

Caution, poison! Mycotoxins in feed.

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Mycotoxins are a growing problem for all horse owners. Current studies assume that more than 25% of all grain samples contain harmful mycotoxins. Mould and alkaloid contamination via basic feed such as hay, haylage, or straw is also on the rise. Possible consequences: respiratory problems, allergies, digestive disorders, liver and kidney damage, movement disorders or even fertility problems (see Fig. 1).



Fig. 1:

Possible damage to health due to mycotoxin contamination

Deoxynivalenol (DON):

- | delayed feed intake (SCHULZ 2012)
- | damage to the intestinal epithelium (DÄNICKE 2014)
- | immune depression (JOHNSON et al. 1997)
- | risk of developing chronic intestinal inflammation (DÄNICKE 2014)
- | reduction in nutrient intake (DÄNICKE 2014)
- | weight loss (RAYMOND 2003 and 2005)
- | loss of performance (RAYMOND 2003 and 2005)
- | increased liver enzyme values (ZEYNER 2002)
- | higher sensitivity to DON in sport horses suspected (RAYMOND 2003 and 2005)

Aflatoxins and ochratoxins (OTA):

- | formation during the storage of e.g. grain (so-called storage fungi)
- | liver damage (hyperlipidaemia), lack of appetite, disruption of the general metabolism due to aflatoxins suspected
- | kidney damage and immunodepression due to OTA suspected

Zearalenone (ZEA):

- | fertility disorders possible (VERVUERT and SCHULZ 2015)

Endophytes (ergovaline):

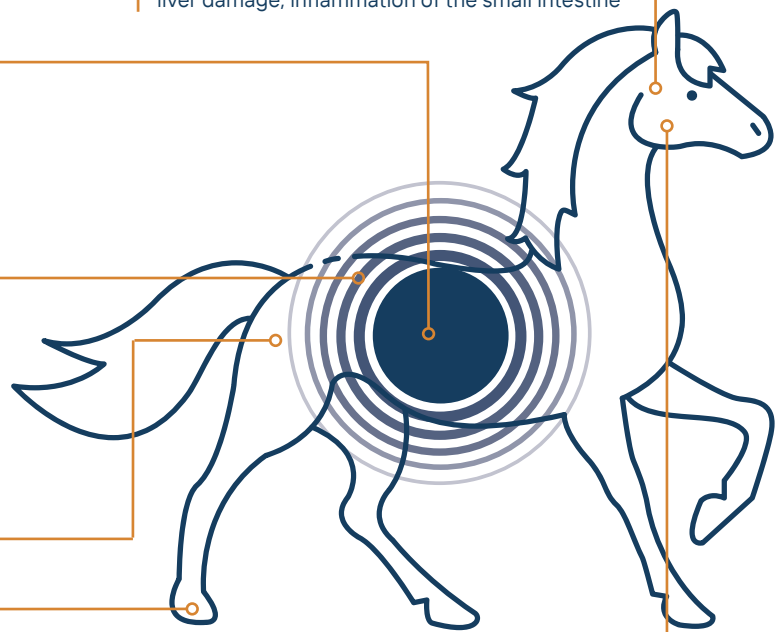
- | an externally invisible, naturally occurring fungus that grows inside the plant. Tall fescue and ryegrass are particularly affected and can therefore also be found in hay and silage.
- | circulatory disorders, abortions
- | profuse sweating, salivation, colic
- | loss of condition, heavy feeding
- | increased hoof temperature, lameness (DOUTHIT et al. 2012)
- | suspected laminitis attacks (VERVUERT and SCHULZ 2015)

Fumonisin B1:

- | equine leukoencephalomalacia (ELEM); brain disease of the horse with ataxia, tremors, paralysis of the tongue and lips, and even death of the animal. (MARASAS and KELLERMANN et al. 1988)
- | disorders of the central nervous system
- | cardiovascular problems
- | liver damage, inflammation of the small intestine

Ergot alkaloids:

- | ergot infestation in cereals and increasingly also in grasses and thus also in hay and silage!
- | fertility disorders, milklessness, feelingness, and lameness on the front legs (VANSELOW 2014/2015)
- | suspected link to Equine Cushing Syndrome (ECS) (VANSELOW 2014/2015)
- | ryegrass staggers, stiff gait, ataxia, head shaking, disorders of the central nervous system (VANSELOW 2014/2015)
- | impaired intestinal motor function, increased heart and respiratory rate (JOHNSTONE et al. 2012)
- | equine vibratory oedema, oedema of the head, nostrils, ganaches, parotid gland and intestines, etc. (VANSELOW 2014/2015)





Mycotoxins are poisonous, secondary metabolic products of mould fungi

More than 300 mycotoxins are known to be produced by more than 100 mould species (including aspergillus, penicillium, and fusarium). Particularly dangerous are aflatoxins, ochratoxins, zearalenones (ZEA), DON, fumonisins and increasingly also toxic ergot alkaloids in cereals and grass. Scientific studies show that the mycotoxins DON and ZEA are most frequently found in horse feed and are also frequently detected in urine and blood samples from sport horses. However, horses appear to be less sensitive to DON and ZEA. However, they are much more sensitive to fumonisin B1, endophytes and ergot alkaloids. More detailed studies on aflatoxins and OTA are currently lacking, but here, too, the horse appears to be very sensitive. The current practice of transferring existing mycotoxin limit or orientation values for pigs or ruminants to horses is therefore not advisable. However, there are no specific values for horses currently available, only recommendations.

How do mycotoxins develop?

Every feed has a natural content of typical germs. Poor harvesting or unfavourable storage can cause these germs to multiply explosively. They are particularly common in starch-rich cereals such as maize or oats, but also in forage such as hay and straw. Mould growth is influenced by the ambient temperature, humidity, pH value, and nutrient density of the feed (example: haylage). These factors must be taken into account during har-

vesting and storage in order to prevent mould growth and thus mycotoxin formation. If obvious defects (colour changes, extraneous matter content, odour deviations, dust) are detected by sensory inspection (smell, touch), this feed should no longer be fed to horses. In addition to analyzing nutrients, basic feed samples should therefore always be tested for quality by appropriate laboratory analyses.

The risk of infection with mycotoxins and in particular ergot alkaloids and endophytes will continue to increase in the coming years. This is particularly due to increasing global warming and the associated extreme weather conditions.

Yeast cell walls can bind mycotoxins!

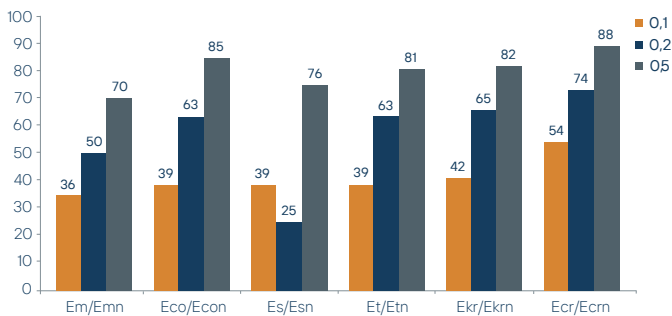
Mannanligosaccharides (MOS) and β -glucans are natural components of the brewers' yeast cell wall. They have a prebiotic effect, promote the intestinal microbiome and strengthen the intestinal mucosa and thus the protective barrier of the intestine against intruders such as viruses, bacteria, and fungi. The β -glucans they contain also stimulate the immune system. Thanks to their specific surface structure and the associated high adsorption capacity, mannanligosaccharides (MOS) also have a high binding capacity against many different mycotoxins and, in some cases, pathogens.

In a recent in-vitro study, the binding activity of Biolex® MB40 against various ergot alkaloids was demonstrated (see Fig. 2). A dose-dependent effect was shown, i.e. the higher the Biolex® MB40 dosage (0.5%), the better the binding effect.





Fig. 2: Ergot alkaloid binding activity of brewers' yeast cell walls (Biolex® MB40) under in vitro gastrointestinal conditions, Leiber GmbH (2022)



Biolex® MB40: prebiotic. Pro health.

The targeted promotion of intestinal health is now regarded as the key to animal health and welfare. Leiber Brewers' Yeast products are gently processed and dried as a by-product of the brewery. This preserves their native structure and thus their high biological activity. They contain a variety of valuable active ingredients and nutrients that have positive effects on digestion and the immune system, among other things. The horse becomes more resistant overall to stress factors.

Increasing exposure to mycotoxins, ergot alkaloids, and endophytes is a growing stress factor for horses and can cause damage to their health. The natural strengthening of the gastrointestinal tract as well as the high binding activity of brewers' yeast cell walls (Biolex® MB40) against mycotoxins and alkaloids can make a useful contribution here.



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