

ESCOLA SUPERIOR DE
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HORSE STABLE ENVIRONMENT

WHAT TO EXPECT REGARDING FUNGI AND PARTICLES OCCUPATIONAL EXPOSURE?

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BACKGROUND

- Bacterial, fungal spores and floor material are the main constituents of respirable dust in stables.

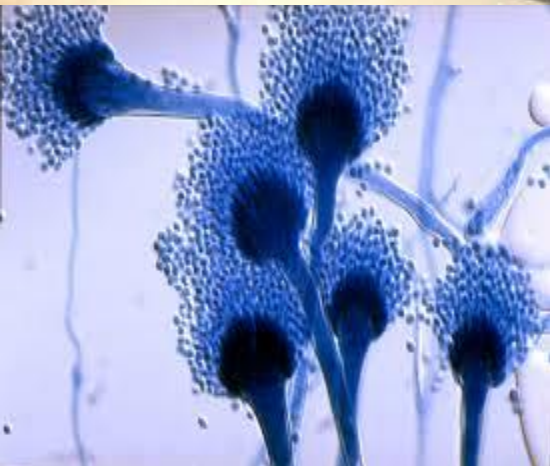
(Elfman et al., 2009).

- Fungi are easily accumulated and aerosolized, acting as indoor air biocontaminants especially in densely horse-populated environments.

(Robison et al., 1996).

- Other risk factors that can be present besides fungi (Gallagher et al., 2007):

- Dust
- Mycotoxins
- Endotoxins.

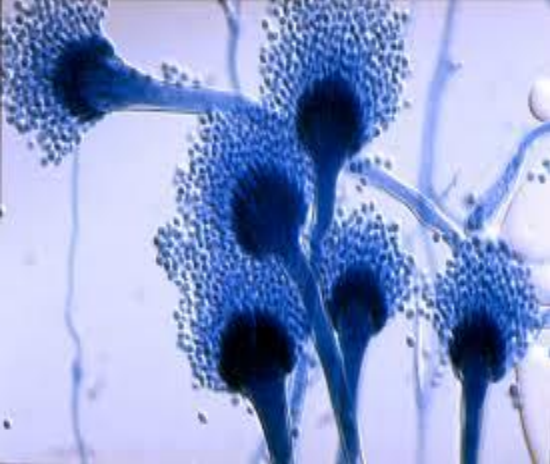


BACKGROUND

Particles have been reported as a good carrier for mycotoxins and endotoxins, promoting exposure to these metabolites.

(Allermann et al., 2000; Viegas et al., 2013a,b)

This study intends to characterize the horse stable environment and to recognize fungi and particles occupational exposure.

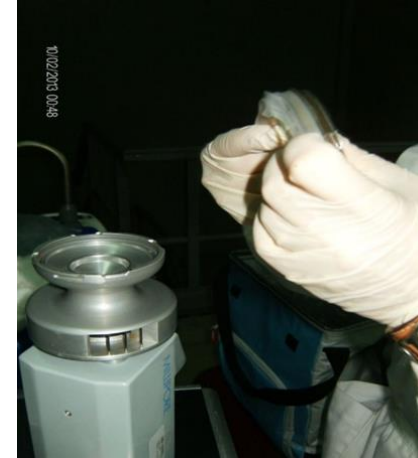




MATERIALS AND METHODS

Fungal contamination

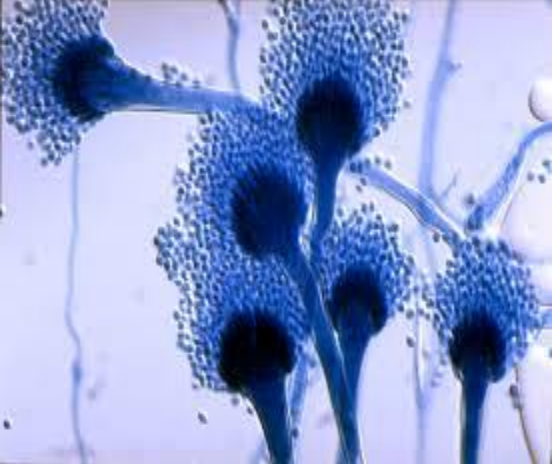
- Air samples of 50L
- Impaction method
- Surfaces samples



- All the collected samples were incubated at 27°C for 5 to 7 days.

Particles assessment

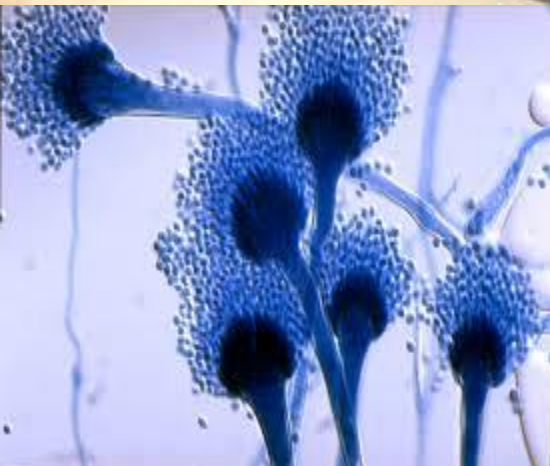
- Developed in the paper



RESULTS

Fungal load

- Air results from indoor spaces ranged from 0 to 100 CFU/m³.
- Surfaces present higher load than the air with results that ranged from 2x10⁴ to 3x10⁴ CFU/m².



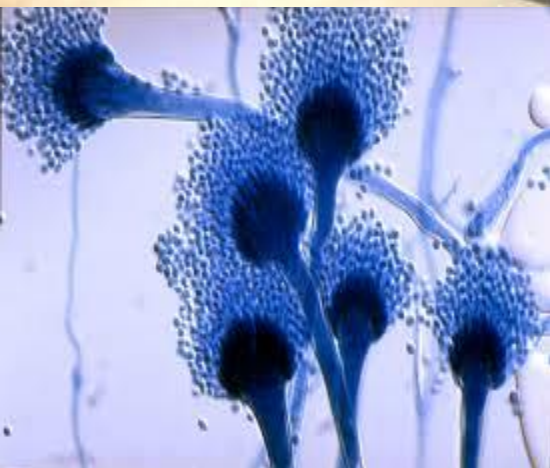
RESULTS

Fungal load

- Round pen was the sampling site with the highest fungal load in air



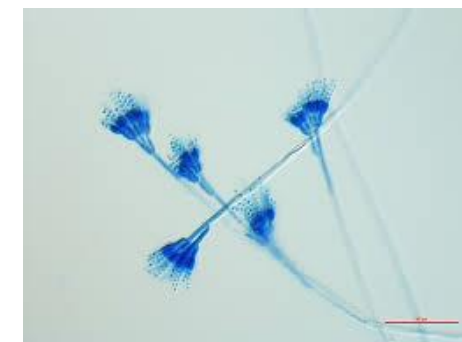
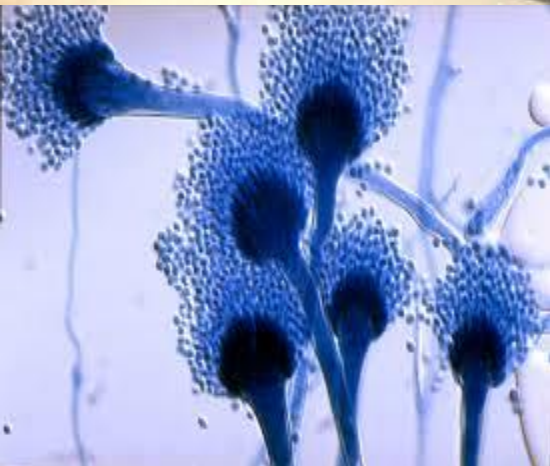
- Closed box during litter changing and feed warehouse has the highest fungal load in surfaces samples.



RESULTS

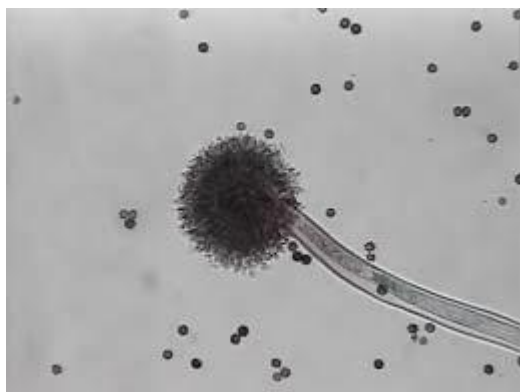
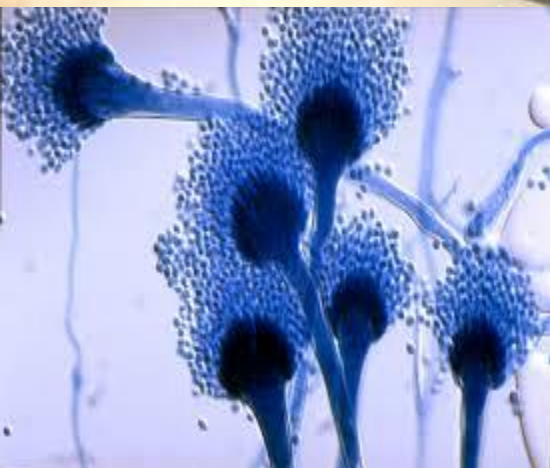
Fungal identification

- *Penicillium* sp. impossible to count in air in closed box when brushing a horse and
- Rhizopus* sp. impossible to count in air and surface samples in closed box during litter changing.



RESULTS

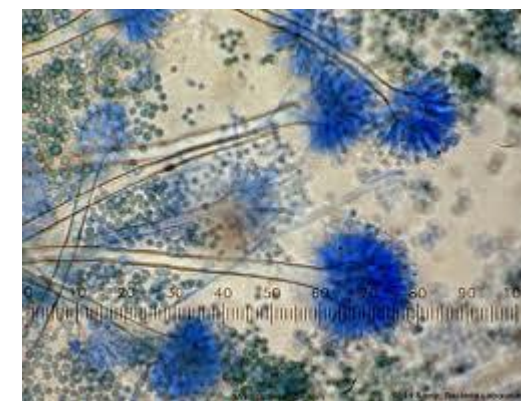
- ***Aspergillus* genus presents the highest prevalence in air (53.8%) and surfaces (87.5%).**
- *A. niger* complex and *A. fumigatus* complex were the most prevalent fungi in air and surfaces sampling, but *A. flavus* complex was also isolated in air and *A. versicolor* in surfaces.



A. niger complex



A. flavus complex

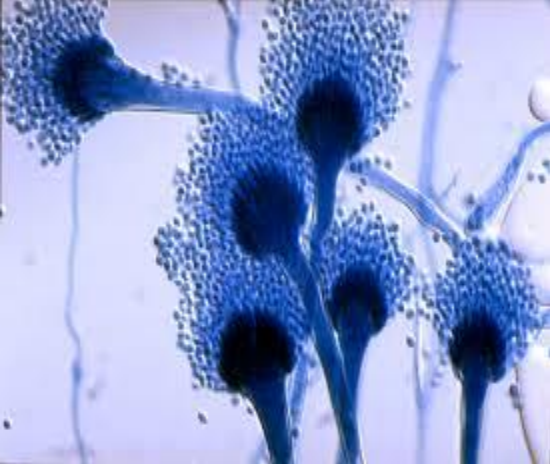


A. versicolor complex

DISCUSSION

- None of the sampling sites surpass the WHO value (150 CFU/m³)
- 3 from the 6 sampling sites presented higher fungal load than outdoor sample
- Identification of the species from *A. flavus* and *A. fumigatus* complexes requires implementation of corrective measures.

(AIHA, 1996)



DISCUSSION

- Some of the strains from the species found are also known for their toxigenic potential, including species from *Penicillium* genus, and species from *A. fumigatus*, *A. niger*, *A. flavus* and *A. versicolor* complexes.
- The same complexes belonging to *Aspergillus* genera were found in other assessed settings: swine, poultry, waste water treatment plants, waste sorting, incineration.

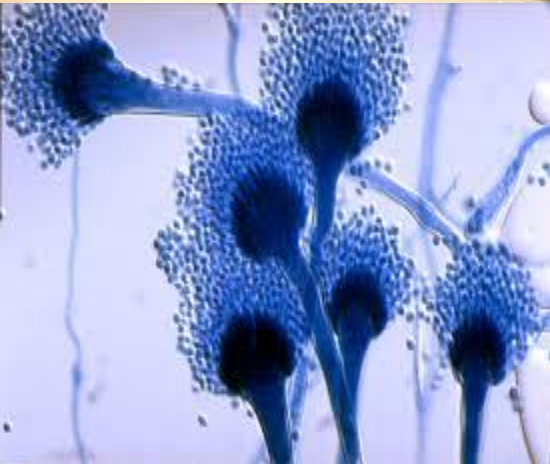
Ann. Occup. Hyg., 2014, 1–9
doi:10.1093/annhyg/meu082


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Worker Health Protection



Assessment of Workers' Exposure to Aflatoxin B1 in a Portuguese Waste Industry

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Elisabete Carolino¹ and Carla Viegas¹



DISCUSSION

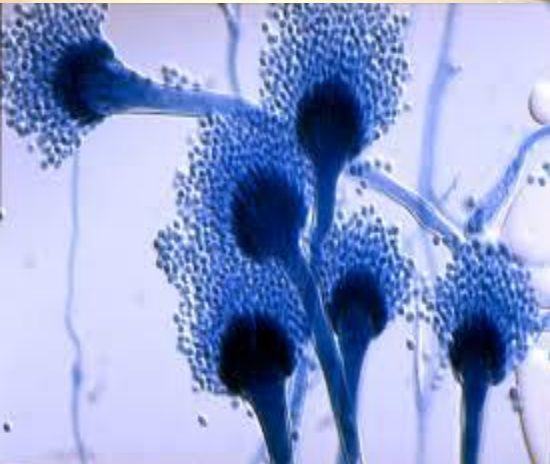
We must potentially consider simultaneous exposure to several mycotoxins.

(Thrane et al., 2004).

More critical when we are facing settings prone in dust since mycotoxins can be transported to workers respiratory system through particles.

(Allermann et al., 2000; Viegas et al., 2013).

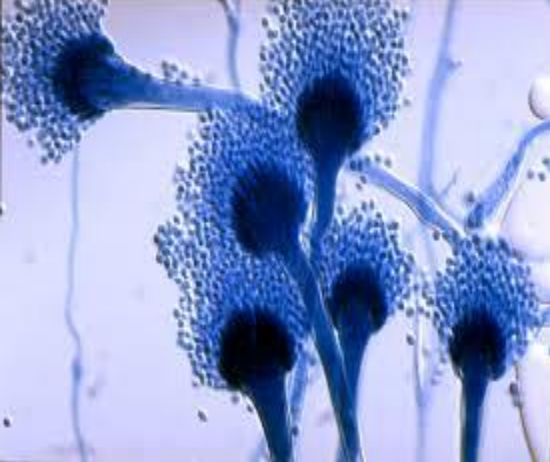
Results point out to the need for applying adequate preventive and protective measures.



ON GOING AND FUTURE RESEARCH WORK

- Apply molecular biology methods to assess pathogenic and toxigenic strains from fungi genera already identified
- Identify the prevalence rate of pulmonary airway disturbances in exposed workers
- Assessment of occupational exposure to AFB1 and OTA through biomarkers of internal dose.

Research Group Environment & Health



MOST IMPORTANT REFERENCES

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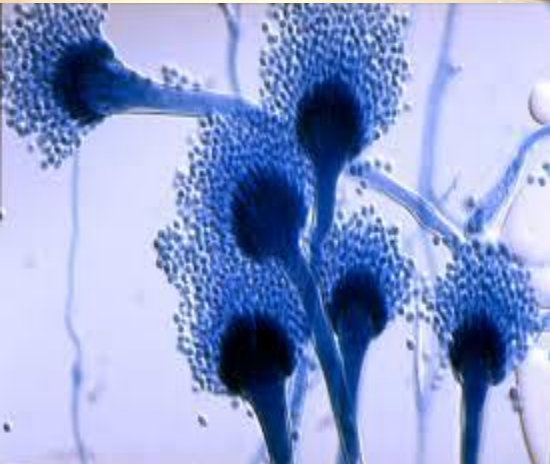
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Thank you for your kind attention