



Northeast Organic Farming Association of Vermont

An organization of farmers, gardeners, and consumers working to promote an economically viable and ecologically sound Vermont food system

Mycotoxins, Feed and Animal Health

With this year's wet growing season in Vermont and the Northeast many dairy and livestock farmers are concerned about the increased possibility of mycotoxin (mold toxin) contamination of feed.

They should be. Mycotoxins can have significant impact on animal health, production and profitability. Producers need to keep in mind some important information about mycotoxins in order to avoid problems.

What is the problem ...

- Mycotoxins are chemical poisons produced by growing molds; they are not infectious agents like bacteria and viruses. There are hundreds of different known mycotoxins (and probably hundreds of unknown ones), but relatively few are well-known causes of disease.
- Molds capable of producing mycotoxins can be found in every field – organic and conventional -- in Vermont and throughout the world. Crops growing under stressful conditions (too wet, too dry, poor soils) are at risk of being infected by mycotoxin-producing molds. Hay, grains and silages that have been improperly harvested, handled or stored are at higher risk to be contaminated with mycotoxins.
- Mycotoxins are stable and persistent; they are often present, even at high levels, after mold growth has ceased and mold is no longer visible. More than one type of mycotoxin is commonly found in contaminated feed at the same time
- All species of livestock are affected by mycotoxins. Monogastrics (swine, horses) are most sensitive, followed by ruminants and poultry. In general, young stock and animals under environmental, nutritional and production stresses are most sensitive.
- Mycotoxins in feed may have sudden and dramatic effects (sharp drops in production, hemorrhaging, abortions), but *far more often* they are present at low levels with subtle effects. Over periods of days and weeks symptoms may become apparent as more contaminated feed is ingested.
- Safe levels of mycotoxins in feed, below which there are no effects on animal health or production, are not well established.
- Mycotoxins may suppress the immune system, cause organ toxicity, and interfere with digestion and utilization of nutrients, vitamins and minerals.
- Symptoms of mycotoxin poisoning vary widely and often the same as other widely recognized and common diseases, nutritional disorders and management factors –



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e.g., off feed, failure to thrive, decreased fertility, diarrhea, displaced abomasums, increased rates of infection, high somatic cell counts, mastitis, ketosis, and others. As a result, farmers, veterinarians and nutritionists often fail to diagnose it correctly in a timely way – or not at all!

What to look for ...

- Feed refusal or decreased intake are often observed when feed is contaminated with mycotoxins; contaminated feeds are often less palatable
- Herd health problems that do not respond as expected to treatments and interventions may be due to mycotoxins.
- In mammals, a drop in milk production and/or reproductive problems (low conception rates, repeat breeding, irregular or absent estrus, abortions) are commonly observed.

If you think you have a problem

- If possible, remove & replace suspect feed for several days or more to see if feed intake increases or symptoms of concern disappear or lessen. If so, discard the feed. (Note: stored hay, grains and silages may have limited areas of contamination --“hot-spots” – due to improper handling, areas of high moisture, etc.)
- Ensure that the ration is balanced to provide adequate energy, nutrients and minerals. Increase levels of dietary antioxidants, vitamins A and E, selenium and zinc.
- If possible, blend suspect feed with other feeds to reduce concentrations of mycotoxins that may be present. Watch for effects on feed refusal and symptoms of concern.
- Consider having a sample of the feed tested by a laboratory. Mycotoxin screening tests have limitations: not all mycotoxins can be tested for and the tests can not determine safe levels of mycotoxins that may be found. Still, the presence of **any** mycotoxins in the feed in conjunction with observed symptoms should be viewed with concern. (See below.)
- Add an organically certified **mycotoxin binder** to the ration. These substances attach to and ‘tie-up’ mycotoxins in the gut, thus reducing or preventing their absorption in the body and resulting disease. The use of a mycotoxin binder **may** allow for suspect or tested-positive feeds to be fed without ill effects. (Contaminated feed may have reduced nutritive value. Test and rebalance the ration if necessary.)
- There are several types of reasonably priced, organically certified mycotoxin binder on the market (see below). Each type, however, has its limitations in terms of its ability to “tie-up” different mycotoxins. Since contaminated feed often contains more than one type of (usually unidentified) mycotoxin, finding an effective binder can be a trial-and-error process: if, after a week or two, one binder does not seem to be working, another binder can be tried.

Preventing mycotoxin problems ...

- Keep good feed, production and health records so that problems can be spotted early.
- Molds will grow in the presence of moisture and oxygen. Make sure wrapped bales and silage bags are not torn (creating “hot spots”) and that silos and bunkers are filled

properly and fed out at the correct rates. Keep grain moisture levels low. Harvest hay when dry and store it properly.

- Discard visibly moldy and spoiled feed as there is an increased risk of mycotoxins. (But, again, mycotoxins may be present at high levels in feed in the absence of visible mold and spoilage.) Do not use discarded hay to bed animals.
- Minimize nutritional, environmental and production-related stresses. Make sure that the diet is fully balanced, including all vitamins, minerals, and buffers.
- Do not overfeed grain: it may result in digestive system “stress” (e.g., low rumen pH) and thus increase both exposure and sensitivity to mycotoxins.
- Clean grain bins, bunkers, silos and feed storage areas whenever possible. Elevated levels of mycotoxins are often present in accumulated chaff, broken kernels and fines.
- Be vigilant. Don't let “early signs” go unattended!

Resources and information

About mycotoxin binders: While the FDA has yet to approve any product or substance specifically for use as a mycotoxin binder, a number of perfectly safe, readily available, certified-organic products are commonly used as feed additives by organic producers in treating suspected mycotoxicity in livestock. Laboratory and animal research studies have shown that they vary widely in effectiveness depending on the types of mycotoxin that are present, livestock species and other factors.

The following products have been approved for use by either the USDA-National Organic Program and/or NOFA-VT's Vermont Organic Farmers (VOF). Check with VOF if you have any questions about these or other products. *Be sure to use each of these products at the recommended rates.*

Clay-mineral products: These are natural, mined products that are commonly used as mycotoxin binders. Several are sold and widely used as mineral supplements.

- *Desert Dyna-Min* (Agri-Dynamics: Tele: 610-250-9280)
- *Redmond Mineral Conditioner* (available from Green Mt. Feeds, 802/234-6278)
- *Holistec Clay* (Holistec, Inc., Quebec. Tele: 418-362-2203; Dist. 802-755-6202)
- *Pro-Fit* (Bio-Logic, VT; 802-888-3255); also contains approved plant compounds
- *MRX Mineral Mix* (Bio-Logic)
- Generic Bentonite clays -- may be available through feed dealers and mixed with feed at the mill. They may interfere with mineral absorption in the gut; extra minerals can be added to the ration.

MOS/Glucomannin products: These are naturally occurring sugar compounds found in yeast cells and many plants. Recent studies have found them to be effective immune system “boosters” and capable of binding a range of the more commonly encountered mycotoxins.

- *Check-M* (formerly *Toxi-Halt*) (Crystal Creek Services, WI. 1-888-376-6777)
- *Agrimos* (Lallimand Animal Nutrition, WI. 1-414-464-6440)
- Aloe products -- Aloe leaves are high in glucomannins and are found in a variety of approved products. Aloe's efficacy as a mycotoxin binder has not been established, but its use in conjunction with one of the above products may be of benefit.

Activated charcoal: An age-old treatment for poisonings of all kinds, in animals and humans. As with Bentonites (above), it may interfere with mineral absorption in the gut and probably should be used with supplemental minerals. At this time a commercially available and economical source for livestock use is not known to us. *Note: only activated charcoals produced with vegetable matter are certified-organic.*

Other substances are also used or marketed as mycotoxin binders: *Aluminum silicates (HSAC)* are used in conventional feeds but are not approved for organic production. Some naturally occurring *humic acid (humate)* products have been approved, but results from scientific studies and from farmers who have used them for this purpose are limited at the present time.

Mycotoxin testing: *Screening tests that detect the most important mycotoxins are available through many laboratories. Be sure to contact the laboratory for information and advice about sampling and handling of samples: the analysis is only as good as the sample that is submitted! (Again, ‘hot spots’ may be present which may affect sampling and test reliability.)*

UVM Forage Laboratory

Agricultural and Environmental Testing Laboratory
Contact: Gail Lapierre, Supervisor; Tele: 802-656-5777
\$60/test (9 mycotoxins tested)

Dairy One

Ithaca, New York
Tele: 1-800-496-3344, 607-257-1272
\$25/toxin tested (details at www.dairyone.com)

Further reading:

Updates of this factsheet, information on mycotoxins and weblinks to publications on mycotoxins and their effects in different livestock species can be found on the NOFA-VT Dairy and Livestock Technical Assistance Program webpage: www.nofavt.org (click on ‘NOFA Programs’ link)

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