

## **Mycosorb® – The detox diet for your horse**

Mycotoxins are a known health threat to horses. It is now thought that at least 25% of the harvested cereal grain throughout the world is contaminated with mycotoxins. In addition, pasture grasses, hay and straw can all support fungal growth and, therefore, may contain these mycotoxins. Although, much of this research has been extrapolated from other agricultural animals such as pigs and cows, significant research is now being carried out on horses, due to the negative effects on equine health and performance.

The word mycotoxin stems from the Greek word "mykes" meaning mold and "toxicum" meaning poison. Mycotoxins are toxic secondary metabolites produced by fungi growing on crops in the field, during handling and in storage. As the name suggests, mycotoxins are capable of causing disease, which may even be fatal.

Health problems commonly associated with mycotoxicosis in horses include:

- Reduced growth rates
- Decreased appetite
- Poor performance
- Colic
- Respiratory problems
- Hypersensitivity
- Reduced reproductive performance
- Increased susceptibility to disease
- Brain lesions
- Neurological disorders
- Organ involvement, liver, kidneys
- Death

Fungi only produce mycotoxins under favorable environmental conditions and not all fungi produce mycotoxins. In other words the presence of fungi does not always indicate the presence of mycotoxins. Also the absence of visible fungi does not necessarily mean that there are no mycotoxins, as the fungi could have died, leaving the mycotoxins in place. Mycotoxins are often found in cereals such as oats, barley, maize and wheat and their by-products. They may also be found on pasture and, therefore, conserved forage in certain environmental conditions. Infestation of cereal grains and forage plants normally begins before harvest in the field. This is highly dependent upon weather conditions and is, therefore, very difficult to control. This may be compounded by poor storage conditions post harvest. A cooler, wetter season is more likely to result in greater fungal contamination of crops. Higher moisture levels will increase fungal growth and cooler temperatures result in the formation of mycotoxins by the fungi. Forage, and traditionally cereals, plays a huge role in the diet of horses. This is particularly true for the cereals fed to performance horses. Cereals are important for providing horses with concentrated energy for work and breeding.

Horses can take in mycotoxins via feed, forage or bedding. In fact mycotoxins are odorless and tasteless, making ingestion more likely. Horses eating contaminated feed or forage and breathing in air surrounding moldy bedding are all-important causes of exposure. Low-level intakes of mycotoxins over long periods are likely to produce chronic toxicological symptoms. This may affect athletic performance and breeding capability, possibly without obvious disease symptoms. General symptoms such as loss of appetite, weight loss, unthriftiness, poor performance, increased susceptibility to infectious diseases, reduced growth rates, poor breeding performance, or increased red bag delivery may all be associated with chronic mycotoxin intake. Because mycotoxins negatively affect equine performance and health, mycotoxin control is an important equine health issue.

Historically, human cases of ergotism or St. Anthony's Fire have been described in Europe since the Middle Ages and are now known to be caused by mycotoxins produced in rye by the mold *Claviceps purpurea*. In 1960, an outbreak of Turkey X disease in England and the subsequent discovery of the aflatoxins stimulated great interest in the field of mycotoxin research. Since then many more mycotoxins which may affect horses, such as trichothecenes (DON, T-2), zearalenone, ochratoxins, fusaric acid, aflatoxins and fumonisins, have been discovered.

There are hundreds of known mycotoxins, but few have been extensively researched in horses. Fewer still have good methods of available analysis. It is important to note that mycotoxins vary greatly in their severity. Because horses are hindgut fermenters, it is thought they may be more susceptible to the effects of mycotoxins than ruminants (foregut fermenters), which are able to degrade many mycotoxins in the rumen before they become harmful. As hindgut or post gastric fermenters, horses will take mycotoxins into the body following eating contaminated feed or forage. Eventually they may enter the small intestine where they exert their effects on the intestinal wall or are absorbed into the horse's body via the blood.

As mycotoxins may cause rather unspecific symptoms, it can be difficult to properly diagnose the problem in horses. The symptoms of mycotoxicosis will depend upon the mycotoxin type and also the health status, age, sex and work level of the exposed horse. Mycotoxicoses may be categorized as chronic or acute. Acute toxicity may be observed as rapid onset of symptoms following intake of the toxin whereas chronic exposure to the mycotoxin leads to chronic toxicity symptoms, which are often difficult to pinpoint.

General symptoms such as reduced performance or impaired immunity are often seen when dealing with moderate or low mycotoxin levels, while symptoms caused by higher mycotoxin intakes are often more specific and obvious. In addition, mycotoxicoses increase the horse's vulnerability to microbial, viral and other diseases.

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Although moldy feed and hay is usually avoided by horse owners, mycotoxin-producing fungi may also grow on pasture grasses, exposing grazing horses to potentially harmful effects. These include, fusarium toxins (zearalenone and trichothecenes) and endophyte toxins such as ergot alkaloids in fescue and lolitrem B in perennial ryegrass.

Although this paints a dim picture, there are ways of dealing with the problem. Prevention is much better than cure, so good hygiene is vital to minimize potential mycotoxin problems.

- Check feed bins and clean regularly, clean all feeding equipment such as buckets and mangers regularly, empty and clean and dry feed bins periodically and clean up feed spillages.
- Moldy or out of date feeds should not be fed to horses.
- Hay and chaff products must be properly harvested and dried.
- Feed should preferably be kept within the bag until just before use and once opened stored in a cool dry place free from extreme temperature fluctuations.
- Bedding in stables should be cleaned out thoroughly and deep litter bedding is more likely to contain fungi.
- Pasture seed mixes must be guaranteed endophyte-free.
- Grass pastures should be topped regularly to maintain pasture in a vegetative growing state and prevent the formation of flowers and seeds.

Another method of dealing with the potential mycotoxin problem in horses is to use a mycotoxin adsorbent. An adsorbent is a material that causes the mycotoxin to bind to its surface rendering it harmless, as it can no longer be absorbed into the horse's bloodstream. A common adsorbent used by feed manufacturers is fine clay. Although cheap, this absorbent needs to be added in much greater volumes which displaces the important nutrients in the feed. Furthermore, clays are known to bind other dietary components such as vitamins and minerals and are only effective against aflatoxins.

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An alternative is the glucomannan polymer, developed by Alltech, which has been researched globally with studies conducted in horses and many other animal species. This has a very high surface area relative to its weight and can therefore be used at much lower inclusion levels in the feed and has been proven to be effective against a broad range of mycotoxins. Despite these strategies, it is also vital to purchase good quality feed from reputable manufacturers. Straight cereals such as oats and barley which have been processed by rolling, crimping, bruising, etc. will be more likely to develop fungal, and, therefore, mycotoxin problems as the grains are effectively damaged by processing. These are often not tested for mycotoxins before sale to horse owners. Manufacturers of compound feed for horses on the other hand regularly monitor mycotoxin levels in ingredients and finished feed for mycotoxins and commonly add Mycosorb® to reduce the potential impact of mycotoxins that may be present in the cereal grain.

Trial work at the University of Guelph has shown the effectiveness of Alltech's glucomannan polymer. This study was conducted to measure the effect of feeding naturally Fusarium contaminated cereal grains on feed intake and blood profiles of horses and to measure the effects of adding the polymer. The main mycotoxins of fusarium species present in cereal grains include T-2 toxin, deoxynivalenol (DON), and zearalenone. It was concluded that the feeding of cereal grains naturally contaminated with Fusarium mycotoxins altered serum chemistry in mature horses and significantly reduced feed intake. Supplementation of the glucomannan polymer (Alltech, Inc.) to contaminated cereal grains helped to alleviate reduced feed intake in these horses. The increase in serum GGT activities (associated with liver damage), when contaminated grain was fed was prevented with the inclusion of the polymer.

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In addition, through more than 30 trials conducted worldwide, it has been demonstrated that the feeding of Alltech's glucomannan polymer can be used as part of a strategy to reduce the effects of mycotoxins in horses.

Mycotoxins are very difficult to remove once they have been formed, which makes it difficult to control potential mycotoxin problems in horse feed and pasture. Taking preventative measures such as good hygiene, discarding any moldy feed or forage, and choosing compound feed from a manufacturer that has added a mycotoxin binder such as Alltech's will all help to reduce the threat to horses' health and performance.