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Introduction

Contrary to fungi, exposure to mycotoxins is not usually identified as a risk factor present in occupational settings. This is probably due to the inexistence of limits regarding concentration of airborne mycotoxins, and also due to the fact that these compounds are rarely monitored in occupational environments (Degen et al., 2011). Despite the optimal conditions for fungal growth and, consequently, for mycotoxins production in all the waste management chain, only a few articles were dedicated to study occupational exposure to mycotoxins in this occupational setting (Mayer et al., 2012; Viegas et al., 2014).

Aim of Study

A study was developed in Portugal aiming to assess occupational co-exposure to mycotoxins in the waste management setting.

Materials and Methods

First, it was performed an environmental fungal contamination study in the waste management company. Air samples of 250L were collected through an impaction method during a work day. Surface samples, taken at the same time, were collected by the swabbing method. All the collected samples were incubated at 27°C for 5 to 7 days.

Occupational exposure assessment to mycotoxins started by measuring Aflatoxin B₁ (AFB₁) in workers serum by enzyme-linked immunosorbent assay (ELISA). Forty-one workers from the waste company were enrolled. A control group (n = 30) was also considered in order to know the AFB₁ background levels for the Portuguese population.



Fig. 1 - Equipment used for air samples collection



Fig. 2 – ELISA equipment

Results and Discussion

All the workers showed detectable levels of AFB₁ with values ranging from 2.5 ng/ml to 25.9 ng/ml with a median value of 9.9 ± 5.4 ng/ml. All of the controls showed values below the limit of detection (LOD=1 ng/ml).

Table 1. Aflatoxin B1 results (ng/ml)

	Female (median; range)	Male (median; range)
Workers (n=41)	9.7; 5.8 – 25.9	9.9; 2.5 – 22.7
Controls (n=30)	<LOD	<LOD

Besides *A. flavus* complex were found other toxigenic fungi: *A. niger* complex and *A. fumigatus* complex. Therefore, we have to consider that probably there is a co-exposure to several mycotoxins.

Considering this possibility of co-exposure, it must be ponder the additive effect reported in several studies due to the interaction between mycotoxins and the significant risk that represents to human health (Speijers & Speijers, 2004).

Conclusions and Future Actions

The results showed occupational exposure to AFB₁ and the presence of fungal species that are known as producers of several mycotoxins. Besides aflatoxins co-exposure can occur to ochratoxins and fumunosins.

In the near future it will be measured ochratoxin A in the same serum samples.

References

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