

Exposure assessment to mycotoxins in a Portuguese fresh bread dough company by analysis of dust and urine samples

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Occupational exposure to mycotoxins can occur in many and different work environments. Critical workplaces for mycotoxins appearance have already been studied and nowadays it is possible to conclude that exposure to mycotoxins occurs essentially by inhalation due to their presence in dust (Viegas et al., 2015).

STUDY DESIGN

This study aimed to assess occupational co-exposure to mycotoxins in a fresh bread dough company located in Lisbon, Portugal. Occupational exposure assessment to mycotoxins was done with a LC-MS/MS urinary multi-biomarker approach following a dilute-and-shoot sample preparation after centrifugation of thawed samples (Gerding et al., 2014). Twenty-one workers and nineteen controls participated in the study. Additionally, a settled dust sample from the company was also analyzed by a LC-MS/MS system.



RESULTS

- ✓ **Workers urine samples** showed quantifiable results for deoxynivalenol-glucoside (LOQ= 4.14 ng/mL; 43% of the samples) and Aflatoxin M1 (LOQ=0.38 ng/mL; 10% of the samples).
- ✓ In the **control group**, only CIT (LOQ= 2 ng/mL) presented one sample with a quantifiable result.
- ✓ In the **settled dust sample**, the mycotoxins and metabolites found were: Deoxynivalenol-3-glucoside, deoxynivalenol, zearalenone, monoacetoxyscirpenol, ochratoxin A and mycophenolic acid. **DON was clearly the mycotoxin highly measured in the settled dust sample (58.2 ng/g).**



CONCLUSIONS

- ✓ Workers exposure is probably due to the **raw materials contamination** and their manual handling during the work routine in the company.
- ✓ Workers and controls are **exposed to several mycotoxins simultaneously** and workers might have a **higher exposure to airborne DON** due to the flour dust contamination.
- ✓ Risk management measures should be applied to prevent exposure and occupational health surveillance programs should be implemented.



References

- Gerding J, Cramer B, Humpf H-U (2014) Determination of mycotoxin exposure in Germany using an LC-MS/MS multibiomarker approach. *Mol Nutr Food Res* 58(12):2358–2368. <https://doi.org/10.1002/mnfr.201400406>.
- Viegas S, Veiga L, Almeida A, dos Santos M, Carolino E, Viegas C. (2015) Occupational Exposure to Aflatoxin B1 in a Portuguese Poultry Slaughterhouse. *Ann Occup Hyg*. doi: 10.1093/annhyg/mev077.

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