

CONCENTRATION OF DIFFERENT MYCOTOXINS IN FEED AND STRAW ON 6 IRISH RACEHORSE FARMS

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Introduction

Mycotoxin contamination of feed can affect equine health and performance. This can result in reduced animal well-being and in major economic losses for the equine industry. In addition to reduce growth rates, reproductive performance and physical performance, mycotoxins also act to weaken the immune system, leading to greater susceptibility to disease and secondary infections, and consequent increases in veterinary costs [1] [2] [3] [4] [5] [6]. Historically, the principle focus for investigation into mycotoxin contamination has been on grain, yet evidence is now accumulating that roughage and even straw used as bedding can as bedding or 'environmental enrichment' can play a role in mycotoxicosis.

Mycotoxins are naturally occurring, toxic chemical compounds produced by filamentous fungi (molds). These molds can produce a variety of mycotoxins, such as aflatoxin, fumonisin, deoxynivalenol (DON), ochratoxin A, T-2 toxin and zearalenone.

Accurate diagnosis of a mycotoxicosis is difficult because affected animals may exhibit few or many of a variety of symptoms. The fact that most of the symptoms are rather unspecific and can be caused by many other factors makes it often difficult to properly diagnose mycotoxin problems.

The aim of the present trial was to investigate the concentration of different mycotoxins in feed and straw of 6 Irish racehorse farms in order to get a measure for actual challenge levels.

Materials and Methods

A total of 175 feed and straw samples were collected during the time period October 02 - March 03 in 6 Irish racehorse farms. All samples were analyzed by ELISA for the following six mycotoxins: aflatoxin, ochratoxin, fumonisin, deoxynivalenol, T-2 toxin and zearalenone. The samples were grouped as straw, hay/haylage, grain and mixed feed and the data were analyzed by descriptive statistics.

Results and discussions

Zearalenone and DON were the 2 main mycotoxins found in the samples (Table 1 and 2). The maximal concentration measured for aflatoxin was 17.7 ppb, for fumonisin 627.0 ppb, for ochratoxin 22,1 ppb and for T-2 toxin 208.1 ppb.

Mycotoxin concentrations varied from farm to farm with the mean farm concentrations for zearalenone ranging from 20 to 117 ppb and the mean farm concentrations for deoxynivalenol ranging from 50 to 270 ppb. Many of the samples were contaminated with multiple *Fusarium* mycotoxins. This is of concern, as mycotoxins can act synergistically.

Overall, the survey demonstrates that mycotoxins are present in considerable concentrations in both the bedding and the feed. Bedding and feed qualities have to be managed properly and mycotoxins should be taken into consideration when performance, health or reproductive problems do occur on horse farms.

Table 1: DON concentrations of horse feed and bedding

	DON		
	Mean, ppb	Maximum, ppb	%Positive
Hay/haylage	167.0	1424.0	22.7
Straw	200.0	1300.0	24.4
Feed	160.7	1087	33.8
Grain	132.0	500.0	31.8

Table 2: Zearalenone concentrations of horse feed and bedding

	Zearalenone		
	Mean, ppb	Maximum,ppb	%Positive
Hay/haylage	38.0	291.2	18.2
Straw	62.2	1334.0	22.0
Feed	77.3	298.0	61.8
Grain	3.0	65.8	4.5

Conclusions

Bedding and feed qualities have to be managed properly and mycotoxins should be taken into consideration when performance, health or reproductive problems do occur on horse farms.

References

- [1] Bauer, J., Heinritzi, K., Gareis, M. and Gedek, B. (1987) Veränderungen am Genitaktakt des weiblichen Schweines nach Verfütterung praxisrelevanter Zearalenonmengen. *Tieraerztl. Praxis*. 15:33-36.
- [2] Cast (1989) Mycotoxins: Economic and Health Risks. Council for Agriculture Science and Technology Task Force Report 116. Eds. Ames, I.A.
- [3] Dacasto, M., Rolando, P., Nachtmann, C., Ceppa, L. and Nebbia, C. (1995) Zearalenone mycotoxicosis in piglets suckling sows fed contaminated grain. *Vet. Hum. Toxicol.* 37:359-361.
- [4] Smith, T.K., McMillan, E.G. and Castillo, J.B. (1997) Effect of feeding blends of *Fusarium* mycotoxin-contaminated grains containing deoxynivalenol and fusaric acid on growth and feed consumption of immature swine. *J. Anim. Sci.* 75(8):2184-2191.
- [5] Young, J.C., Trenholm, H.L., Friend, D.W. and Prelusky, D.B. (1987) Detoxification of deoxynivalenol with sodium bisulfite and evaluation of the effects when pure mycotoxin or contaminated corn was treated and given to pigs. *J. Agric. Food Chem.* 35:259-261.
- [6] Raymond, S. L., T. K. Smith[†]2, and H. V. L. N. Swamy Effects of feeding a blend of grains naturally contaminated with *Fusarium* mycotoxins on feed intake, serum chemistry, and hematology of horses, and the efficacy of a polymeric glucomannan mycotoxin adsorbent. *J. Anim. Sci.* 2003. 81:2123-2130