

Biological monitoring of aflatoxin (AFB₁) in workers of swine and poultry production

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Introduction

Aflatoxin B₁ (AFB₁) is one of the most deeply studied mycotoxins and belongs to the group of toxins produced by the genus *Aspergillus* (*A. flavus*, *A. parasiticus*, *A. nomius*).

AFB₁ has been classified as a human carcinogen (hepatocellular carcinoma) by the International Agency for Research on Cancer with a sufficient evidence in humans and a strong support that main mechanism is genotoxicity.¹

Although many literature exists concerning the ingestion of food contaminated with aflatoxin, there are still few studies regarding mycotoxin inhalation in occupational settings.

Since mycotoxins are relatively non-volatile, exposure by inhalation is caused by airborne fungal particulates or fungi-contaminated substrates that contain aflatoxin.²

Aim of the Study

To determine occupational exposure to aflatoxin in Portuguese poultry and swine production.



Materials and methods

- ✓ Study was carried out in 7 poultry and 7 swine farms located at the district of Lisbon.
- ✓ A total of 19 workers (11 swine; 8 poultry) and 30 controls (administratives) provided blood samples. All subjects were protocol informed and signed a consent form.
- ✓ Measurement of AFB₁ was performed by ELISA (R-Biopharm).
- ✓ Serum samples were treated with pronase (Merck), wash in a Column C18 and purification was made with immunoaffinity columns (R.biopharma), specific for AFB₁.
- ✓ The assay was calibrated with aflatoxin standards ranging from 1 to 50 ng/ml.
- ✓ It was applied statistical test (Mann-Whitney) to verify statistical difference in AFB₁ results between the two settings.

References

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Results and Discussion

- ✓ **Poultry: <1-3.67 ng/ml/ Swine:< 1-5.96 ng/ml.**
- ✓ **Controls:<1 ng/ml.**
- ✓ Wasn't found statistical difference between the two settings.
- ✓ Results reveal a tendency for poultry workers have higher aflatoxin values - poultry activities are related with higher exposure to particles.³
- ✓ Particles presence probably promotes exposure by inhalation: Brera and colleagues (2002) found aflatoxin in airborne dust.⁴
- ✓ Only women's in both settings have results <1ng/ml - probably due to differences in the activities: men develop tasks with higher dust exposure and physical effort that lead to higher inhalation rates.
- ✓ Inhalation should be considered a route of exposure in both settings - experimental and epidemiological evidences to suggest that the lung is, besides liver, a target for AFB₁.^{5,6,7}
- ✓ Biomarker data obtained give accurate about exposure - allows a focus on the body burden or the total absorbed dose.⁸

Conclusions

Results obtained suggest that exposure to AFB₁ by inhalation occurs and represents an additional risk in both occupational settings that must be recognized, assessed and prevented.

