Exposure to fungi in cork: Potential occupational hazard

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Introduction

Cork is a light, porous, impermeable material extracted from the bark of some trees. The most widely used cork is obtained from the cork tree (*Quercus suber*). It is estimated that the area occupied by cork oaks in the Iberian Peninsula is around 33% in Portugal and 23% in Spain [1]. Portugal is the largest cork producing country in the world, followed by Spain, and its industry is an important economical resource [2].The processes used in the manufacture of cork depend on the end product to be obtained, being the production of stoppers for wine bottles the main application. Most of the cork is stored under dark humid and moldy conditions. During the manufacturing process, workers are exposed to an environment that is heavily contaminated with cork dust [3]. Due to this repeated exposure to moldy cork dust, cork workers are at risk for developing occupational lung diseases such as occupational asthma and Suberosis.

Aim

Given the importance of this occupational setting in Portugal, the aim of this review study is to assessing occupational exposure to fungi in cork industry and potential health effects.

Prevalent Species

In the analyzed scientific papers it was possible to verify that there are two fungal species frequently cited as the most prevalent in the cork and associated with Suberosis and Occupational Asthma.

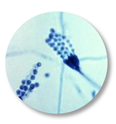
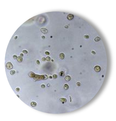
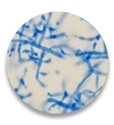
Other studies	Fungi species			
	Penicillium glabrum (*Penicilliium frequentans*) 	*Crysonilia sitophila* 	*Thricoderma longibrachiatum* 	Other species
Wink et al, 2001	✓			
Alegre et al, 2000	✓			
Wink et al, 2004	✓	✓	✓	
Wink et al, 2002	✓			
Wink et al, 2003	✓	✓		
Wink et al, 2003	✓	✓		
Morrel et al, 2003	✓			✓
Villar et al, 2009	✓			✓
Deschamps et al, 2003	✓			
Morais et al, 2004	✓			

Table 1: The most referred spicies on moldy cork dust.

Health Effects

The studied articles refer two major diseases associated with this occupational setting, **occupational asthma and Suberosis.**

Occupational asthma is a disease whose origin is related to the exposure to a particular factor in a workplace. Recent studies have identified *Chrysonilia sitophila* as a cause for this occupational disease in the cork and logging industry [4, 5]. This fungi is a common mould found in cork samples analyzed [6].

Suberosis is the term applied to hypersensitivity pneumonitis due to cork dust inhalation [3], is considered as occupational disease . This hypersensitivity pneumonitis form is caused by inhalation of *Penicillium glabrum* that contaminates cork during its industrial processing [7]. This fungi is consider the triggered factor for the immunological response associated to this occupational disease [6].

The most frequent methods used to identify these fungal species in the workers body are specific skin tests and identification of the specific antibodies [3, 4, 5].

Conclusion

A specific knowledge about occupational exposure to fungi in the cork industry is the key to better understand the related diseases and to define preventive measures. According to some studies there are preventive measures that can be adopted in order to reduce workers fungi exposure during the labor period, emphasizing the workplace frequent cleaning and located ventilation in certain tasks [8].

Considering that there are few studies on this matter, and the importance of this occupational setting in Portugal, is essential to realize more studies and subsequent regulation of fungal exposure in this field.

Taking into account that fungal exposure is associated with inhalation of aerosolized particles will be relevant in future studies evaluate the combined exposure of fungi, particles, and also their metabolites.

References

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