Mycotoxins in Poultry feeds

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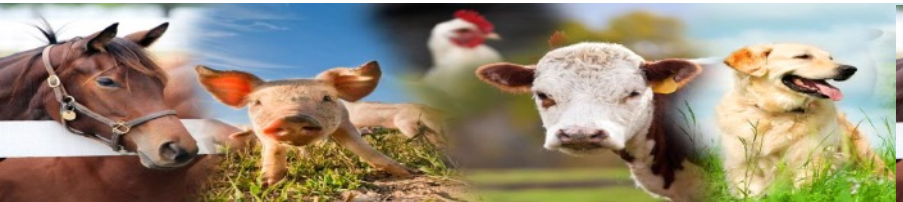
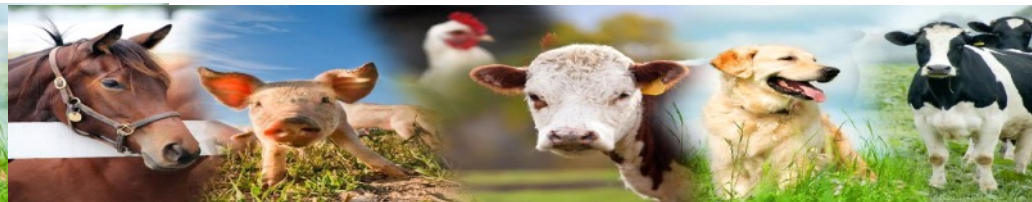
ESVCN





Mycotoxins

- Definitions:
  Mycotoxins are a diverse group of toxic secondary metabolites produced by certain moulds when they grow on agricultural products under certain condition
- Mycotoxicoses :
  Disease condition caused by consumption of contaminated feed with Mycotoxins.
- Mycotoxins are not essential for mould growth.
- According to FAO about 25% of the world's crop harvests are contaminated by Mycotoxins.

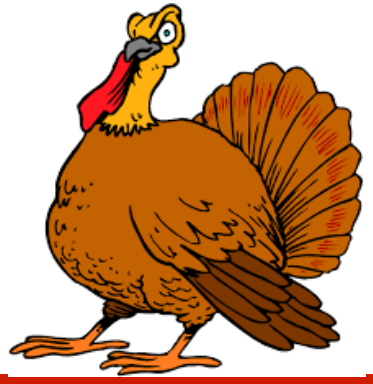
Brief History of Mycotoxin and Mycotoxicoses

- Horses in the Soviet Union from 1931 to 1940 (stachybotryotoxicosis due to feeding moldy hay).

- 1940 to 1950, several deaths of poultry in USA (due to feeding moldy feed)

Brief History of Mycotoxin and Mycotoxicoses

- In 1960, a dramatic mycotoxicosis of turkeys occurred in England called turkey X disease
- Aflatoxin was discovered as the etiological agent of this disease.



Brief History of Mycotoxin and Mycotoxicoses

- In the last 27 years, ochratoxin A, trichothecenes, deoxynivalenol and nivalenol were shown to be etiological agents for mycotoxicoses of man and livestock.

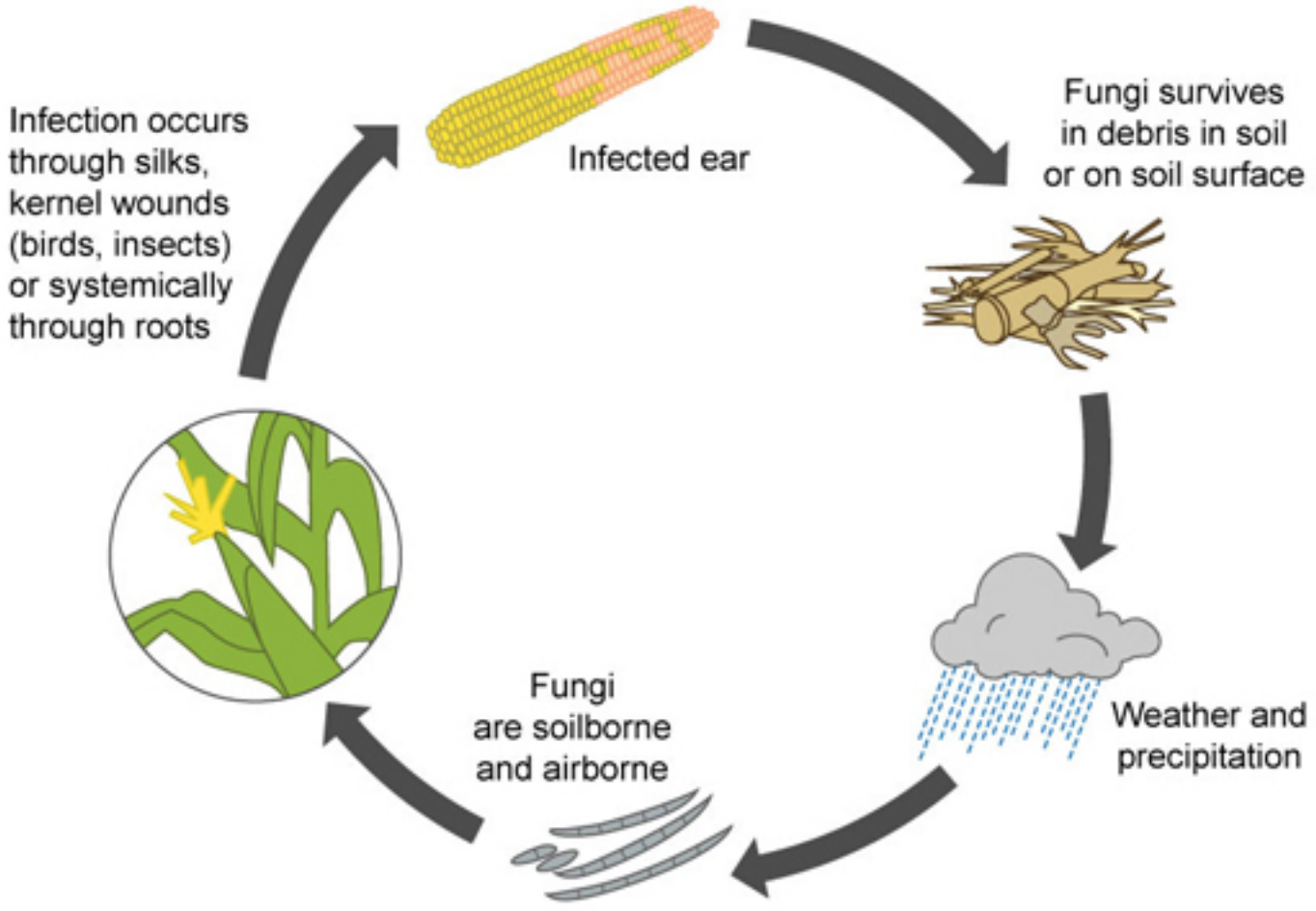
Mycotoxins

- Chemical compounds produced by some fungi
- Contaminate grains, food, and feed worldwide
- Aflatoxins were the first mycotoxins discovered
  - Hundreds now known worldwide
  - 30 are significant health hazards
- 5 principle mycotoxins affect cereal grains (corn, wheat, rye, barley, oats)
  - aflatoxins, fumonisins, ochratoxin A, deoxynivalenol (vomitoxin), and zearalenone

Gibberella ear rot caused by *Fusarium graminearum* (*Gibberella zeae*)
Source: Pioneer Hi-Bred, Intl

Fusarium head blight
http://www.ars.usda.gov/Main/docs.htm?docid=9765

Cycle of Fungal Disease



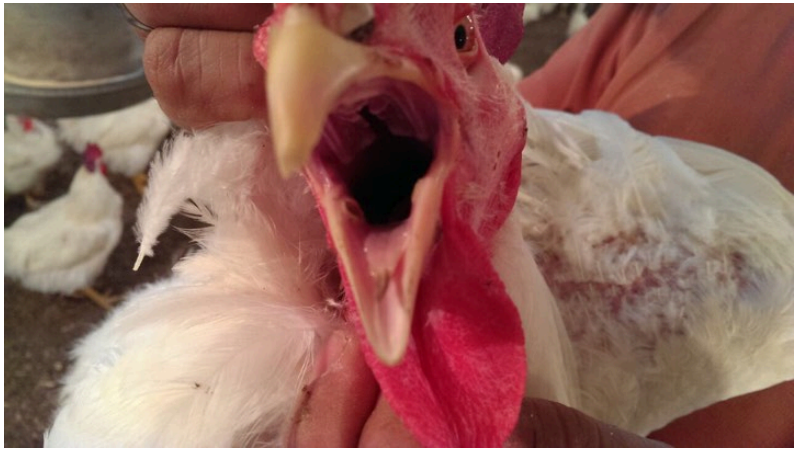
Mycotoxins	Primary Origins*	Effects on Poultry
Aflatoxin	*A. flavus* *A. paracitus* *A. nomius* *A. pseudotamarii*	• Reduces feed intake and weight gain • Reduces feed efficiency • Reduces immunity • Increases mortality • Results in liver damage, such as fatty liver • Causes hemorrhaging of the kidney and intestine • Causes carinogenesis and teratogenesis
Fumonisin	*F. moniliforme* *F. verticillioides*	• Little effects on growth performance of moderate levels • Reduces immunity and promotes poor growth at high levels (200~400 ppm)
Ochratoxin	*A. ochraceus* *P. verrucosum* *P. palitans*	• Reduces growth performance • Reduces hatchability • Kidney and liver damage • Carcinogenesis and teratogenesis
Trichothecenes Deoxynivalenol T-2 Toxin	 *F. graminearum* *F. sporotrichioides*	• Reduces feed intake and feed efficiency • Reduces immunity • Decreases egg production • Oral lesions and gizzard erosion • Regression of the bursa
Zearalenone	*F. graminearum*	• Little effects on growth and reproduction as compared to mammals

*A. – Aspergillus; F. – Fusarium; P. – Penicillium

The case

- Different farms in Delta region Egypt

The case

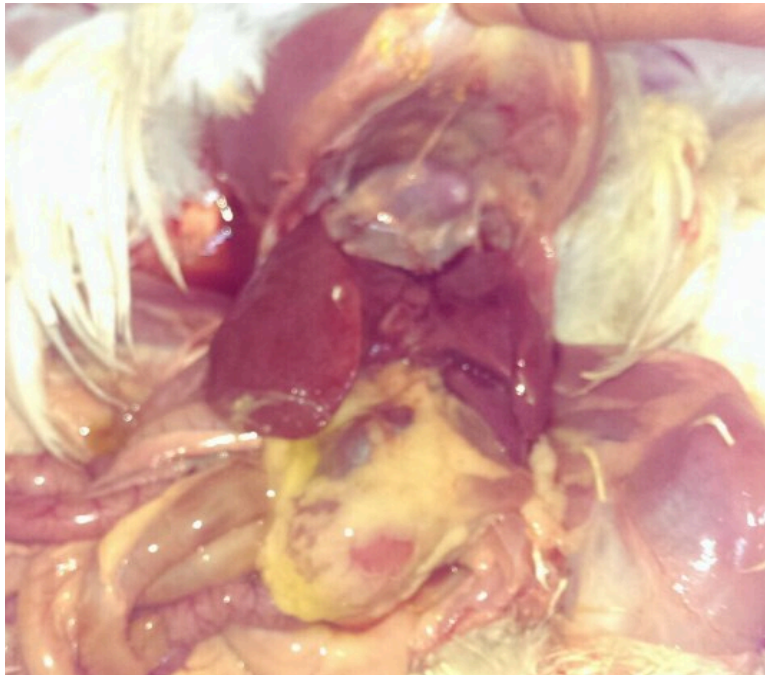


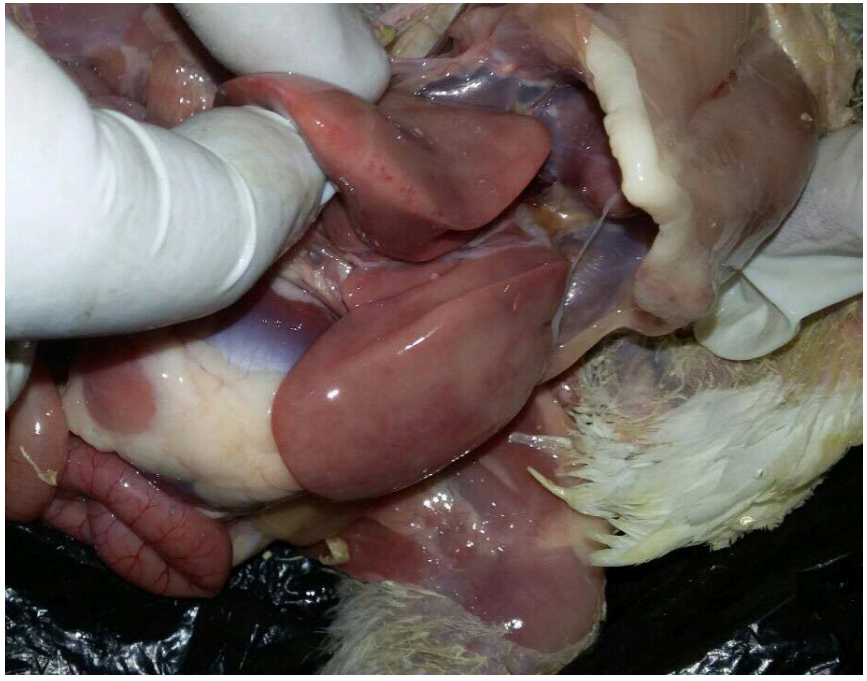
Case History

- 20-25 days old chicks (15000 bird)
- Birds suffer from decrease feed intake with poor conversion
- Decreased feed consumption
- Increase mortality
- Paralysis and lameness.
- Characteristic mouth lesions

PM

- Liver and kidneys were enlarged and pale.
- Shrunken firm nodular liver





PM

- Bile distended gall bladder and hemorrhages

Treatment

Prevent further exposure
Changing of the diet

+

Using mycotoxin binder

improvement in body weight, Reduction in F.C.R. & Decline in mortality rate


Thank You!

KEEP CALM AND DON'T ASK QUESTIONS

LEVELS AT WHICH MYCOTOXINS CAN CAUSE PROBLEMS AND THE LIKELY EFFECTS

Mycotoxin	Guidance value* (ppm @12% moisture)	Problem level (ppm)	Adverse effects
Aflatoxin		2.5 1.0	Broilers/turkeys – decreased growth rate. Layers – reduced egg production. Other poultry species, such as ducks, potentially more sensitive.
Ochratoxin A	0.1	1.5 – 2 0.5	Broilers/turkeys – depressed growth, increased water intake and wetter droppings. Layers – reduced egg production, shell quality and reduced feed intake.
T2 toxin		4.0 4.0	Broilers/turkeys – reduced growth rate and abnormal feathering. Characteristic mouth lesions. Layers – reduced egg production and mouth lesions.
Vomitoxin	5.0		Poultry are reasonably resistant to the effects of vomitoxin.
Zearalenone	0.5		Limited risk to poultry, but may be used as a benchmark for presence of other fusarium toxins.

*The guidance levels have been produced by the EU Commission, to give an indicator of good agricultural practice.

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