Featured expert of the month...

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Mold and Mycotoxin Testing

Each year molds and mycotoxins leave a major economic impact on the dairy industry and despite advances in analysis of these toxic metabolites produced by molds, they still prove to be difficult to measure and quantify.
There are hundreds of thousands of unique mycotoxins in the environment; however there are good analytical methods for approximately 20 toxins and most labs are proficient at testing from five to eight toxins. These are the more common toxins such as Vomitoxin (DON), Aflatoxin, Zearalenone, T-2 toxin, Fumonisin, Ochratoxins etc. Several different mycotoxins can be present simultaneously and since these mold-induced toxins are synergistic, they often create a larger impact on livestock together than as individual single toxins.

When testing for molds and mycotoxins, there are four possible scenarios: 1) no molds and no mycotoxins are present; 2) molds are present, no toxins are present; 3) mycotoxins are present no mold is present; and 4) molds and mycotoxins are present. Here lies one of the many challenges in testing for mycotoxins.

The largest source of frustration in testing for mycotoxins is the difficulty in obtaining a representative sample for laboratory analysis. Mycotoxins, unlike protein and starch, are not evenly distributed throughout the "lot" of grain or feed to be sampled. Mycotoxins will only occur in small locations or "hot spots" of the feed in question. In retrospect, feed and forage sampling are the process of reducing tons of feed down to grams of material to be sent to the lab. In addition, when the sample arrives at the lab it is further reduced from grams to milligrams of material to be tested. Finding the level of mycotoxins at parts per million can be likened to finding one kernel in two tons of corn and parts per billion is the equivalent of finding one penny in ten million dollars.

To obtain a representative sample, the following guidelines have been developed by laboratories and university specialists that routinely deal with sampling issues.
Hay: Use a bale core sampler to reduce error with a minimum of 15 to 20 cores per lot. A "lot" is defined as forage harvested within one day of, from one field, for the same cutting and maturity, and is similar in the amount of grass, weeds, rain damage, etc.
Silages- Tower Silos: Take fresh samples unless specifically testing spoiled material. Collect 15 to 20 handfuls from silo unloader into a plastic bucket and mix thoroughly.
Silages- Bunker. Take 10 to 12 samples from the face of bunker and mix them to make one composite sample.
Total Mixed Rations- TMR: Mix TMR per normal routine. Place containers (minimum of three) along the bunk and unload the TMR.

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For all types of forage, it is recommended to use clean plastic bags, remove as much air as possible and seal tightly. All bags submitted for testing should also be labeled properly. Even with the best sampling methods, testing and detecting mycotoxins that are causing problems on the farm is difficult. As Dr. Mike Murphy of the University of Minnesota once said, "The potential for problems are greater with the three or four mycotoxins that you did not detect versus the one or two mycotoxins that you may be able to detect."

Given the difficulty in determining mycotoxin contamination on the farm, another approach gaining interest is the use of testing for mold counts and then further identifying the type of mold present. By identifying the type of mold present you can determine if they are capable of producing mytoxins that are detrimental to livestock production. This approach provides some advantages: 1) a properly trained and experienced microbiologists can readily identify many molds that are capable of producing mycotoxins; 2) several of the primary molds can be identified at one time; 3) mold identification is less expensive that testing for a full "battery" of mycotoxins; and 4) useful information is obtained that can be used to make changes to the feeding program.

While identifying molds is no guarantee that mycotoxins are present, there is a growing body of evidence that this is a useful and practical tool in diagnosing problems on the farm. The use of mold counts and identification at Dairyland Laboratories, Inc. over the last 7 years has grown exponentially while testing for mycotoxins has remained relatively consistent.

While there are many challenges in testing for mycotoxins, it is still a useful tool and should be included in a tool box when trying to troubleshoot production problems. Incorporating a mold count and identification test is likely to yield additional valuable information. Consequently, more information will result in better decisions.