the European Union's Horizon Europe Research and Innovation Programme under Grant Agreement No 101079173.

Food Science and Human Nutrition