

CORRESPONDENCE

Fungal growth on wine corks—a potential source of exposure to susceptible individuals

It is recognized that alcohol can cause bronchoconstriction in susceptible asthmatics, usually because of congeners present in the beverage, rather than the alcohol itself [1]. Wheezing due to alcoholic drinks is common in asthma, affecting around 20% of patients in an out-patient asthma population, the most common drink reported to cause worsening symptoms being red wine [2]. As wine corks are sometimes seen to have considerable fungal growth when the lead is removed from the bottle we decided to culture such wine corks to determine the types of fungi commonly found in this situation.

Fourteen corks with visible fungal growth were cultured, five from bottles of white wine (two French, two from Alsace, one from Germany) and nine from bottles of red wine (eight French, one Spanish). Cork fragments were plated out on Agar and the resulting fungi were subcultured and identified. *Aspergillus* and *Penicillium* species were grown on Czapek Dox for 7 days at 25°C in the dark, being identified by their recognizable morphological characteristics.

Eighteen isolates were obtained from the 14 corks (Table 1). Thirteen (72%) of these were *Penicillium* species, eight of which were *Penicillium roquefortii*. Two *Aspergillus* species were isolated (*Aspergillus fumi-*

gatus and *Aspergillus nidulans*) and there was one isolate each of *Oidiodendron rhodogenum*, *Paecilomyces variotii* and a *Rhizopus* species. No *Cladosporium* species were isolated.

The most frequent fungal species isolated were from the genus *Penicillium*, although *Penicillium chrysogenum* (formerly named *P. notatum*) used most frequently in skin-prick test solutions, was not isolated. *Penicillium* spores are the most common indoor fungal species [3,4], although in the outdoor environment *Cladosporium* is far more prevalent [5]. In the asthmatic population, skin-test positivity to *Penicillium* is unusual, reported in 3% in one study [7] although in one series specific IgE to *Penicillium chrysogenum* was found in 45% of a selected group of patients with asthma compared with 7% of controls [3]. Recent work has shown cross-sensitivity between certain *Penicillium* species notably *P. frequentans* with *P. chrysogenum* [8]. Patients with asthma with positive skin-test sensitivity to a variety of moulds may be more likely to wheeze on drinking beer and wine and have a significantly greater reported 'sensitivity' (rash, angioneurotic oedema) to penicillin compared with those insensitive to moulds [9].

P. glabrum is the fungus in mouldy cork which causes

Table 1. Isolates obtained from 14 corks

Cork	Origin	Growth
A White wines		
1 Vin D'Alsace Table wine	Alsace	<i>Aspergillus nidulans</i>
2 Barsac (Table wine)	France	<i>Rhizopus</i> sp. <i>Penicillium roquefortii</i>
3 Dolamore Blanc de Blancs (Table wine)	France	<i>Penicillium corylophilum</i>
4 Pinot Blanc (Table wine)	Alsace	<i>Penicillium glabrum</i> <i>Penicillium corylophilum</i>
5 Gewürtztraminer (1982)	Germany	<i>Penicillium roquefortii</i>
B Red wines		
1 Rioja Federico-Patemia (1975)	Spain	<i>Penicillium roquefortii</i>
2 Chateau Citron (1976)	France	<i>Penicillium roquefortii</i>
3 Chateau Citron (1976)	France	<i>Penicillium roquefortii</i>
4 Chateau Citron (1976)	France	<i>Penicillium roquefortii</i>
5 Chateau de Gorgazand (1979)	France	<i>Penicillium corylophilum</i> <i>Aspergillus fumigatus</i>
6 Beaujolais Village Berangere (1981)	France	<i>Penicillium roquefortii</i>
7 Chateau Guirand Cotes de Beurge (1980)	France	<i>Penicillium spinulosum</i> <i>Paecilomyces variotii</i>
8 Chateau Thieuley (1982)	France	<i>Penicillium roquefortii</i>
9 Chateau de Sudre (1979)	France	<i>Oidiodendron rhodogenum</i>

suberosis in cork workers [10] either as asthma or alveolitis.

In contrast, *Aspergillus fumigatus* is a known pathogen [11] while *Aspergillus nidulans* has been reported to cause invasive disease only in the immuno-suppressed. *P. roquefortii* has the lowest requirements for oxygen for growth of all the penicillia, hence its success in ripening blue veined cheese and its ability to exploit the no doubt oxygen-depleted ecological niche of covered bottle corks [11].

It is hypothetically possible that a concentrated cloud of *Penicillium* spores delivered to a susceptible individual when uncorking a bottle with fungal growth on the cork might cause exposure to a very high concentration of allergen. Whether such high doses of fungal spores delivered to immunosuppressed individuals or to sensitized asthmatics would increase their risk of developing invasive disease or attacks of rhinorrhoea or asthma respectively, would be open to debate, but any potential risk in both these situations could be obviated by the simple precedent of cleaning the cork under running water before removal.

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