Is There a Relationship Between Mold & a Healthy Digestive Tract in Farm Animals

by Fernando Valdez, Kemin AgriFoods

Mold is a general term used to describe various fungi that grow in animal feed and degrade the quality of that feed. Molds germinate at temperatures as low as 45°F, with the most rapid growth at 75°-90°F and at a fairly neutral pH. But, when considering molds, they are thought of in terms of visual contamination of feeds outside the animal. Molds are rarely talked about as agents that get ingested, encapsulated and germinate to grow in the animal's intestinal tract causing negative interactions that affect animal production. In farm animals, molds and their metabolites have negative effects on feed intake, animal performance, reproductive rate and growth efficiency. Reduction in nutrient absorption, nutritional status and immune response can be added to the list as well.

Molds are present throughout the environment. Their spores are present in high numbers in soil and plant debris and lie ready to infect growing plants in the field. It has been estimated that ~25% of crops worldwide are infected annually. Most field molds produce secondary metabolites, called mycotoxins, that form on crops in the field, during harvest, or during storage, processing or feeding. The growth of different molds and their production of metabolites are usually associated with extremes in weather conditions leading to plant stress, as well as variations in hydration of feedstuffs, poor storage practices, low feedstuff quality or inadequate feeding conditions.

How can molds have a negative effect at the intestinal level? Molds in hostile environments (the animal gut is not the ideal environment) can produce secondary metabolites that can be carcinogenic, mutagenic, teratogenic (causing birth defects), tremorgenic (causing tremors or damage the central nervous system), hemorrhagic, as well as cause damage to the liver and kidneys. All these metabolites get absorbed in the gut.

Outside of the animal, mold will grow on feed under any condition.They can grow in all conditions. *Aspergillus flavus* growth in corn favors heat and drought stress associated with warmer climates. *Fusarium* molds commonly cause ear and stalk rot in corn and head blight (scab) in small grains. In wheat, excess moisture at flowering and afterward is associated with increased incidence of mycotoxin formation. In corn, *Fusarium* diseases are more commonly associated with warm conditions at silking and with insect damage and wet conditions late in the growing season. *Penicillium* molds grow in wet and cool conditions and some require little oxygen.

How does this information pertain to forage growers? Forages make up anywhere from 45-95% of a ruminant diet, depending on the production situation. The use of forage and grain mold treatment programs is well established. However, producers usually implement them when harvest or storage conditions appear unfavorable for good fermentation, drying or packing.

So what about treating forages even when conditions are good? And what is the payoff in doing so? A key part of the equation is whether the producer sells the forage or uses it on his own farm. However, treating can be a good option regardless of how the forage is used. If treating forages for sale, producers are ensuring that the forage will maintain the nutritional value for which it was sold, insuring repeat business. If kept for on-farm consumption, producers are ensuring that they will feed what they harvested and not lose quality.

For example, in laboratory terms it is considered that a good feed has <100 CFU/g (colony forming units), an average feed has 100-1,000 CFU/g, and a poor feed has >1,000 CFU/g. Think about this: if a horse is fed 10 lbs of hay with a mold count of 500 CFU/g, it is considered average. However, that means the horse could be consuming 2.2 million CFU of mold a day (10 lbs x 454 g x 500 CFU = 2,270,000). Not good! By the way, this mold can be any species, especially a *Penicillium* or a *Fusarium* that under stress, can produce toxins like DON, fumonisin or aflatoxin and cause production problems as described above. This is similar to growing organic crops and then irrigating them with manure from animals whose health condition is unknown.

In recent years, treating feeds has become even more important with the unpredictable weather changes. This will continue to change as population increases and agricultural land use becomes more intense. With such unpredictability, treating forages as an insurance policy to protect feed needs to be considered. What will it cost to protect the feed that was fed to the horse in the example above? There are a wide range of products in the market with different acid blends or bacterial inoculants, but a rough estimate is 1.5-2¢/day. That's money well spent –much less than a cup of coffee.

So, the next time harvest rolls around, think less about how the weather affected the crop and instead, think more about making the forage harvested even better than in the past.

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