

How biomonitoring helped to evidence this.

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Introduction

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). Aflatoxin B1 (AFB1) is the most prevalent aflatoxin and is associated with carcinogenicity, teratogenicity, genotoxicity and immunotoxicity (IARC, 2013). Although dietary exposure to AFB1 has been extensively documented, only a small number of studies examined exposure in occupational settings.

Aim of Study

A study was developed aiming to know exposure to AFB1 in four occupational settings: poultry and swine production, poultry slaughterhouse, and waste management.

Materials and Methods

A biomarker of internal dose that measures AFB1 in serum was used. For AFB1 quantification, the RIDASCREEN Aflatoxin B1 30/15 enzyme-linked immunosorbent assay (ELISA; R Biopharm) was used, and was calibrated with aflatoxin standards from 1 to 50 ng/ml. 114 workers were enrolled on the study:

- ✓ 34 from poultry farms
- ✓ 30 from poultry slaughterhouses
- ✓ 11 from swine production farms
- ✓ 40 from waste management industry.

A control group (n = 30) was also considered in order to know the AFB1 background levels for the Portuguese population.

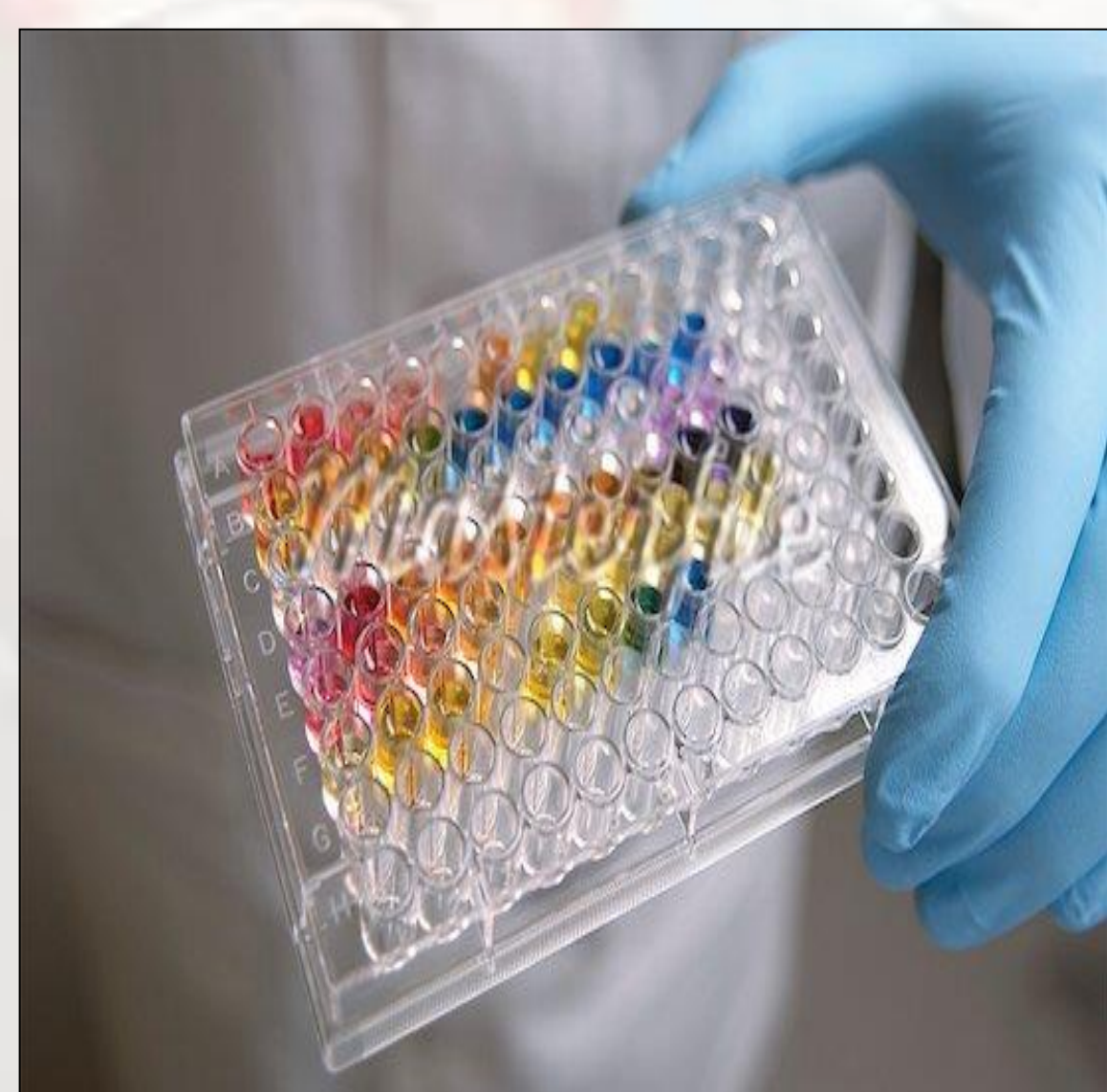


Fig. 1 – ELISA equipment and consumables

Results and Discussion

Exposure occurs in all the occupational settings with higher results in waste management. In the control group, the AFB1 values were all below 1 ng/ml (LOD).

Table 1. Aflatoxin B1 results in workers group (ng/ml)

	Poultry	Slaught.	Swine	Waste
Workers with results >LOD	18 (58.6%)	14 (47%)	6 (54.5%)	40 (100%)
Range/Median	< LOD to 4.23/1.36	<LOD to 4.03/1.73	< LOD to 8.9 /1.1	2.5 to 25.9/9.75

The most adequate measure to avoid exposure is the control of mycotoxins presence in the materials that are handled. However it can be a real challenge to restrain this contamination.

In these settings particles exposure is probably acting as a carrier of AFB1 to the workers breathing zone and mouth (Autrup et al., 1993; Brera et al., 2002; Viegas et al., 2013). Preventing exposure to particles will contribute to reduce exposure to AFB1 (Viegas et al., 2014). Local exhaust ventilation and the use of respiratory protection are the most suitable protection measures.

Conclusions

Data showed that occupational exposure to AFB1 occurs in all these settings with the waste management being the most problematic. Besides a food contaminant, the use of a biomarker allowed to recognize AFB1 also as an occupational risk factor.

References

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