



## Investigation on Airborne Fungi in Sheep Houses

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### Abstract

Besides the well-known allergens, several other risk factors may exist for health in animals' house. The exposure to these factors may be significant in animal units especially those with poor ventilation. This study was carried out to investigate the presence of airborne fungi in sheep fences. Eight fungal species were identified from air samples after diagnostic examination. *Penicillium*, *Aspergillus*, *Alternaria* and *Fusarium* were the predominant fungal genera.

**Key words:** airborne, fungus, sheep houses.

### المستخلص

بالإضافة لمحبيات الحساسية المعروفة هناك العديد من عوامل الخطير الأخرى التي تؤثر على صحة الحيوانات داخل الحظائر. التعرض لهذه العوامل يؤثر بفاعلية خاصة في حظائر الحيوانات سببية التهوية. تم اجراء هذه الدراسة لمعرفة الفطريات الموجودة في الهواء داخل حظائر الضأن. تم عزل وتشخيص ثمانية انواع فطرية من عينات الهواء بعد عمل الاختبارات التشخيصية. البنسليلوم والرشاشيات والالترنيريا والفيوزريم هي الاكثر تواجاً.

### Introduction

Filamentous fungi represent a large group of multicellular organisms naturally occurring in soil and various organic debris. Thus, high numbers of airborne fungi, along with other microorganisms, solid particles and volatiles, are being aerosolised in animals houses contaminated with organic materials (Matković *et al.*, 2007).

Microbiological composition of air, as a factor of ambient conditions in animal facilities can significantly influence performance, health and animal welfare (Matković *et al.*, 2009). Airborne contaminants

may affect the respiratory tract including total and respiratory dust, ammonia, endotoxins, bacteria and fungi. All of these occur in high concentrations in the air of farm livestock buildings (Mulhausen *et al.*, 1987; Zejda *et al.*, 1994; Preller *et al.*, 1995 and Louhelainen, 1997). Their association with acute and chronic respiratory symptoms and changes in lung function have been suggested by several authors (Donham *et al.*, 1989 and Preller *et al.*, 1995).

Some veterinarians and feeders who were exposed to the fungal aerosol are very

easily infected with respiratory diseases. Thirteen percent veterinarians in Argentina are reported to be infected in this way (Che and Yu, 1998). The total number of 318 pathogenic fungi and 420 metabolized mycotoxins, which have been identified, would make human and animals grow slowly, immunosuppressant, organ function let down, even death of mycotoxins (Li and Cao, 1999).

The objective of this study was to investigate the airborne fungi in sheep' house environment and potential evaluation of possible risk of respiratory diseases.

### Material and Methods

The study was conducted in one building for sheep. In total 15 air samples were taken weekly, in the middle of each week at the same time (between 13:00 and 14:00 h). In each trial, four air samples were collected. One technique was applied for the airborne fungi trapping: the sedimentation method. In this method Petri dishes with the radius of 90 mm that containing 15 ml of Sabouraud dextrose agar were used. The plates were exposed in the same spaces at each trial: in the front, in the left and right side of the middle and on the end of sheep houses. The exposure time for the sedimentation plates was 10 minutes. Then the plates were incubated at  $26\pm2^{\circ}\text{C}$  for fungal growth. The fungal colonies developed were counted after 3, 5, and 7 days.

For the identification of isolates, the purified fungal cultures were transferred onto malt extract, *Czapek*. Their cultural and morphological characteristics were studied employing light microscopy. Identification up to the genus and/or species level was done by considering the rate of growth, texture and the pigmentation of cultures (Hungerford *et al.*, 1998).

### Results

Ten species belonging to eight fungal genera were isolated and identified from the sheep houses investigated as shown in Table 1

**Table 1: Numbers and frequencies of isolated fungal species**

Isolates	Number of isolates	Percent
<i>Aspergillus niger</i>	23	30.7
<i>Aspergillus flavus</i>	14	18.7
<i>Aspergillus terreus</i>	12	16
<i>Penicillium</i> spp	9	12
<i>Rhizopus</i> spp	6	8
<i>Fusarium</i> spp	4	5.3
<i>Curvularia</i> spp	3	4
<i>Rhinocladiella</i> spp	2	2.7
<i>Alternaria</i> spp	1	1.3
<i>Exserohilum</i> spp	1	1.3

### Discussion

*Aspergillus* and *Penicillium* were the most dominated airborne fungi in sheep house (Table 1), the same species were found also by Burge *et al.* (1979) and Mayeux *et al.* (1995). *Aspergillus* may have importance as an opportunistic pathogen (Morris *et al.*, 2000). Kaliste *et al.* (2002) reported that the presence of bacteria and fungi in animal air is a natural phenomenon. Their primary sources are the animals themselves (fur, epidermal material), their waste (faeces, urine), and materials used in their maintenance (feed, bedding, disinfectants). Moreover microorganisms are a constituent of solid and liquid bioaerosols. This mostly refers to saprophytes, however pathogenic microorganisms were also found in the animal houses air Atin *et al.* (2004).

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