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FAQ on
Management of Mycotoxins
at the Farms and in the Feedmill

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What are Mycotoxins?

Mycotoxins are toxic secondary metabolites of low molecular weight produced by fungi growing on foodstuff or animal feeds.

What are the Effects of Mycotoxin?

Mycotoxins can be acutely or chronically toxic or both depending on the kind of toxin and dose.

Some common effects of mycotoxicosis include:

1. Pale and enlarged livers
2. Enlarged kidneys
3. Oral lesions
4. Immunosuppresion
5. Reduced growth rate
6. Inhibition of nutrient absorption
7. Decreased egg production and egg weight
8. Decreased bone strength
9. Decreased reproduction rates and swelling of genitals

When and Where is Mycotoxin Produced?

Production of mycotoxin can occur at any of the following stages. Early suppression of mycotoxin levels will help in reducing the final amount present.

1. In the field during growing stage.
2. At harvest time.
3. During storage of grains.
4. During feed manufacturing.
5. During delivery to the farm.
6. At the farm.

How Can I Minimize the Risk of Mycotoxin Contamination?

Controlling the adverse effects of mycotoxins therefore requires a multifaceted approach:

1. Control environmental factors that influence fungal growth

1.1 Minimize moisture content of grain and feeds < 14%
1.2 Minimize relative humidity of grain and feeds < 70%
1.3 Minimize storage temperature of grain and feeds < 20°C
1.4 Minimize oxygen availability during storage < 0.5%

2. Control the purchase of quality grains and feed

Residence time of feed at the farm is highly correlated with mycotoxin contamination. Frequent delivery of feed with shorter residence time is preferred. Feed should generally be consumed within 10 days of delivery. Physical condition of grains and feeds is important. Ensure low grain damage. If this is not possible, screen grain to reduce amount of broken kernels.

3. Good management practices at the farm and in the feedmill

In the feedmill :

3.1 Storage bins should have good ventilation to minimize heat build up and sweating. Bin size should be matched to herd size to ensure they can be periodically emptied and thoroughly cleaned. Ensure no material build up in crevices.
3.2 Screw conveyors and elevator legs must be thoroughly cleaned as they can harbor old meal.
3.3 Roofs must be periodically checked for possible leaks.
3.4 Pellet cooler can be an excellent source of mycotoxin contamination due to high temperature and moisture of pelleted feeds. It should be cleaned at least weekly. Pelletizing may not kill all molds especially the heat tolerant ones. It is important to remove the excess moisture added during palletizing otherwise the palletized feed can be a media for mold growth.

At the farm :

3.5 Feed troughs should be periodically emptied, scrubbed and disinfected with a 5% sodium hypochlorite solution. Continuous topping up of feed through is a bad practice. Feeder system should be turned off weekly so that the animals will be forced to clean out all the feed in the troughs before it becomes excessively old and moldy.
3.6 Animal houses need to have adequate ventilation. The air inside these houses can be very humid due to respiration and defecation. The whole house including its facilities should be thoroughly cleaned before placing new animals into the houses.

3.7 Leftover old feed should not be brought back to the mill after removing the flock as old feed can be a source of contamination.

3.8 Do not use recycle bags if they are wet or exhibit signs of moldiness.

4. The use of additives and nutriotional supplement

4.1 Antimold agents must not be relied solely to control mycotoxins. It must be remembered that antimold agents only inhibit mold growth and do not inactivate toxins already present in the meal. When the concentration of the mold inhibitor is reduced until it is incapable of inhibiting mold growth, the mold begins to use the inhibitor as a food source and grows.

4.2 Mycotoxin binders such as 0.5% hydrated sodium calcium aluminosilicate can be used to sequester aflatoxins but it is not effective against other mycotoxins such as ochratoxin A, T-2 toxin or DAS.

4.3 Antibiotics such as chlortetracycline can be added at concentrations of 50 ppm to broiler diets to alleviate the adverse effects of aflatoxin.

4.4 Copper sulphate is a method to treat fungal disease but excessive levels of copper may be toxic to young animals and cause mouth lesions to poultry.

4.5 Addition of fat soluble vitamins (A, D, E, K) is of little benefit in alleviating mycotoxicosis as most commercial feed already contain these vitamins in quantities greater than their minimum requirements except may be vitamin D. However, if the diet is not fortified with vitamins, addition of Vitamin E and selenium helps in cellular detoxification. It is also helpful to include reduced gluthathione in drinking water.

4.6 Thiamin supplementation is helpful in alleviating the effects of mycotoxin.

4.7 Inclusion of trace elements like zinc, copper, selenium and manganese can be helpful in reducing oxidative stress in the cell.

4.8 Protein. Increasing dietary protein levels although costly, can alleviate aflatoxicosis. Addition of specific limiting amino acids, such as methionine, may be more cost effective.

4.9 Dietary lipids interfere with the absorption of certain mycotoxin such as aflatoxin.

5. Animal Management

5.1 Reduce stress to animals.

5.2 Reduce intake of suspected contaminated feed by 50% or replace completely.

5.3 Dietary manipulations. Because mycotoxins typically reduce nutrient absorption, one approach to alleviate these effects has been to increase levels of critical dietary nutrients. (Refer to point 4.9 and 4.10 above)

Refence :
Mycocurb seminar at Sunway Hotel – 23 June 2000
Mycotoxin in Grains – Compounds other than Aflatoxin. Chap. 9 : Toxicology of Mycotoxins.