



Feedlot Tech Update

Feeding Moldy Corn

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Utilizing moldy corn is a hot topic today and is sure to continue through the coming months. I'm sure that everyone would agree the best answer would be to not feed grain containing high levels of mold but I do not anticipate that will be an option for most producers. Mycotoxins are the most recognized cause of lost animal production associated with moldy grain. However, it is important to recognize that mycotoxins are not the only issue, production losses have also been noted with moldy grain without high levels of mycotoxins being reported.

Mold growth is dependent on moisture and oxygen. Limiting either will substantially decrease, if not eliminate, further mold growth and mycotoxin production. Also, minimizing fines will aid in the drying process and decrease readily available nutrients for mold growth during storage. This will not eliminate mold or mycotoxins already on the grain but will prolong its nutritional value as a feedstuff. Therefore, proper drying and management of this year's grain crop is imperative to ensure quality is not compromised over time.

Mold growth can exist without the presence of mycotoxins and, as previously noted, the absence of mycotoxins does not mean that feeding will result in optimal animal production. When mold becomes visible (approximately 1,000,000 colony forming units/gram) you could expect a reduction in energy (5 to 10%), crude protein (5 to 10%), and fat (up to 50 to 60%) content of the grain as the mold uses these nutrients for their metabolism and growth. Additionally, some molds may produce metabolites with antibiotic characteristics that affect rumen bacteria resulting in reduced efficiency of fermentation and production. Other potential health concerns, particularly respiratory distress, may also exist but are less understood in livestock compared to humans.

Mycotoxins, which are secondary metabolites of fungi, can result in considerable economic losses from animal production and in some cases may present food safety concerns (i.e. aflatoxin, lactating dairy cattle) if not managed properly. The FDA has placed limitations on the use of feedstuffs containing some mycotoxins, labeled as "action levels" for aflatoxin, "guidance levels" for fumonisins, and "advisory levels" for vomitoxin. These limitations along with recommendations based on published research for zearalenone are listed in Table 1. Ruminant animals tend to be the least susceptible to mycotoxins compared to other species with feedlot cattle being the least. This does not mean that moldy grain is not a concern for feedlot cattle but by following the general guidelines, lost animal production should be minimized.

Distillers grains presents a unique challenge in that mycotoxins present in the grain used for ethanol production are not destroyed during fermentation but instead are concentrated up to 3x that of the original grain. To properly manage mycotoxin intake, it is important that all sources of the toxins are included to ensure that cattle performance is not unnecessarily affected.

Moldy corn is not the end of the world, the key is knowing what you have for an ingredient. Test feedstuffs routinely, this knowledge will provide you the ability to help producers make good nutritional and feed inventory decisions to minimize adverse affects on animal production.

Table 1. Action or recommended maximum concentrations of common mycotoxins.
Adapted from Carlson and Ensley, University of Nebraska – Lincoln Extension

Mycotoxin	Commodity	Animal	Maximum Concentration in Feedstuff	Maximum Concentration in Ration
Aflatoxin (Action Level)	<ul style="list-style-type: none"> Corn Peanut Products Other Feeds 	Finished beef cattle	300 ppb	
		<ul style="list-style-type: none"> Breeding Beef Cattle Breeding Swine Mature Poultry 	100 ppb	
		Finishing swine >100lbs	200 ppb	
	<ul style="list-style-type: none"> Corn Peanut Products Other Feeds, excluding cottonseed meal 	Immature Animals	20 ppb	
	Cottonseed meal	<ul style="list-style-type: none"> Beef Cattle Swine Poultry 	300ppb	
All other feeds	<ul style="list-style-type: none"> Dairy Animals Animal species not listed, or unknown intended use 	20 ppb		
Fumonisin (Guidance Level)	Corn and corn by-products	Equids (horses)	5 ppm ($\leq 20\%$ of diet)	1 ppm
		<ul style="list-style-type: none"> Swine Catfish 	20 ppm ($\leq 50\%$ of diet)	10 ppm
		<ul style="list-style-type: none"> Breeding ruminants Breeding poultry Lactating dairy cattle Laying hens 	30 ppm ($\leq 50\%$ of diet)	15 ppm
		Ruminants ≥ 3 month old, raised for slaughter	60 ppm ($\leq 50\%$ of diet)	30 ppm
		Poultry, raised for slaughter	100 ppm ($\leq 50\%$ of diet)	50 ppm
		All other species or classes of livestock	10 ppm ($\leq 50\%$ of diet)	5 ppm
Vomitoxin (deoxynivalenol, DON) (Advisory Level)	Grain and grain products	Swine and other animal species, except cattle and chickens	<ul style="list-style-type: none"> Swine: 5 ppm ($\leq 20\%$ of diet) Other Species: 5 ppm ($\leq 40\%$ of diet) 	<ul style="list-style-type: none"> Swine: 1 ppm Other: 2 ppm
		<ul style="list-style-type: none"> Ruminating beef and feedlot cattle >4 months old Chicken 	10 ppm ($< 50\%$ of diet)	5 ppm
Zearelenone (Recommended Level)	Diet	Prepubertal gilts		<1 ppm
		<ul style="list-style-type: none"> Sexually mature sows Bred Sows 		<3 ppm
		Young boars		<20 ppm
		Mature boars		<200 ppm
		Virgin heifers		<10 ppm