

Mycotoxins

Mycotoxins are produced by molds and fungi to aid in the establishment and growth of the species. The function of the mycotoxins are to protect the fungus and act as a defense mechanism by excluding or poisoning animals, plants or other species of molds or fungi.

The fungi primarily affect the seed or grain portion of the plant. The spores of the fungi are carried to the seed by wind or insects where they germinate and may produce mycotoxins. Insect damaged corn kernels are particularly susceptible. Maize weevils, corn earworm, fall army worm and European corn borer can lead to increased fungal growth and mycotoxin production. The fungi rapidly establish themselves on damaged kernels.

Other field factors that can lead to mycotoxin problems in corn include:

- High temperatures
- Drought
- Plant variety
- Planting density
- Planting date
- Soil texture
- Soil fertility
- Rain during harvest
- Continuous cropping
- Competition with other fungi

Improper storage conditions may also encourage mold or fungi growth. To reduce field losses, corn is often picked and shelled at high moisture levels and molds quickly if not rapidly dried in storage. Mechanical shelling increases kernel damage allowing the fungi to get a foothold. Increased moisture levels due to exposure to rain, structural leaks or condensation can promote fungal growth. Lack of proper aeration can cause temperature differentials and moisture migration. Storage insects accelerate fungal growth through feeding and the dissemination of spores. Other predisposing storage conditions include:

- Poor sanitary practices
- Broken kernels
- Accumulation of fines
- Dust
- Weed seeds
- Heating

Corn or grains that are grown or harvested under suspect conditions should be treated prior to storage to avoid mycotoxin problems. Preservatives such as propionic acid, acetic acid and anhydrous ammonia are effective in halting the production of mycotoxins.

In corn that is already contaminated, screening can be used to remove broken kernels (the broken kernels are the most likely to be infected). The remaining corn should then be treated to prevent any further growth. Contaminated corn may also be diluted with higher quality corn to reduce overall levels of toxins. This is only permissible if the corn is destined for feed use, not for human consumption.

Mycotoxins impair animal performance by negatively influencing metabolic processes. The mechanisms of action include:

- Inhibition of key enzymes.
- Reactions with DNA and RNA to hinder protein synthesis.
- Interaction with biological membranes to impair molecular processes.
- Reactions with cofactors to reduce enzyme activity.

Susceptibility depends upon species, age, form of toxin and nutritional status. Early signs of possible mycotoxin problems include feed refusal and the appearance or smell of moldy

feed. Discontinue feeding any feeds that are suspect or test above levels deemed acceptable for that class of livestock.

Refer to the Mycotoxin Chart which lists the most common mycotoxins, conditions that promote growth, and possible animal effects.

Identifying and Managing Mycotoxin Contaminated Feeds

1. Observe symptoms in animals.
2. Rule out other causes.
3. Test suspect feeds.
4. Remove or dilute contaminated feeds.
5. Consider addition of research proven adsorptive agent.
6. Work with a qualified nutritionist to insure rations are properly fortified.
7. Repair or replace storage facilities that may be contributing to the problem.
8. Consider using mold inhibitors on future harvests.