

AFLATOXIN TEST FOR GRAINS NOW AVAILABLE

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

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

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

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

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

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

Aspergillus Flavus is the primary producer of aflatoxin. A. Flavus can invade the crop before, during and after harvest depending upon the crop, locale and year. Corn, peanuts and cottonseeds can be affected before and after harvest. Soybeans and small grains show little preharvest infestation with growth generally occurring in storage.

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

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

Susceptibility depends on species, age, form of toxin and nutritional status. Early signs of mycotoxin problems include feed refusal and the appearance or smell of moldy feed. Other symptoms are:

- Unthriftiness
- Decreased milk production
- Decreased body weight gains
- Lethargy
- Normal or below normal body temperature
- Dry, peeling skin on the muzzle
- Prolapsed rectum
- Liver damage
- Altered blood chemistry
- Abdominal edema

Unfortunately, these symptoms are not particular to aflatoxin poisoning, making diagnosis difficult. Often, the problem is only identified after a positive analysis occurs in the feed, urine or milk.

Daily consumption of aflatoxin for 4 to 6 days will result in the continuous excretion of aflatoxin into the milk. Aflatoxin is a potent carcinogen.

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 the broken kernels (the broken kernels are 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 the overall level of aflatoxin. This is only permissible if the corn is destined for feed use, not for human consumption.

The following table outlines the allowable levels of aflatoxin for animal feed usage:

TABLE 1.

Class of Animal	Acceptable Aflatoxin Level
Lactating dairy cattle, immature animals, (including immature poultry), or destination unknown*	≤ 20 ppb
Breeding cattle, breeding swine or mature poultry	≤ 100 ppb
Finishing swine (100 lbs. or greater)	≤ 200 ppb
Finishing beef cattle	≤ 300 ppb
* Corn destined for human food use also fits into this category.	

Using a black light on suspect samples indicates the presence of a mold or fungus. It does not tell you if mycotoxins have been produced. To determine this, the samples must be analyzed for mycotoxins.

DHIA will begin screening samples for aflatoxins. This test is sensitive for aflatoxins B1, B2 and G1 and is applicable to most grains and ingredients. The procedure is an enzyme-linked immunoassay (ELISA). It has been approved by the USDA's Federal Grain Inspection Service (FGIS) and the Association of Official Analytical Chemists (AOAC).

To have your sample screened for aflatoxin, simply write "**AFLATOXIN TEST**" in the comment section of the information sheet. Since the majority of samples that pass through the lab are destined to be fed to lactating dairy cows, samples will be screened at the 20 ppb level. Results will be expressed as greater than or less than 20 ppb. If you would like to have the feed analyzed at one of the other levels, please indicate the desired level on the information sheet. If you include your phone number on the information sheet, we will telephone the results within 24 hours. The cost per test is \$18.00.

FREE FAX RESULTS — Now, in addition to E-Mail and free telephone results, FAX results are available. This has been added to our list of services as part of our continuing efforts to get your results back to you as soon as possible. If you would like to have your results sent via FAX, please write "FAX RESULTS" and your FAX number in the comment section of the forage sample information sheet.

For sending FAX information to DHIA, the fax number is 607.257.6808.

FREE SOLUBLE PROTEIN RESULTS — DHI has completed the grant work that was partially funded by NYS Dept. of Ag & Markets. The grant originally was for the development of a NIR soluble protein calibration for haylages. This was expanded to include hay and corn silages. All calibrations have been successfully completed. Soluble protein results are now being provided automatically at no additional charge for hay, haylage and corn silage receiving the (01) NIR Complete Analysis. Non-structural carbohydrates (NSC) results are also automatically provided with the NIR package for these forages. This makes the Northeast DHIA NIR package the most complete analysis of its type available.

SUMMARY RESULTS AVAILABLE — forage analysis data from May 1988 through April 1989 has been summarized. The summary contains averages and standard deviations for most common forages and grains. Along with our Grand Summary, data is also summarized by state and county (NY only). For some of the state and county summaries, data were limited and care should be taken when interpreting and using the summary data. If you would like to receive a summary, please notify us by letter or phone call.

E-MAIL, BACK UP AND RUNNING — The ailing E-Mail system has been revised to provide more consistent and reliable service. New additions to the **FORAGE MENU** are:

- (7) List Incomplete samples — samples that have arrived are listed, but no results are available yet.
- (8) Set List on Descending Date — starts with the most recent date and works downward.
- (9) Set List on Descending Sample Number — starts with the highest sample number (most recent) and works downward.

The Special Format Menu now includes several format options that will enable you to download information into spreadsheet or other programs. You may also choose "Display as a form". This will print one analysis report per page in a format similar to the regular DHIA forage report. It can be taken directly to the farm and presented as a completed report. Please be sure to try this option.

Thanks for sending your forage samples to Northeast DHIA.