



Instituto Politécnico de Lisboo



Complementarity of conventional and molecular methods in the assessment of fungal contamination caused by *Aspergillus fumigatus* complex in one Portuguese composting plant

Viegas C¹, Quintal Gomes A^{1,2}, Sabino R^{1,3}

1Environmental Health RG - Lisbon School of Health Technology - Polytechnique Institute of Lisbon; 2 Institute of Molecular Medicine, Faculty of Medicine of Lisbon; 3 Micology Laboratory – Instituto Nacional de Saúde Dr. Ricardo Jorge For further information please contact: carla.viegas@estesl.ipl.pt

Introduction

The handling of waste and compost that occurs frequently in composting plants (compost turning, shredding, and screening) has been shown to be responsible for the release of dust and airborne microorganisms and their compounds in the air ¹. Thermophilic fungi, such as *A. fumigatus*, have been reported ¹

and this kind of contamination in composting facilities has

Results and discussion

CONVENTIONAL METHODS

 Nine different species of filamentous fungi were identified in air samples with a total of 982 isolates.

been associated with increased respiratory symptoms among

compost workers ².

Aim of the study

This study intended to characterize fungal contamination in a totally indoor composting plant located in Portugal. Besides conventional methods, molecular biology was also applied to overcome eventual limitations.

Materials and Methods

Air and surfaces samples were collected through impaction and swab methods, respectively. The analyzed places inside this plant were: Maturation park, Waste screw, Maintenance workshop, Room process control, Pre-treatment and

Centrifugues.



- Aspergillus genus showed the highest prevalence (90.6%) of isolates.
- The complexes Nigri (32.6%), Fumigati (26.5%) and Flavi

(16.3%) were the most prevalent fungi.



SURFACES

- Four different species were isolated in surfaces samples with a total of 1810000 isolates.
- Aspergillus genus also showed the highest prevalence (60.8%).
- Mucor sp. (39.2%), and the Aspergillus complexes Nigri (30.9%) and Fumigati (28.7%) were the most frequently found.



For molecular analysis, air of 250L samples were also collected from the same sampling the sites using Molecular method. impinger Aspergillus detection of *fumigatus*-complex was achieved by Real Time PCR (RT-

Fig. 1 - Equipment used for air samplescollectiontoapplymolecularmethodologies

PCR).

References

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4 Bellanger A, Reboux G, Murat J, Bex V, Millon L. 2010. Detection of Aspergillus fumigatus by quantitative polymerase chain reaction in air samples impacted on low-melt agar. Am.J. Infect. Control. 38: 195 - 198.

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Table 1 – Conventional and molecular detection and quantification of isolates belonging to *A. fumigatus* complex in the composting plant

Sampling sites	Air (CFU/m ³)*	Surfaces (CFU/m ²)*	Real Time PCR (Ct – Cycle treshold)
Maturation park		30000	+ (29.67)
Waste screw	60	· · ·	+ (34.97)
Maintenance workshop	-	-	+ (37.07)
Room process control		10000	+ (33.02)
Pre-treatment	160		+ (32.56)
Centrifuges	20	300000	+ (37.41)

* Total of colonies count

+ Detected

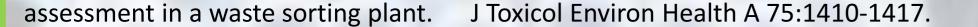
settings.

- Not detected

Results corroborated complementarity of conventional and molecular methodologies³, as in others studies already reported ⁴⁻⁶.

Conclusions

The resultsobtainedhighlighttheneedtoapplyconventionalandmolecularmethodstoassess



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occupational fungal exposure in highly contaminated