Mycotoxin Overview
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Mycotoxins are secondary metabolites produced by certain fungi. Secondary metabolites are compounds that are produced by an organism but are not required for normal metabolic activities like growth or reproduction. Antibiotics are also secondary metabolites produced by fungi, however, the classification of something as an antibiotic or a mycotoxin is based on whether it is useful in treating disease or is toxic. Since mycotoxins are secondary metabolites, not all strains of a particular mold species will produce them and their prevalence can vary widely.

Health Effects:
While there are hundreds of mycotoxins that have been discovered, there are a few key ones that we monitor for poultry production. These are: aflatoxins, deoxynivalenol (also called "vomitoxin"), fumonisins, ochratoxin-A, and T-2 toxin. The chemical structure and mode of action vary among each of these.

ll mycotoxins create some negative impact on the body's metabolic chemistry. They can be deadly at high levels and carcinogenic at low levels over an extended period of time. Though the particular effects vary for each one, there are common effects for poultry with any of the mycotoxins, such as reductions in feed intake, impairments of nutrient absorption and metabolism, damage to protein synthesis and function, and suppression of the immune system.

MYCOTOXIN	FDA ACTION LEVEL	CHARACTERISTIC EFFECTS
Aflatoxins	0.02 ppm (immature poultry) 0.10 ppm (mature poultry)	Highly toxic to the liver, can cause suppression of the immune system
Deoxynivalenol (vomitoxin)	10 ppm (poultry)	Known to cause feed refusal and vomiting, damage to the gut lining
Fumonisins	30 ppm (laying hens) 100 ppm (poultry for slaughter)	Known for interfering with normal bone development, poultry more resilient than mammals
Ochratoxin-A	No FDA action level	Highly toxic to the kidneys and shown to increase water consumption, poultry more resilient than mammals
T-2 Toxin	No FDA action level	Suppresses the immune system, can lead to gizzard erosion and oral lesions
Zearalenone	No FDA action level	Has estrogen-like effects, may affect fertility and hatchability, poultry more resilient than mammals

* ppm = "parts per million". 1 ppm = 1 mg/kg

Mycotoxin Control:
The best method for reducing mycotoxin exposure is the proper handling of grain during growing, harvest, and storage. In this case, an ounce of prevention will be worth a pound of cure. Once mycotoxins have been produced, they will not be destroyed by typical feed processing techniques. In fact, they are often concentrated by processes like grading/sorting and screening out fines.

The first thing to do is to never use grain or feed that is showing signs of mold growth. While the presence of mold is not a direct indicator that mycotoxins will be present, the fungus is able to produce mycotoxins at any point during feed transport and storage. However, even with excellent management of the grain and no visible mold growth, low levels of mycotoxins may still be present in poultry feed.

Because such is the case, the addition of a mycotoxin binder is also common. There are a range of compounds that are able to "trap" the mycotoxin, making it unavailable for absorption by the bird. These compounds include: clay/bentonites, activated charcoal, and yeast cell wall products. Each binder will work differently with each of the various mycotoxins, and grains (when contaminated) rarely contain only one mycotoxin. Therefore, the strongest control measure will include a combination of approaches: such as a combination of a bentonite clay, yeast cell wall, and extra antioxidants or vitamins.