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Multi-mycotoxin detection in dried and fresh fruits

Occurrence of mycotoxins in food commodities in the Greek market

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Mycotoxins are gaining global attention due to their frequent contamination of food supplies and serious health risks to humans and animals. Fruits, with their high sugar and moisture content, are particularly vulnerable to spoilage fungi, especially during pre- and post-harvest phases, which increases mycotoxin production potential.[1] While European legislation regulates established mycotoxins like aflatoxins (AFs) and Ochratoxin A (OTA) in dried fruits, information on *Alternaria* and *Fusarium* mycotoxins in fresh and dried fruits is limited, classifying them as emerging threats.[2,3] Their rising incidence underscores the need for more sensitive methods for multi-mycotoxin detection. The purpose of this work was to develop a reliable and rapid method for the simultaneous determination of 13 mycotoxins (AFB1, AFB2, AFG1, AFG2, OTA, Alternariol (AOH), Alternariol methyl ether (AME), Zearalenone (ZON), Deoxynivalenol, Fumonisin B1, Fumonisin B2, T2-toxin, HT-2 toxin) and to study their occurrence in 18 dry and 3 fresh fruits in the Greek market, followed by UHPLC–(ESI)MS/MS analysis. Comparison of two sample preparation methods (QuEChERS and Immunoaffinity Columns, IAC), was carried out and the most suitable and efficient one was chosen for the extraction of each mycotoxin. QuEChERS was used for the determination of AME, AOH, HT-2, ZON and DON while IAC was used for the determination of AFs, OTA, T-2, Fumonisins and DON. The results indicated that AOH, HT-2, ZON and DON were absent (<LOD) in both dried and fresh fruits while AME was detected in 3 samples at very low concentrations (0.02-0.08 ng/g). No AFs were detected in fresh fruits but they were detected in 3/18 of dry fruit samples at concentrations 0.03-1.06 ng/g and OTA was detected in half of the investigated samples at concentrations 0.06-0.79 ng/g. None of the mycotoxins investigated in both substrates were found above the legislative limits (MRL); instead, they were 0.5 to 40 times below the legal threshold.

References:

[1] Juan C., Mañes J., Font G., Juan-García A, LWT-Food Sci. Technol. 86 (2017) 344-351.

[2] Commission Regulation (EU) 2023/915

[3] Gruber-Dorninge C., Novak B., Nagl V., Berthiller F, J. Agric. Food Chem. 65 (2017) 7052-7070.

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