
FUNGAL CONTAMINATION OF MILKING COWS FEED

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ABSTRACT

This paper presents the fungal contamination of milking cows feed samples in Vajdaság. 12 types of feed samples, used for feeding of milking cows throughout one research year were investigated. As it was found all feed samples (100%) in summer and spring were contaminated with fungi, 95% in autumn and winter period. The genus *Aspergillus* and *Penicillium* occurred as contaminants in all seasons and shown the highest presence of all tested fungi species. *Aspergilli* about 63% of feed samples in summer, 67% in autumn, 89% in winter and 48% in spring, *Penicillium* about 87% in summer, 61% in autumn, 72% in winter and 61% in spring were contaminated with them.

INTRODUCTION

Mycotoxins occur worldwide. They occur frequently in a variety of feedstuffs (Gareis et al., 1989; Sharma and Salunkhe, 1991; Wood, 1992; Škrinjar 2008.) and are therefore routinely consumed by dairy cattle. These typically low levels of mycotoxins are associated with sub-clinical losses in milk production, increases in disease and reduced reproductive performance. In some cases, mycotoxin concentrations in feedstuffs are high enough to be associated with severe problems including death. The majority of human health risk from mycotoxins is from consumption of contaminated grains and nuts. Several mycotoxins have been shown to occur in the milk of dairy cattle. Concentrations are extremely low because only a small fraction of the amount consumed by a cow is transferred to milk in the parent form or as a derivative (Wood and Trucksess, 1998). Contamination of forages and cereals with mycotoxins frequently occurs in the field following infections of plants with pathogenic fungi or with symbiotic endophytes (D' Mello, 2002). The possibility of contamination may continue during the processing and storage of harvested products and feed (Adamović et al., 2005; Bočarov – Stančić et al., 2005; D' Mello, 2002). A degree of fungal and mycotoxin contamination depends significantly on environmental conditions, such as moisture content/humidity and ambient temperature. Classical representatives of plant pathogenic species («field fungi») belonged to the genera *Fusarium*, *Claviceps*, *Alternaria* and some other genera from the *Hyphomycetes Dematiaceae* group, while *Aspergillus* and *Penicillium* exemplify storage organisms.

More than 200 species are classified into the genus *Aspergillus*. Many of them are harmful to humans and animals. High incidents of *Aspergillus* mycotoxins are noticed in warm and humid regions, but they often occur in temperate zones, too.

In this paper the results of the occurrence of various fungi species in feeds for milking cows feeding throughout one research year are presented.

2. MATERIAL AND METHODS

Mycological contamination of different feed samples (92) for milking cows feeding during one year in Vajdaság was examined in this work. Samples were taken from four farms throughout all seasons. Type and number of feed samples are given in Table 1.

Tab. 1. Type and number of feed samples used for feeding of milking cows throughout one research year

Type of feed	Number of feed samples			
	Summer	Autum	Winter	Spring
Hay	4	4	4	3
Dried lucerne	3	4	4	4
Concentrate	5	4	4	4
Sunflower meal	1	–	–	–
Dried corn silage	–	3	4	2
Fresh corn silage	3	–	–	2
Corn grain silage	–	–	2	3
Pelleted malt spent grains	2	3	2	1
Fresh rape leaf	–	1	–	–
Pelleted sugar beat pulp	1	3	2	4
Fresh sugar beat pulp	1	1	1	1
Fresh rape-seed leaf	–	–	–	2
Total				

2.1. Mycological investigation

Determination of total viable count of moulds per 1 g of each sample was done as well as the isolation and identification of all fungal genera. Their share in isolated mycopopulations, with toxigenic and allergic properties, was examined, too.

Total viable counts of moulds per 1g of sample was determined by standard Koch' s method. Sabouraud maltose agar (SMA) with streptomycin (0.01–0.02%) was used as an isolation medium. Incubation was carried out at 25 °C for 7 days and identification of fungal genera according to Samson and van Reenen-Hoekstra (1988).

3. RESULTS AND DISCUSSION

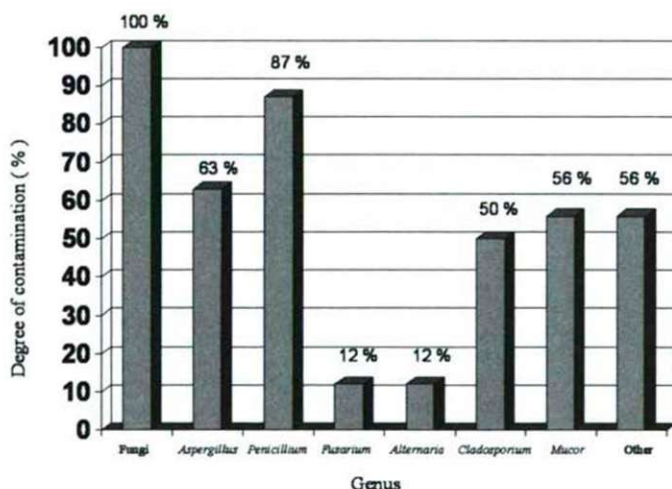


Figure 1. Contamination degree of feed samples with certain fungal genera in the summer

Summer. All of the feed samples tested in summer period were contaminated with moulds (Fig. 1) at the number ranged from 10.0 (dried corn silage) to 2.8×10^7 /g (pelleted malt spent grains). It was found that 87% of samples were contaminated with species from the genus *Penicillium*, 63% with *Aspergillus* spp., 56% *Mucor* spp., 50% *Cladosporium* spp., 12% with *Fusarium* and *Alternaria* species. About 56% of feed samples were spoiled with fungal species which belonged to the other genera.

Autumn. As it was established (Fig 2.), about 95% of feed samples (18 of 19 total examined) contained moulds at various degree (from 70.0 – pelleted sugar beet pulp to 4.0×10^5 /g – pelleted malt spent grains). The lowest contamination was observed with *Fusarium*

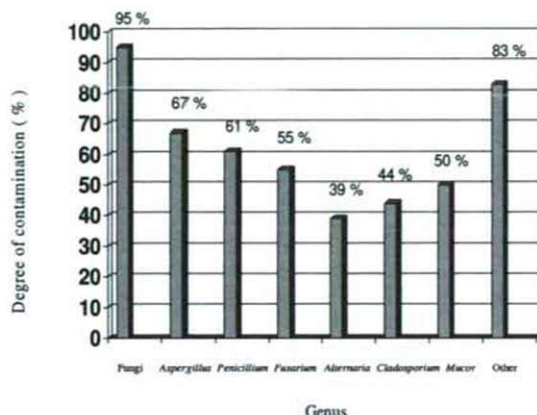


Figure 2. Contamination degree of feed samples with certain fungal genera in autumn

Winter. Total viable count of moulds in winter research period varied between 10.0 (corn grain silage) and 2.1×10^7 /g (dried corn silage). Results of fungal contamination of feeds were approximately in conformity with those determined in autumn, figure 3.

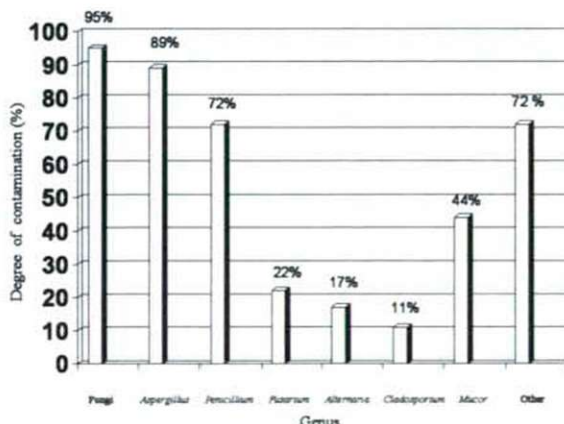


Figure 3. Contamination degree of feed samples with certain fungal genera in winter

Spring. All feed samples were contaminated with fungi again (Fig. 4). Their number varied from 20.0 (pelleted malt spent grains, fresh sugar beet pulp) to 6.1×10^5 in 1 g (dried lucerne).

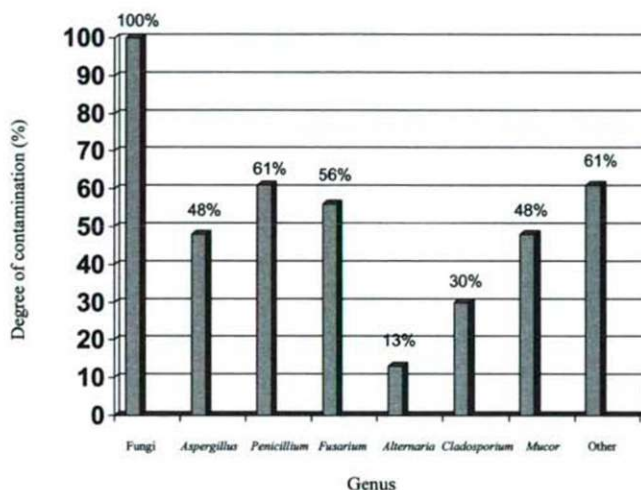


Figure 4. Contamination degree of feed samples with certain fungal genera in spring

4. CONCLUSION

All fungi species were constantly present in milking cows feeds throughout one research year. The percentage in all seasons was: 100% in the summer and in the spring, 95% in autumn and winter. The highest degree of contamination (89%) with *Aspergillus* was observed in winter period, and the lowest (11%) with *Cladosporium* also at the winter. The genus *Aspergillus* and *Penicillium* shown the highest presence of all tested fungi species. *Aspergilli*, about 63% of feed samples in summer, 67% in autumn, 89% in winter and 48% in spring, *Penicillium* about 87% in summer, 61% in autumn, 72% in winter and 61% in spring were contaminated with them.

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