



Aflatoxins and Dairy Cattle

Whenever crops are under stress, the potential for aflatoxins increases. Aflatoxins are poisonous by-products of the growth of some species of the mold fungus *Aspergillus*. Some crops may be contaminated with aflatoxins, particularly whenever drought stress occurs.

When lactating animals are fed aflatoxin contaminated feed, they excrete aflatoxin metabolites into the milk. The aflatoxins are capable of causing aflatoxicosis in consumers of milk. This is why government regulations specify that milk must be free of aflatoxin. However, action is not taken until the aflatoxin level exceeds 0.5 ppb in market milk, the level below which there is no hazard for the consuming public.

"Action levels" for livestock represent the level of contamination at which the feed may be injurious to their health or result in contamination of milk, meat or eggs. Action levels by class of livestock are in table 1.



Aspergillus flavus growth on corn.

Aflatoxicosis is a disease caused by the consumption of aflatoxins, the mold metabolites produced by some strains of *Aspergillus flavus* and *Aspergillus parasiticus*. The four most common aflatoxins are B1, B2, G1 and G2. Contaminated grains and grain byproducts are the most common sources of aflatoxins in Texas. Corn silage may also be a source of aflatoxins, because the ensiling process does not destroy the toxins already present in silage.

Table 1: The FDA Center for Veterinary Medicine "Action" levels for aflatoxin in feed grain in interstate commerce.

Action Level (parts per billion)	Class of Animal
20	Dairy
	Immature Animals
	Immature Poultry
100	Breeding Cattle
	Breeding Swine
	Mature Poultry
200	Finishing Swine
	(100 lbs. or greater)
300	Finishing Cattle

Aflatoxins are metabolized in ruminants by the liver and excreted in the bile. Aflatoxin B1 is the most potent mycotoxin (toxic substance produced by a mold). Aflatoxin B1 increases the apparent protein requirement of cattle and is a potent cancer causing agent (carcinogen). When significant amounts of aflatoxin B1 are consumed, the metabolite M1 appears in the milk within 12 hours. Research suggests M1 is not as carcinogenic or mutagenic as is B1, but it does appear to be as toxic as its parent compound.

Symptoms

Dairy and beef cattle are more susceptible to aflatoxicosis than sheep. Young animals of all

species are more susceptible to the effects of aflatoxins than mature animals. Pregnant and growing animals are less susceptible than young animals but more susceptible than mature animals.

Feed refusal, reduced growth rate, decreased milk production and decreased feed efficiency are the predominant signs of chronic aflatoxin poisoning. In addition, listlessness, weight loss, rough hair coat and mild diarrhea may occur. Anemia along with bruises and subcutaneous hemorrhage are symptoms of aflatoxicosis. The disease may also impair reproductive efficiency, including abnormal estrous cycles (too short or too long) and abortions. Other symptoms include impaired immune response, increased susceptibility to other diseases and rectal prolapse. In dairy cattle, aflatoxin metabolites appear in the milk before any of the above signs develop.

Pathology

Clinical laboratory findings vary with the species, level of aflatoxin in the ration, and duration of feeding the contaminated feed. Necropsy shows the liver is usually pale tan, yellow or orange. Hepatic fibrosis and edema of the gallbladder may also be observed.

Diagnosis

Aflatoxicosis in milking cows is readily evident from milk samples. However, diagnosis in nonlactating cattle is more difficult because of the variation in clinical signs, gross pathology, and presence of other diseases due to suppression of the immune system. More than one mold or toxin can further complicate diagnosis as well. By the time overt symptoms are noticed, the prognosis is poor. Feed can be analyzed for aflatoxin and other mycotoxins at the Texas A&M Veterinary Medical Diagnostic Laboratory, P.O. Drawer 3040, College Station, TX 77841-3040, (409) 845-3414, or a commercial laboratory of your choice.

Prevention

Aflatoxicosis can only be prevented by feeding rations free of aflatoxin. Preventing aflatoxin contamination requires an on-going and thorough sampling and testing program.

1. Purchase feed from reputable persons and companies experienced in aflatoxin prevention and who have a proven record of properly monitoring their feed products. A reliable feed company will carry insurance to cover misfortunes with aflatoxins or other problems.
2. Don't buy poor quality feed or feed ingredients. A good deal on feed prices can be the most expensive buy a dairy farmer ever makes if it proves to contain aflatoxin.
3. Store feed at proper moisture levels.
4. Develop a systematic inspection and clean-up program to keep bins, delivery trucks and other equipment free of adhering or caked feed ingredients.
5. Minimize dust accumulation in milling and mixing areas. Keep all feed equipment free of caked feed.
6. Check feed storage bins for leaks.
7. Implement effective rodent and insect control programs in grain storage areas.
8. Grains contaminated with aflatoxins have been successfully treated with ammonia but it is expensive and dangerous to do.

Treatment

Aflatoxicosis is typically a herd rather than an individual animal problem. If aflatoxin is suspected, analyze the ration immediately. Eliminate the source at once, if aflatoxins are present. Increase levels of protein and vitamins A, D, E, and K in the ration as the toxin binds vitamins and affects protein synthesis. Practice good management to alleviate stress, reducing the risk of secondary infections. Provide immediate attention and treatment for secondary infections.

When Prevention Fails

Because preventing aflatoxin contamination is not always 100 percent effective, here are a few facts to remember when dealing with contaminated feeds.

1. The recommended aflatoxin feeding level is 0 parts per billion (ppb).
2. The level of aflatoxin an animal can tolerate depends on age and sex of the animal, its health status, and overall management on the farm.
3. To avoid contamination of milk, do not exceed 20 ppb aflatoxin in the total ration of lactating cows.
4. Do not feed calves milk from cows fed in excess of 20 ppb aflatoxin.
5. Do not feed beef cattle more than 300 ppb aflatoxin in the total ration. The maximum for young stock is 100 ppb in their total rations.
6. Aflatoxin levels can increase if grain is stored improperly.

Conclusion

Aflatoxins are highly toxic to livestock and people. Even fed at non-lethal levels, aflatoxins can seriously impair animal health and productivity. For lactating cows, do not exceed 20 ppb aflatoxin in the ration to avoid exceeding the Food and Drug Administration level of 0.5 ppb in milk.

Written by Ellen R. Jordan, Ph.D. Extension Dairy Specialist, Department of Animal Science, Texas A&M AgriLife Extension Service, The Texas A&M University System



UW-Madison Division of Extension Crops and Soils Program is offering two more webinars for the Fall Badger Crop Connection session on Wednesdays at 12:30 PM.

October 13th: Seed Trait Selection for Pest Management and Yield

October 27th: 2021-2022 Grain Marketing Outlook

Register for the fall 2021 sessions at
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Raising Calves That Thrive in the Winter



The thermal neutral zone

A newborn calf's thermal neutral zone is between 60 and 77 degrees Fahrenheit. The thermal neutral zone is the temperature at which an animal is the most comfortable and extra energy is not required to maintain normal body temperature.

When environmental temperatures are below the thermal neutral zone, the calf uses energy just to maintain its body temperature. Even on a warm winter day of 40 degrees Fahrenheit, the maintenance requirement for calves younger than three weeks old is 40 percent higher than when temperatures are within the thermal neutral zone. At zero degrees, the maintenance requirement is about double.

Additional measures must be taken during the winter to help calves stay warm, healthy and continue to grow in the cold.

How to help calves stay warm and healthy in winter

Calves must be born in a very clean, dry environment

Calves are born with only three to four percent body fat. They are also born with a special layer of fat called brown fat. Brown fat's only purpose is to release energy as heat. To prevent using all the fat within a few hours of birth, dry off calves rapidly.

The calving area should also be draft free. Warming boxes or rooms should be considered if

calving in outside cold facilities. Four quarts of colostrum should be fed as soon as possible after birth to provide passive immunity and nutrients to the newborn calf.

Increase nutrition

In cold weather, calves need more energy just to maintain body temperature. This is particularly important during the first three weeks after birth, before calves consume much calf starter. Once calves consume starter and begin to ruminate, heat produced by feed digestion helps keep calves warm.

Unless calves are already consuming eight or more quarts of high quality milk replacer or whole milk per day, consider increasing the amount of milk offered up to these levels or higher.

- Research shows this will not result in scours and the extra energy will allow calves to better fight off disease.
- Increase the number of feedings per day from two to three or increase the amount of liquid at each feeding.
- Do not just increase the amount of milk replace powder in the same amount of water. This has the potential to cause dehydration, especially if water access is limited.
- Feed milk at 105 degrees Fahrenheit.
 - Milk can cool rapidly during extreme cold.
 - Adjust the initial temperature to achieve a milk feeding temperature of 105 degrees.

Calf blankets

Wearing blankets in cold weather helps keep calves warm.

Canadian research shows that when calves were housed at a temperature of zero to -22 degrees Fahrenheit, blankets provided a 52% increase in whole animal insulation.

Warm water

- Offer calves warm water daily. This can be a challenge in our winter climate.

- Drinking water stimulates consumption of grain that promotes rumen development.
- Consider offering warm water after calves are finished with their milk.
 - After 10 minutes, empty the water from the pails before it freezes.
 - Another option is to offer warm water other times during the day.

Clean, dry bedding

- Provide lots of clean, dry bedding. Calves' hair coats provide excellent insulation if they are clean and dry.
- Kneel in the bedding. If your knee gets wet, the calf will also get damp when lying down.
- Deep bedding allows a calf to nest down in it and provide a barrier of warm air around itself.
- Bed calves to a nesting score of three, where the calf is able to nestle deeply into the bedding material, and its legs are not visible.

Ventilation

- Most hutches have openings or vents to keep air fresh for the calves.
- If no air is circulated within the facility, there is an increased disease risk because heat and moisture can create an environment that is open to pathogen growth.
- Well-designed air tubes keep small amounts of fresh air distributed throughout the building without creating a draft.

Delay weaning

Delay weaning during extremely cold weather. Holstein calves can normally be weaned when consuming 1.5 to 2.0 pounds of starter for three consecutive days. However, since weaning is a stressful period, delaying weaning during extremely cold weather is recommended.

Written by James Salfer, Extension dairy educator



BEEF QUALITY ASSURANCE IN WISCONSIN

BQA does more than just help beef producers capture more value from their cattle: BQA also reflects a positive public image and instills consumer confidence in the beef industry. When producers implement the best management practices of a BQA program, they assure the cattle they sell are the best they can be. Today, the stakes are even higher because of increased public attention on animal welfare. BQA is valuable to all beef and dairy producers because it:

- Demonstrates commitment to food safety and quality.
- Safeguards the public image of the beef and dairy industries.
- Upholds consumer confidence in valuable beef products.
- Improves sale value of marketed beef cattle.
- Enhances herd profitability through better management.

HOW CAN YOU BECOME CERTIFIED?

In-person training for Kewaunee County farmers:

Date/Time: December 1, 5:30pm

Location: Kewaunee Co Fairgrounds, Luxemburg

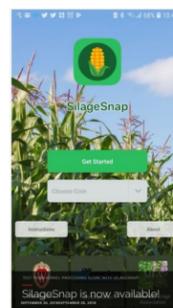
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Corn Silage \$ App

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SilageSnap App

SilageSnap allows you to check the particle size of corn kernels in your chopped and processed corn silage during harvest.



Sporecaster App

Sporecaster is designed to predict the probability of white mold apothecial presence.

All the apps can be found in the Apple App Store and Google Play Store.