

New approach to study the real exposure to fungi in cork industry: nasal swabs mycobiota investigation coupled with screening on fungal resistance to azoles

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Introduction

The permanent contact with cork may lead to constant exposure to fungi, raising awareness as a potential occupational hazard in the cork industry [1].

The presence of fungi belonging to the *Penicillium glabrum* complex has been associated with the development of respiratory diseases such as suberosis, one of the most prevalent diseases among workers from cork industries, besides occupational asthma [2,3]. Azoles are used as pesticides but also the first line therapy in the treatment of *Aspergillus* infections; azole-resistance as been described as to have also an environmental source and is considered an emerging public health problem.

Aim of Study

The aim of this work was to characterize fungal distribution and to evaluate the presence of azole-resistant *Aspergillus* isolates in nose swab samples from the cork industry workers.

Methods

Nose swab samples were collected from 305 workers of two cork industries. The introduction of the swab for biological collection was done along the septum to 2.5 cm from the external orifice (up to "feel " a slight resistance) and rotated several times before removing it .

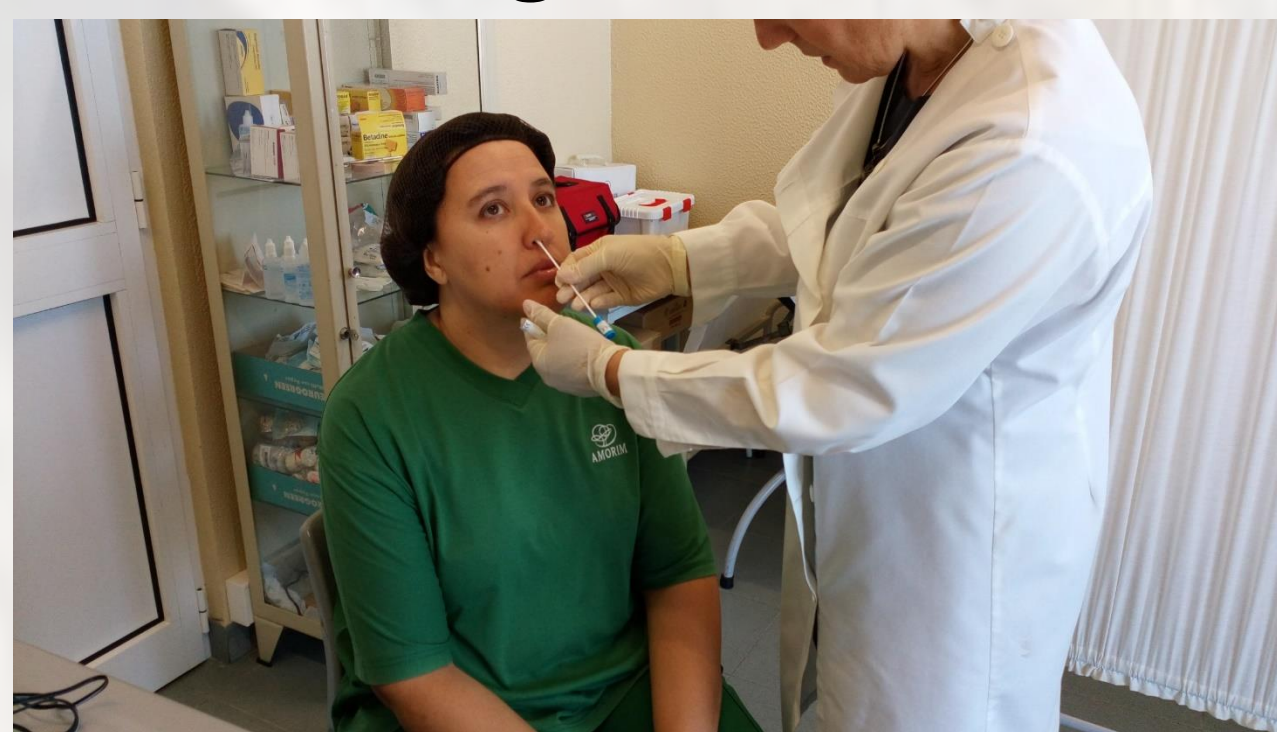


Figure 1 – Nose swab samples

Samples were plated onto malt extract agar (MEA) media (for morphological identification of the present mycobiota) and also onto azole-resistant screening media of Itraconazol and Voriconazol (to detect resistant *Aspergillus* isolates). Plates were incubated at 27°C during 5 to 7 days.

Conclusions

This approach allowed knowing the real contact with fungi of the cork industry workers. Additionally, it was possible to obtain detailed data regarding the fungal mycobiota in order to allow a more accurate risk assessment. Ongoing studies in this setting are being performed aiming to assess possible health implications related to fungal exposure and to identify some of the measures that can be in place to reduce work environmental contamination and workers exposure.

References

- [1] Serra R, Peterson S, Venâncio A. Multilocus sequence identification of *Penicillium* species in cork bark during plank preparation for the manufacture of stoppers. *Res Mycobiol* 2008;159:178-86. doi: 10.1016/j.resmic.2007.12.009
- [2] Basílio M, Gaspar R, Pereira C, Romão M. *Penicillium glabrum* cork colonising isolates-preliminar analysis of their genomic similarity. *Rev Iberoam Micol* 2006;23:151-4. PMID: 17196021
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Results

- Fungal contamination was evident in 267 from the 305 samples collected (87.5%).
- From 267 contaminated samples, 109 presented countless units of *Chrysonilia sytrophila* (40.8%) besides other fungal isolates.
- In Figure 2 is possible to observe that the most prevalent genus found was *Penicillium* sp. (73.6%), followed by *Cladosporium* sp. (9%), *Chrysonilia* sp. (2.9%) and *Acremonium* sp. (2.6%).

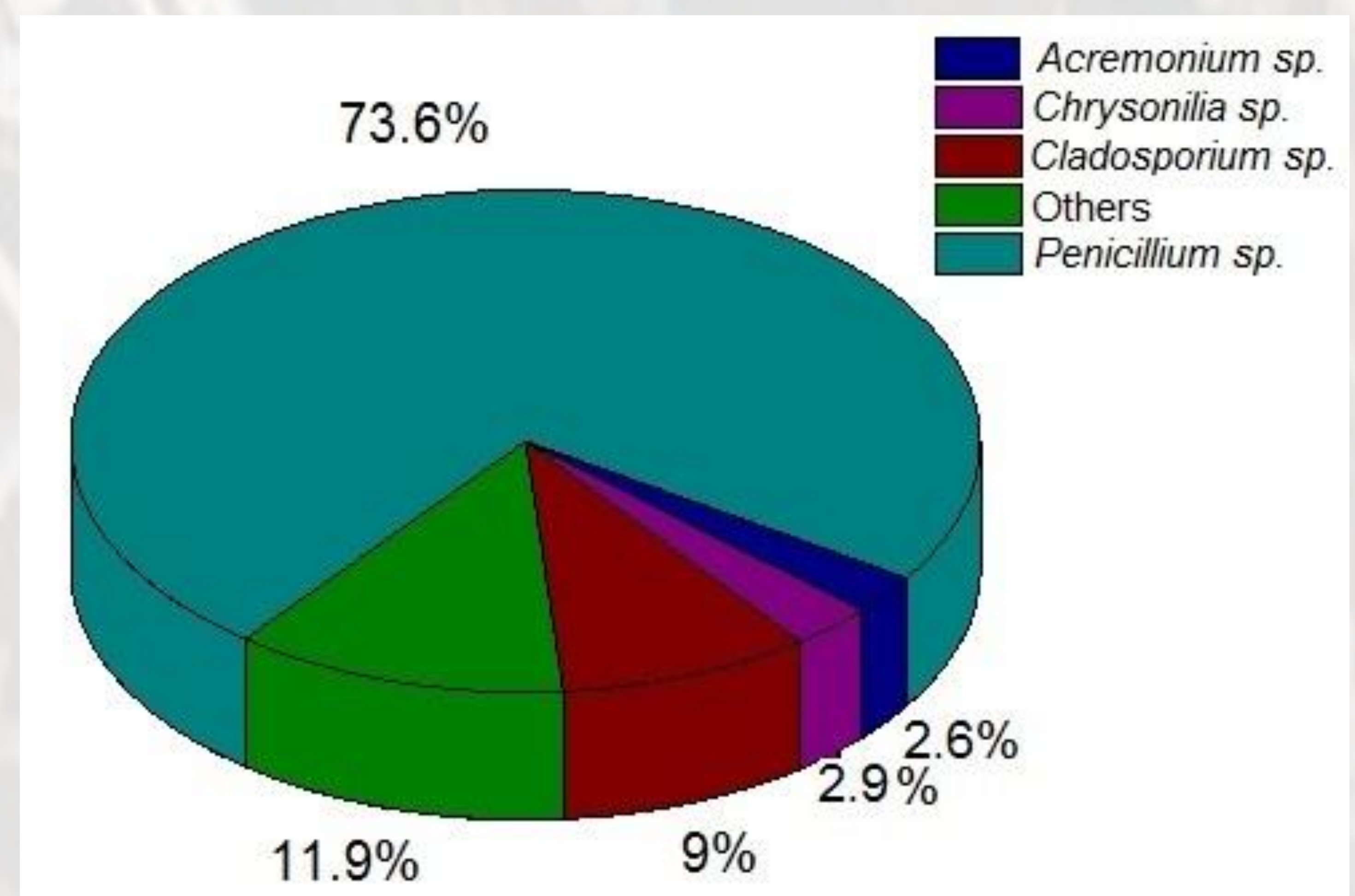


Figure 2 – Most prevalent genus found

- From the 305 samples collected 161 belong to workers from the cork yard.
- Penicillium* sp., *Cladosporium* sp., *Acremonium* sp. and *A. niger* complex were the most commonly found species in workers from the cork yard.
- Itraconazole resistant isolates of the *Aspergillus* genus were found in nose samples from two workers of the cork yard, belonging to the *Nigri* and *Fumigati* sections.