



MANAGING MYCOTOXIN RISK

Mold spores are widespread and increasing worldwide and many of our agronomic practices may be contributing to an increase in their presence in the environment. While there are hundreds of different mold types in the environment, there are four that are primarily implicated in producing mycotoxins that result in deleterious effects to livestock production; Fusarium, Aspergillus, Penicillium and Ergot Alkaloids.

While molds are ubiquitous, it's important to realize that just because mold is present, it doesn't necessarily mean there are mycotoxins present. Conversely however, for mycotoxins to be present it is a prerequisite that molds were present at some point *whether seen or unseen*. Therefore, it is important to monitor feedstuffs for the presence and level of mycotoxins while monitoring animal performance for possible associations.

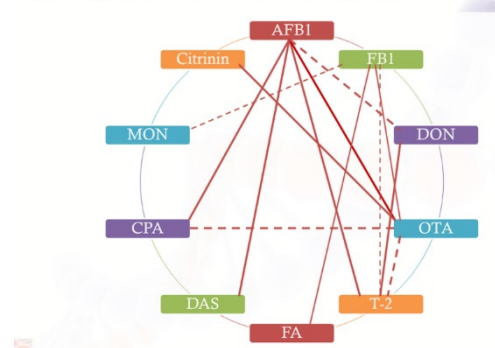
How are mycotoxins produced? Mycotoxins are a natural defense mechanism used by molds to defend itself against one of many stressors in its environment. When stressed, a mold produces secondary metabolites, many of which are toxic. Some of the mycotoxins and concentrations to monitor for are:

Toxin	Cautionary, ppb	Regulatory, ppb
Aflatoxin	5	20
Vomitoxin (DON)	300	5,000
Zearalenone	100	500
Fumonisin	500	10,000
T2 Toxin	100	500

SYNERGISTIC, CUMULATIVE AND MASKED MYCOTOXINS

While each of these toxins should be monitored and managed based on their individual concentration levels, it is important to recognize that many mycotoxins have **synergistic** effects meaning multiple mycotoxins, each being below the recognized tolerance level, can work synergistically together to bring about negative effects. Also true, some mycotoxins fed at tolerable levels can **accumulate** to produce negative effects when fed repeatedly over extended periods of time. Finally, many mycotoxins may be bound into benign complexes that are '**masked**', thus unreported in lab analyses yet may be metabolized to toxic forms during the digestion process.

Synergistic effects of mycotoxins



MYCOTOXINS AND THEIR IMPACT ON ANIMAL HEALTH & PERFORMANCE

In general, mycotoxins exert their effects through several means:

1. Reduced feed intake or feed refusal
2. Reduced nutrient absorption and impaired metabolism
3. Altered endocrine and exocrine systems
4. Suppressed immune function
5. Altered microbial growth (rumen and GI effects)

Mycotoxins clearly produce a wide range of harmful effects in animals with significant economic impact. Worldwide, approximately 25% of crops are affected by mycotoxins annually (CAST, 1989), which would extrapolate to billions of dollars (Trail et al., 1995). Annual economic costs of mycotoxins to the U.S. agricultural economy is estimated to average \$1.4 billion (CAST, 2003). A global survey program conducted between 2004 and 2013 uncovered mycotoxin contamination in over 76% of the 25,900 feed and feed ingredient samples that were tested.



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What is to be done to mitigate the risks associated with mycotoxins in animal diets?

1. Prevent mold from growing in the first place. For mold to grow, it requires five key elements... oxygen, moisture (or water activity), temperature, time and nutrients to grow on. Management practices to consider in mitigating mold growth and feed contamination include;
 - a. Limit exposure of high-moisture feeds to oxygen keeping in mind to manage feed-out and presentation in a way that minimizes heating and spoilage.
 - b. Maintain and clean all feed storage units regularly to minimize excess heat, moisture and oxygen from deteriorating feed integrity and to help prevent recontamination.
 - c. Execute a good insect and rodent control program.
 - d. Rotate inventories regularly.
 - e. Clean out feed bunks and feeders regularly.
 - f. Use a high-quality microbial inoculant, such as McNess **SILAGE STARTER PRO-B** or crop specific **SILAGE STARTER ADVANCE**, when putting up forages and high-moisture grains to optimize fermentation, nutrient availability and stability.
 - g. Use **PROFRESH PLUS** feed stabilizer in preparation of complete diets or TMRs to help impede aerobic spoilage and heating while keeping feed fresher and palatable longer.
2. Hope is not a strategy. Proactively monitor animal health and performance keeping in mind that mycotoxins are often a silent and invisible drain on animal performance.
3. Don't wait for acute symptoms of mycotoxicosis to appear. Test and screen suspected diets or ingredients for mycotoxins whenever animal performance or health is lacking, keeping in mind that many toxins work synergistically, cumulatively or are masked and can cause adverse effects even when fed at less than cautionary levels.
4. If you confirm a feedstuff is contaminated, segregate it as best possible and limit the feed to levels that result in a total diet that is at lower risk.
5. If you find yourself in a situation forcing you to use feeds elevated in mycotoxins, direct those feeds to groups more tolerant of mycotoxin exposure such as non-breeding finishing cattle and/or finishing market hogs.
6. **Increase the nutrient density of the diet**, particularly protein (amino acids), energy and vitamins as these are partially degraded/consumed by growing molds and heating.
7. Incorporate species-specific **EQUALIZE™** into the diet to support animal immune function and performance.

