Mycotoxin Review: Simple version

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Mycotoxins

- Produced from molds
  - Warm temperatures
  - Moist conditions
  - Damaged grains
- Molds then produce the mycotoxins
  - Hundreds identified

Subtle mold

Storage Conditions

- Adequate moisture level-13.5%
- Aerate grain to within 10^{o}F outside temperature
  - Grain stored next to bin wall
  - Prevents sweating/condensation→ mold growth

DDGs/Corn Co-Products

- Removal of starch fraction concentrates mycotoxins
- Corn Processing does not remove mycotoxins
- DDGs = 3X toxin vs corn

Monitoring

- Sampling is critical
  - 1 ppm = parts per million
  - 1 ppb = parts per billion
- Take several subsamples/probes
  - 5 to 10 sub-samples pooled to composite sample
- Still may be disappointed on test results
  - Contamination maybe in pockets

Testing

Iowa State

Mycotoxins - LC/MS/MS panel	
FEE:	$100.00 - panel $50 for Aflatoxin only $50.00 - other individual mycotoxins
SPECIMEN:	• feed 2lbs
DAYS TESTED:	
TURN-AROUND:	5-7 days
PANEL INCLUDES:	Aflatoxin B1, B2, G1, G2, Fumonisin B1, B2, B3, Nivalenol, Ochratoxin, T2, Vomitoxin, Zearalenone, Zearalenol
SUBMISSION GUIDELINES:	See submission guidelines
SEE MORE INFO:	• aflatoxin • mycotoxins

NDSU

Method:	GC/MS HPLC
Samples Accepted:	Feed-grains, distillers, TMR's, silages and haylages
Species:	
ND Price:	$100.00
Out of State Price:	$120.00
Days Tested:	MON, TUE, WED, THU, FRI
Turn Around Time:	3-7 days
Lab Section:	Toxicology

Home / Tests / Mycotoxin Screen

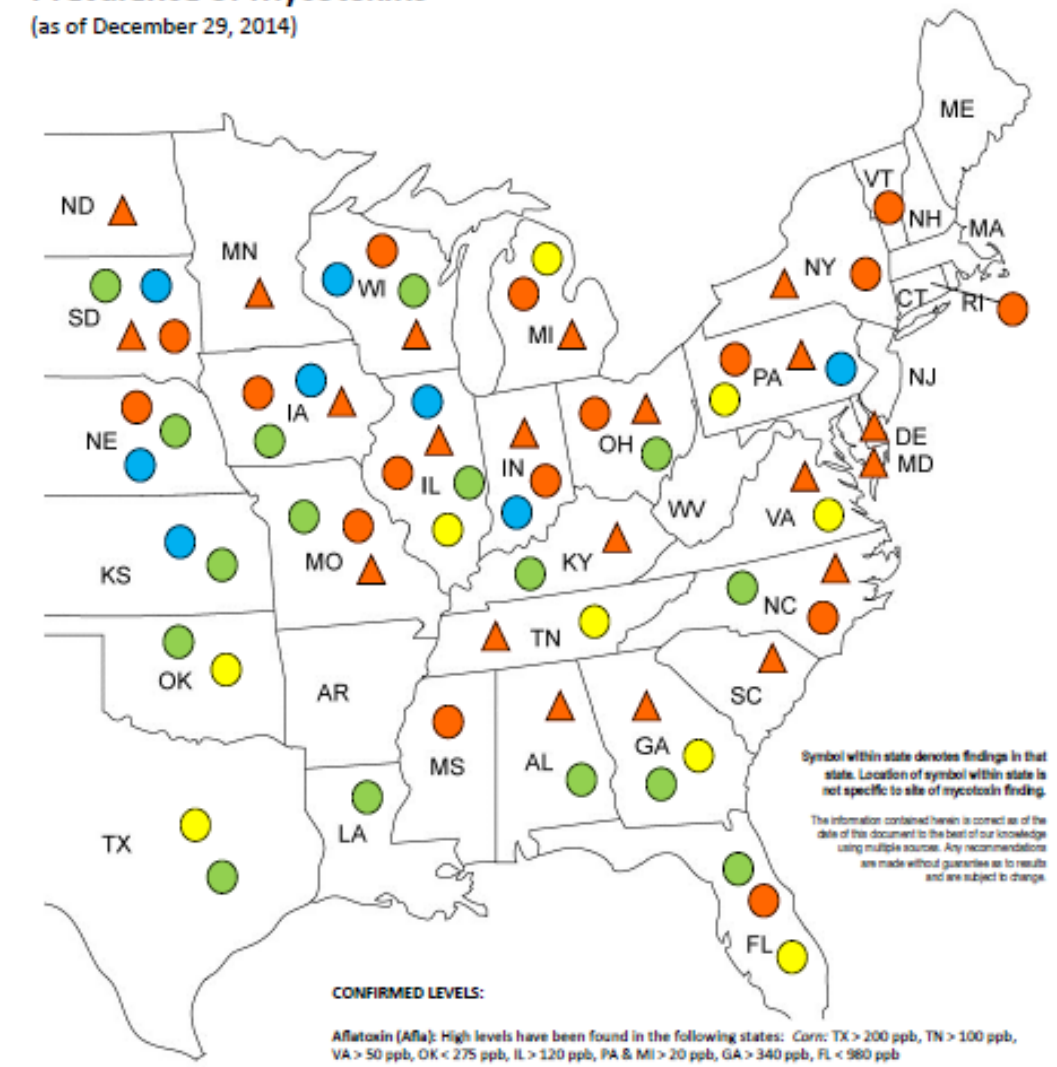
PRINT

Mycotoxin Screen

Screen includes Vomitoxin, T-2 Tetraol, Fusarenone-X, 3-Acetyl DON, 15-Acetyl DON, DAS, T-2 Triol, T-2 Toxin, Iso T-2 Toxin, Scirpentriol, Nivalenol, 15-Acet-scrip, Neosolaniol, HT-2 Toxin, Zearaleone, Zearalenol, plus Aflatoxin B1, Fumonisin B1. The laboratory does not analyze forages for fumonisins. Please contact the lab ahead of submission for specialized feeds and/or forage analysis for aflatoxins.

Prevalence of Mycotoxins

(as of December 29, 2014)



Symbol within state denotes findings in that state. Location of symbol within state is not specific to site of mycotoxin finding.

CONFIRMED LEVELS:

Aflatoxin (Afla): High levels have been found in the following states: *Corn:* TX > 200 ppb, TN > 100 ppb, VA > 50 ppb, OK < 275 ppb, IL > 120 ppb, PA & MI > 20 ppb, GA > 340 ppb, FL < 980 ppb

Fumonisin (FUM): High levels have been found in the following states: *Corn:* TX > 10,000 ppb, LA > 4000 ppb, OK & NC < 3000 ppb, AL > 2800 ppb, NE < 8400 ppb, KS > 7000 ppb, FL > 5100 ppb, GA > 6500 ppb, OH > 2500 ppb, WI > 6500 ppb, IL > 3000 ppb, IA < 515,000 ppb, MO < 217,000 ppb, SD < 5400 ppb, KY < 5600 ppb

Zearalenone (ZON): High levels have been found in the following states: *Corn:* IA > 560 ppb, IL > 380 ppb, KS < 40 ppb, IN > 2800 ppb, PA > 130 ppb, NE < 2400 ppb, WI > 600 ppb, SD < 300 ppb

Deoxynivalenol (DON): High levels have been found in the following states: *Corn:* IA > 7700 ppb, MI > 5000 ppb, OH > 3500 ppb, IL > 3300 ppb, NE > 2000 ppb, IN > 24,000 ppb, MS & NC < 3000 ppb, PA > 4700 ppb, WI > 9000 ppb, MO < 1300 ppb, FL > 970 ppb, SD < 4600 ppb, VT < 700 ppb, CT < 1300 ppb, NY < 6500 ppb

Wheat/Barley: NC > 3000 ppb, SC & MI > 4000 ppb, AL & IN > 10,000 ppb, GA, IA, PA & OH > 2000 ppb, TN, SD & MN > 5000 ppb, MO > 20,000 ppb, IL > 14,000 ppb, WI > 12,000 ppb, VA, MD, NY, KY & DE > 7000 ppb, ND > 15,000 ppb

KR122914

LEGEND

ZON | Afla | DON | FUM

> greater than < up to

CORN

SOYBEAN MEAL

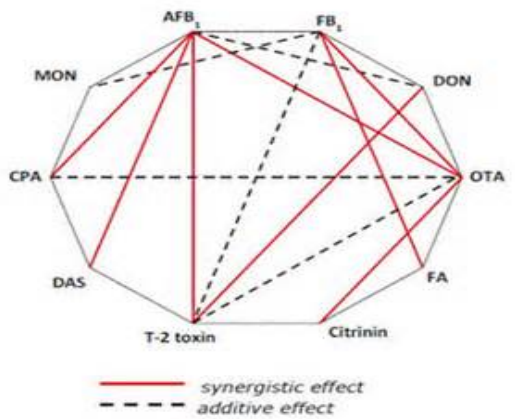
WHEAT/ BARLEY

Science CVS Health Production

Critical Levels of Mycotoxins

Mycotoxin	Level of Intervention
Vomitoxin (DON)	2 ppm
Zearalenone (ZON)	0.25 ppm
Aflatoxin	.05 ppm
Fumonisin	.20 ppm

Synergism between toxins may lower level of intervention.



Animal Signs of Mycotoxin Contamination

- Aflatoxin
  - Reduced performance (ADG,ADFI, FCR)
  - Lower sow performance
  - Kidney function
  - Liver damage-blood metabolites as marker

Animal Signs: Con't

- Zearalenone
  - Reproduction
    - Swelling/reddening of vulva
      - Pre-pubertal gilts
    - Disruption of estrus cycle
  - Rectal/vaginal prolapses

Animal Signs: Con't

- Fumonisin
  - Reduced performance
  - Pulmonary edema
  - Acute respiratory failure
  - Reduced immune competence

Animal Signs: Con't

- Vomitoxin
  - GIT lesions/irritation
  - Immune suppression
  - Reduction in feed intake
    - 3-5 ppm-moderate reduction
    - > 5 ppm-severe reduction
    - 10-20 ppm- vomiting & complete feed refusal

Mitigation Strategies

- Aflatoxin
  - Good “flow agent”
  - *do not use with Mecadox
- Other Toxins-
  - not much faith in product(s) restoring performance
    - Clay component
    - Yeast cell wall (Eg. MOS)
    - Antioxidant
    - Enzymes
- Dilution of contaminated source
  - Adjust DDGs levels
  - Not use products-Eg wheat midds

Summary

- Mycotoxin contaminated feeds:
  - Reduction in feed intake
  - Consuming a “poison”
- Sampling/Testing
- Mitigation
  - Aflatoxin-straight forward
  - Others-less successful