



Cattle Producer's Handbook

Animal Health Section

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Mycotoxins

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Certain fungi (molds) produce potentially harmful or toxic substances called mycotoxins. There are thousands of species of fungi, but relatively few of these grow on agricultural products and only a fraction are capable of producing mycotoxins. Toxigenic fungi spores are present almost everywhere, and they can germinate, grow, and elaborate their toxins into a variety of substrates.

The existence of mold is not a dependable sign of toxins nor is the lack of noticeable mold a sign that toxins are nonexistent. Optimal conditions for toxin production are quite variable.

Production of Mycotoxins

Factors influencing mold development are moisture, temperature, aeration, and substrate. Moisture is most important, but the type of mold and whether a toxin is produced will depend on the interplay of all these factors. Molds can grow and mycotoxins can be produced on feedstuffs either pre-harvest or post-harvest, during storage, transport, processing, or even feeding. Most molds do not produce mycotoxins.

The presence of mold spores does not mean that mycotoxins are present, but they can be! Many types of molds do not produce mycotoxins; however, their presence may reduce palatability and energy value.

Physical damage, such as breakage and stress cracks in grain, and environmental conditions, such as heat and water and insect damage, are large factors in mycotoxin contamination. Cool, wet growing seasons as well as drought conditions that delay maturity can result in mycotoxin formation in the field. Recent research indicates moldy feedstuffs cause previously unexplained production and health problems.

High-moisture feedstuffs, especially if ground, are highly susceptible to fungal invasion and toxin formation. To prevent production of the toxin on harvested products, care should be taken to prevent physical damage at harvest and to reduce the moisture level soon after harvesting. Rapid ensiling or the addition of organic acids will aid in preventing the formation of additional mycotoxins. However, these procedures do not reduce the level of contamination that was present before the treatment. Mycotoxins can be present with little or no obvious signs of mold.

Mycotoxin Effects

Since ruminants have high bacterial population, they are able to detoxify most mycotoxins, therefore, cattle are less susceptible generally to mycotoxin toxicity than are non-ruminants (swine, poultry, and humans). However, there is a limit to the amount of a mycotoxin that cattle can detoxify. In addition, classes of cattle that are more vulnerable to mycotoxins would be (1) pre-ruminant calves with limited rumen function, (2) cows having sub-optimal bacterial populaces (i.e., fresh cows with lower intake, cows with high passage rates, and/or producing cows with high intake), and (3) breeding cows or cows in early gestation.

Mycotoxins exploit their effects through three major mechanisms:

1. Mycotoxins reduce the amount of nutrients available for use by the animal; this is a multi-faceted process. An alteration in nutrient content of feed may occur during the molding process. Mold growth can reduce the content of nutrients such as vitamins and amino acids like lysine in feedstuffs. The energy value of feed can decrease due to mold.