P14 - Exposure to mycotoxins in the Portuguese adult population

Maris E[1,2], Namorado S[3,4], Chen A[1], Pero-Gascon R[1,5], De Boevre M[1], De Saeger S[1], Silva MJ[3,4], Alvito P[3,6]
[1]Centre of Excellence in Mycotoxicology and Public Health, Faculty of Pharmaceutical Sciences, Ghent University, Belgium. [2]Laboratory of Molecular Bacteriology, Department of Microbiology and Immunology, Rega Institute, KU Leuven, Leuven, Belgium. [3]National Institute of Health Doutor Ricardo Jorge, Lisbon, Portugal. [4]Comprehensive Health Research Center (CHRC), NOVA University of Lisbon, Lisbon, Portugal. [5]Department of Chemical Engineering and Analytical Chemistry, Institute for Research on Nutrition and Food Safety (INSA-UB), University of Barcelona, Spain. [6]Centre for Environmental and Marine Studies (CESAM), University of Aveiro, Aveiro, Portugal.
Elias.Maris@UGent.be

Keywords: mycotoxins, deoxynivalenol, tenuazonic acid, human biomonitoring, chemical exposure, Portugal.

Mycotoxins are toxic fungal metabolites commonly found in food, posing health risks such as immunosuppression, carcinogenicity, and endocrine disruption. Despite regulatory limits, chronic low-level exposure remains a concern. Understanding real-life exposure in populations is essential for effective risk assessment. This study aims to investigate mycotoxin exposure among young adults in Portugal, contributing to evidence-based public health interventions.

This study leveraged data and biospecimens from the INSEF-ExpoQuim survey, a cross-sectional study nested within the Portuguese National Health Examination Survey (INSEF). Data was collected via REDCap-assisted telephone interviews, covering sociodemographic and exposure-relevant variables. A subset of 295 first morning urine samples was collected from adults aged 28–39 years between May 2019 and March 2020. Urine samples were analyzed by a newly optimized and validated LC-MS/MS method targeting 40 mycotoxins and/or their corresponding metabolites in urine. Urinary creatinine was measured using a validated colorimetric method to allow adjustment and standardization of mycotoxin concentrations, ensuring accurate exposure assessment and comparability. This methodological approach enabled a robust characterization of mycotoxin exposure in a representative Portuguese population cohort.

The study included 58% females and 42% males. Most participants had medium to high education, and urbanization was nearly evenly split between towns/suburbs (36.9%) and rural areas (35.9%), with fewer living in cities (27.1%). The majority were employed, and sampling was primarily conducted in summer and autumn. The number of mycotoxin co-exposures in the Portuguese population ranged from 0 to 5, with two simultaneous exposures being most common (n = 160). Among the 40 mycotoxins analysed, deoxynivalenol and tenuazonic acid were most frequently detected, with frequency of detection of 85% and 96%, respectively.

This study offers robust biomonitoring data on mycotoxin exposure in Portuguese young adults using a validated LC-MS/MS method. The high prevalence of deoxynivalenol and tenuazonic acid suggests low-level dietary contamination. These findings support the need for continued monitoring and the integration of

human biomonitoring into national food safety strategies. Detailed sociodemographic analyses are planned to further clarify exposure patterns and enable targeted public health interventions.

Acknowledgements

The INSEF-ExpoQuim study is supported under the HBM4EU project that is co-funded by the European Union's research and innovation programme Horizon 2020 under grant agreement No. 733032 and by the participating countries through the participating organizations. Thanks are also due to FCT/MCTES through national funds: CESAM UID/50017/2025 (doi.org/10.54499/UID/50017/2025) and LA/P/0094/2020 (doi.org/10.54499/LA/P/0094/2020); ToxOmics UIDB/00009/2020; and CHRC UIDP/00009/2020, UIDP/04923/2020, UIDB/04923/2020. Elias Maris is supported by an iBOF project from Flanders (grant number 01IB1320). A Chen is supported by an FWO (Research Foundation - Flanders), PhD Fellowship fundamental research (11A0725N). Roger Pero-Gascon is supported by an FWO Junior postdoctoral fellowship (12D4423N). Marthe De Boevre is supported by the European Research Council (ERC) under the European Union's Horizon 2020 research and innovation program (grant agreement No 946192, HUMYCO).