Exposure of Portuguese population to mycotoxins: the contribution of human biomonitoring studies

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Mycotoxins are secondary metabolites produced by fungi that occurs widely in food commodities, and are known to potentially cause toxicity and carcinogenic outcomes to humans. Therefore, it is crucial to assess the population exposure to mycotoxins. Biomarker-driven research appeared as a promising method to assess the mycotoxin exposure in humans. To date, in Portugal, there is a lack of human studies to assess biomarker of exposure to mycotoxins.

In the Scope of National Food, Nutrition, and Physical Activity Survey of the Portuguese General Population (2015-2016), a cross-sectional study was developed based on a convenience sample of 94 participants. Participants were from both genders, aged 18-84 years, from north and center regions of Portugal, and collected 24h urine samples. Analytical determination of mycotoxins urinary biomarkers (n = 40) was performed by liquid chromatography coupled to a mass spectrometer detector.

Preliminary results showed that exposure of Portuguese population to mycotoxins is a reality. Until now, results revealed the presence of seven mycotoxins and metabolites in 10% to 76% of analyzed samples. Considering the 24h-urinary volume, mean dietary excretion of deoxynivalenol (DON) and zearalenone (ZEN) was 35.8 and 1.9 μg/day, respectively. Regarding DON, results showed a good correlation between excreted biomarkers: DON-DON3GlcA (r = 0.7322) and DON-DON15GlcA (r = 0.7538), confirming the adequacy of these biomarkers. Further analysis regarding the excretion of other mycotoxins are still in course.

This biomonitoring study generate, for the first time, reliable data regarding the exposure of Portuguese population to mycotoxins. These data are crucial to perform a more realistic risk assessment, contribute to the knowledge of determinants of this exposure and provides evidence-based data to support the revision of legislative limits concerning the occurrence of mycotoxins in food.

Key messages:

- Portuguese population is exposed to mycotoxins, chemical food contaminants that may be harmful (carcinogenic, immunotoxic, mutagenic, teratogenic, hepatotoxic) for human health.
- Human biomonitoring studies provide realistic data on internal exposure at individual level, allowing a more accurate knowledge of the determinants of exposure to these contaminants.