

Mycotoxins Kraig Peel, Ph.D.

The 2018 growing season around the U.S. has been variable by region to say the least. If you believe the climatologists from the U.N. it is all because of the prosperity of the United States. If you believe like I do that climate change has been around since the beginning of time then you know it is a natural process. Wasn't there an ice age before we were driving cars? That is a discussion for another column. The variability in rainfall and temperature has produced a wide spectrum of forage quality for us to use in animal diets. Many areas have experienced significant hail in the late summer that has also affected the quality of the corn and sorghum crops. The extra stress on these plants has increased the opportunity for the growth of mycotoxins on these plants. If there are mycotoxins on the plants, then they will find their way into silage pits and ultimately to the feed bunk.

We have all seen times when animal performance seems to slump for not apparent reason. Intakes decline for a short time or we see a drop in reproductive performance and then for no apparent reason, intakes go back to normal and reproduction returns to acceptable levels. These responses could be due to mycotoxicosis from one or more of the forages in the diet. The problems can be grouped into 3 broad categories: 1) decreased nutrients available to the cows and heifers; 2) decrease in reproductive performance; 3) immune system suppression.

Mycotoxins can be found in practically all forages that are used in animal feeding operations. The plant that has the highest propensity is corn. We have found mycotoxins in all varieties of corn products including: corn silage, corn snaplage, high moisture corn and corn grain. It is not common but hominy and distillers grains can be infected. It is important to implement a consistent sampling protocol for all of these products that are destined for livestock consumption. It is better to know there is a problem coming from a particular forage versus waiting until the animals respond negatively. If we know we have a problem, there are a variety of binders and absorbents that can be used to limit the negative effects. It must be noted that these products do not remove the mycotoxin but that they bind the toxin in the gut of the animal so that it is not absorbed into the bloodstream. If the toxin is not absorbed then it does not affect the animal and is excreted with other metabolic wastes.

Binders can be found in either of the following forms: inorganic and organic. Inorganic binders are basically from the soil and are composed of silicates and aluminum that bind with the mycotoxin molecules. Inorganic binders are usually inexpensive but may come with a very high inclusion rate and may be included in a vitamin/mineral pack or included into a liquid mineral supplement. Organic binders are carbon based polymers or carbohydrates. Yeast cell wall binders have been the focus of a significant amount of research recently. There are many companies that have developed a line of yeast cell wall products. These products are commonly known as MOS (gluco-mannan-oligosaccharides). MOS products will utilize different yeast strains with varying levels of cellulose and sugars. These products have a unique molecular structure, which enables them to bind with different and often specific mycotoxins. All of these products can be effective in

limiting the negative effects of mycotoxins from forages in the diet. Organic binders are normally more expensive but have lower inclusion rates and can be included into vitamin/mineral packages.

Silages can be inoculated during harvest, which can slow the growth of the negative mycotoxins and promote the growth of positive organisms during the ensiling process. The objective of most inoculants is to lower the pH levels in the silage by driving rapid production of lactic acid which will reduce the growth opportunity of molds which can produce mycotoxins.

The key to limiting negative effects of mycotoxins is to ideally prevent them from growing on the plants in the first place. Unfortunately the environment does not always cooperate. Farmers should implement a systematic testing process to identify potential problems before the animals are affected. If we can determine there may be a problem upcoming from a particular pile, then we can utilize the binder technology to minimize the affects of the mycotoxin to the animal. Anytime we limit the negative effects, we always have a positive effect on the bottom line!