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A New Generation Of Mycotoxin Technology

By Dan Leiterman

In my April, 2016 newsletter article *"Managing Mycotoxins In Feedstuffs: Mycotoxin Binder Strategies"*, I explained the significant negative effects mycotoxins have on livestock health and production. That article pointed out the previous challenges of inaccurate lab analysis of mycotoxins, how to interpret a lab analysis to determine a management plan for a given level of exposure and the subsequent limitations of strategies available at the time. This article can be found on our website under the "Articles" tab, under the sub-category of "Inoculant."

Improved Laboratory Analysis For Mycotoxins

There has been a considerable amount of advancement in the testing technology for mycotoxins in the last year. With the advent of the LC/MS/MS analysis, the industry now has access to a more accurate lab analysis that is sensitive to a broader range of mycotoxins. Mycotoxins are known to attach to carbohydrates in the feedstuffs and can be more difficult to find with a typical ELISA lab analysis. However, with the new LC/MS/MS lab analysis, mycotoxins are separated from the carbohydrate substrate making them more detectable, which significantly improves the accuracy of this testing procedure in more feedstuffs and on a wider range of mycotoxins.

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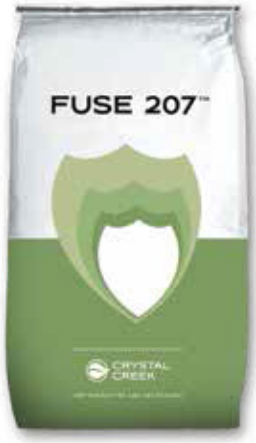

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Figure 1 **RECOMMENDED FEEDSTUFF TESTING METHODS (Lab Specific)**

	Aflatoxin	Vomitoxin (DON)	Zearalenone	T2/HT2	Fumonisin	Ochratoxin	All Other Mycotoxins
Corn Grain	ELISA	ELISA	ELISA	ELISA	ELISA	ELISA	LC/MS/MS
Corn Silage	ELISA	ELISA	ELISA	LC/MS/MS	ELISA	LC/MS/MS	LC/MS/MS
Haylage	LC/MS/MS	ELISA	LC/MS/MS	LC/MS/MS	LC/MS/MS	LC/MS/MS	LC/MS/MS
TMR	LC/MS/MS	LC/MS/MS	LC/MS/MS	LC/MS/MS	LC/MS/MS	LC/MS/MS	LC/MS/MS

Information Sourced from: www.dairylandlabs.com

The LC/MS/MS lab analysis from Dairyland Labs will test for 17 of the more prevalent mycotoxins. This more accurate test can be run for a cost of $250 per sample and has a turnaround time of 5 to 10 days. While the ELISA test is faster, with a 5 to 7 day turnaround and a cost of $160 per sample, it will only test for 5 mycotoxins.

Deciding which lab analysis to choose can also depend on the feedstuff being tested. Dairyland Lab suggests specific lab analysis for these common feed ingredients and/or TMR samples.[1] (**Figure 1**)

Considering the seriousness of mycotoxin exposure, many producers are doing the LC/MS/MS and getting a more complete report. Having more accurate information about the level of mycotoxin exposure will be a tremendous advantage to helping make good management decisions to improve livestock performance and producer profits.

Assessing Mycotoxin Risk

It is important to keep in mind the synergistic nature of mycotoxins. For example, if a test comes back with one mycotoxin and it is below tolerance levels a mycotoxin binder is probably not needed. However, if two or more mycotoxins are found, even if they are each below tolerance level, the impact on the animal could be the same as though there is a high level of one mycotoxin. In that case an effective mycotoxin binder like Fuse 207™ would be needed in the feed.

Use of a mycotoxin binder would be indicated if:

1) Any one mycotoxin is at, or above tolerance level listed for that mycotoxin.
2) Mycotoxin test results range from 100 to 500 ppb when added together. If this occurs, a moderate level of toxin binder should be put into the feed.
3) Mycotoxins are over 500 ppb when added together. In this case, a toxin binder should be put into the feed and higher toxin binder levels may be needed.

Species Specific Mycotoxin Binders

New enzyme technology is being applied to mycotoxin binders, where enzymes are being used to make mycotoxins more susceptible to the binding agents. Some non-polarized mycotoxins like Vomitoxin are very difficult to bind up unless exposed to an appropriate enzyme that will open up the binding sights on the mycotoxin molecule allowing the toxin binder to more easily attach to the mycotoxin itself.

Each livestock species has a different digestive environment and a different pH level. Because the enzymes are organic compounds, they need to be designed to work within a specific pH range and in a specific digestive environment. Consequently, excellent mycotoxin binding performance can be achieved if the enzyme is properly matched to work in the specific digestive system of the targeted livestock species, i.e. ruminant, swine or poultry. The next generation of Fuse 207™ will have an advanced, proprietary enzyme plus a binder formulation that will be specific for feeding to ruminants only. In the past, Fuse 207™ could be used across all livestock species, but it did not have species specific enzyme technology. Now Fuse 207™ is super charged with new ruminant focus technology. Other key species like poultry and swine will also have a mycotoxin binder specific to their digestive system (UltraSorb P and UltraSorb S respectively) as explained in **Figure 2 and 3**.

Figure 2 **ULTRASORB P** INCLUSION RATES **(Poultry Only)**

	Diets	Total Mycotoxin Load < 500 ppb lb./ton Complete Feed	Total Mycotoxin Load > 500 ppb lb./ton Complete Feed
Broiler Chickens	Starter	2.2	4.4
	Grower	2.2	4.4
	Finisher	1.1	2.2
Breeders, Layers	Pullet (starter, grower, developer)	2.2	4.4
	Pre-layer	2.2	4.4
	Layer, Breeder	1.1	2.2
Ducks, Turkeys, Geese	All	2.2	4.4

Figure 3 **ULTRASORB S** INCLUSION RATES **(Swine Only)**

	Diets	Total Mycotoxin Load < 500 ppb lb./ton Complete Feed	Total Mycotoxin Load > 500 ppb lb./ton Complete Feed
Sows	Dry, Gestating, Lactating	2.2	4.4
Boars	Developing, Mature	1.1	2.2
Piglets	Pre-Starter, Starter	2.2	4.4
Grower, Finisher	Grower, Finisher	1.1	2.2

Figure 4 **FUSE 207™** INCLUSION RATES **(Ruminants Only)**

	Diets	Total Mycotoxin Load < 500 ppb Grams/Head/Day	Total Mycotoxin Load > 500 ppb Grams/Head/Day
Calves	Pre-wean to 400 lb.	5	10
Heifers	400 to 1200 lb.	5 to 15	10 to 30
Cows	Dry Cows, Lactating	15 to 20	20 to 30

The New Fuse 207™ Is A Mycotoxin Binder For Use In Ruminant Feeds

The Crystal Creek® mycotoxin binder, Fuse 207™, is being super charged with a next generation formulation that incorporates many new, innovative and exciting technologies to increase effectiveness and reduce cost to the producer at the same time.

The new proprietary formula for Fuse 207™ will now be for ruminant use only. The typical recommended Fuse 207™ inclusion rates will be 20 grams per head per day for mature dairy and beef cattle. The feeding range is 15 grams to 30 grams per head per day depending on need. (**Figure 4**)

Having a good understanding of the challenges mycotoxins present to livestock is key to developing a sound strategy for dealing with them in an effective manner. Protecting livestock from mycotoxins with the advanced technology supplied by Crystal Creek® Fuse 207™, UltraSorb P and UltraSorb S, will improve your bottom-line. Call Crystal Creek® today to develop a mycotoxin strategy that is best for your operation.

[1] Dairyland Labs, Inc. Arcadia Wisconsin, 1-608-323-2123 or www.dairylandlabs.com