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Risk assessment of exposure to multiple mycotoxins in the Icelandic population

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Background:
The proliferation of mycotoxin-producing fungi in agricultural settings poses a challenge for human health and nutrition around the world. Mycotoxins contaminate food sources and their negative health outcomes include carcinogenic, nephrotoxic and teratogenic effects. Potential risks are still poorly characterized and few studies assess exposure at an individual level. Thus, the goal of this study was to assess and characterize exposure risk to multiple mycotoxins in the Icelandic population.
Methods:
Urine samples and data on urinary mycotoxins' biomarkers (deoxynivalenol, zearalenone and ochratoxin A) from a pool of 171 individuals living in Iceland between 2020 and 2021 were used to estimate external doses through reverse dosimetry. For risk characterization, Hazard Quotient (HQ) and Margin of Exposure (MoE) approaches were applied for deoxynivalenol and zearalenone, and ochratoxin A, respectively.
Results:
The Icelandic population was revealed to be exposed to multiple mycotoxins. Mean levels of deoxynivalenol and ochratoxin A were comparable to what have been reported in other European studies, while levels of zearalenone were considerably lower. Nevertheless, risk assessment revealed safe levels of exposure to deoxynivalenol and zearalenone ($HQ < 1$) but MoE based on a neoplastic endpoint to ochratoxin A indicated a possible health concern for all participants ($MoE < 10000$).
Conclusions:
Although there are some uncertainties associated with a human biomonitoring approach, the results of this study confirm that mycotoxins are a growing threat to public health

in the European continent. Since countries with different latitudes already present comparable levels of exposure, this is especially concerning in a climate change scenario. Further studies both on exposure assessment and specific effects on human health are required to accurately assess risk and introduce preventive measures.

Key messages:

- The human exposome of the Icelandic population includes a mixture of mycotoxins.
- Risk assessment shows that mycotoxins pose a growing public health challenge in the European continent.