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MYCOTOXINS

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A common concern this year among swine producers is feeding mycotoxin-contaminated corn to their animals. But what exactly are mycotoxins and what are the best ways of dealing with infected corn?

WHAT ARE MYCOTOXINS?

Mycotoxins are produced by mold, bacteria and yeast that are naturally occurring in the environment and on feedstuffs. In Ontario, corn is the most common crop affected. This creates a sizable problem, when corn is considered the number one source of energy in swine diets.

Mycotoxins can be formed in the field preharvest depending on the growing condition, temperature and harvesting methods provided to the crop. They can continue to be formed under suboptimal storage conditions postharvest. High moisture content often predisposes feedstuffs to fungal growth and mycotoxin formation. The affect of high toxin levels on swine is poor performance and health status, causing substantial economic losses.

Fusarium is a common mold that produces several types of mycotoxins, the most popular being zearalenone and vomitoxin. *Zearalenone* occurs when the corn remains cool and damp, particularly through poor storage or late harvest. *Vomitoxin*,

on the other hand, is produced in the field as the mold grows. Therefore, the presence of pink mold also indicates the presence of vomitoxin.

EFFECTS OF MYCOTOXINS ON SWINE

As mentioned earlier, feeding toxin contaminated corn to swine causes poor performance and health status. Vomitoxin is only one of a large number of chemically related compounds known as the trichothecenes. These are commonly referred to as feed refusal toxins because they cause reduced feed intake. Swine are most sensitive to these compounds, while ruminants are generally the least sensitive to mycotoxin contamination. Zearalenone is the estrogenic *Fusarium* mycotoxin that causes infertility. More specific effects of zearalenone and vomitoxin are indicated in the following chart. (Smith, J. 2006. Mycotoxins and Swine. OMAFRA.)

Tolerances of Swine for Mycotoxins

Mycotoxin	Maximum Concentrations in Feed	Comments
Zearalenone	< 0.5ppm for nursery < 0.5ppm for breeding stock < 2.0ppm for grow/finish pigs	Estrogenic effects. Swollen vulvas, vaginal or rectal prolapses in prepubertal gilts. Enlarged uterus, swollen or twisted uterus, shrunken ovaries, abortion or stillborns, failure or delay in showing heat. In boars, testes atrophy, enlarged mammary glands, decreased fertility.
Vomitoxin	< 0.5ppm for nursery < 1.0ppm for breeding stock < 1.0ppm for grow/finish pigs	Reduction in feed consumption and weight gain are inversely proportional to concentration of vomitoxin. High concentrations (10-20ppm) cause complete feed refusal and vomiting. There is evidence that low levels may suppress the immune system.

NOTE: We have experience in feeding elevated toxin levels with proper binding agents.

WHAT TO DO WITH SUSPECT FEED

An important tool in managing the problems of mycotoxin contamination of feed grains is chemical analysis of mycotoxins. This can be done in many laboratories using a quick test known as the ELISA test. This type of analysis helps confirm the presence of mycotoxins, but is not necessarily accurate in determining the exact levels of mycotoxin present in the sample.

SOLUTIONS TO FEEDING CONTAMINATED CORN

The best solution is to sell the mycotoxin-contaminated corn as cattle feed and purchase clean corn for swine, as cattle can safely consume levels 10 times higher than swine. Here are a few solutions in dealing with contaminated corn if it must be fed to swine.

1. **Dilute or blend the contaminated corn with clean corn to levels where negative effects are minimal.** Vomitoxin must be less than 1 ppm for finishers and breeding stock, and less than .5 ppm in the nursery. Zearalenone can be tolerated at 2 ppm in the grow/finish barn, but must be less than .5 ppm in the nursery and breeding areas.
2. **Clean and screen the grain to reduce the content of fines and dust.** These fractions (cob pieces, kernel tips & red dogs) are often the most highly contaminated fractions of grains. Mycotoxins may be as much as five times higher in the screenings compared to the grain. If possible set your combine to remove the fines and small kernels without causing excess grain damage. Also use grain cleaners before the grain is put into storage.
3. **Proper drying and storage of corn.** High temperature drying stops mold growth and mycotoxin production, but does not reduce mycotoxins already present. Natural air or low temperature drying is not recommended for mouldy corn. In corn silage, the acids produced during proper ensilage will stop the growth of molds. Where there is improper fermentation, molds could continue to produce mycotoxins and lead to higher toxin levels. Bins need to be properly sealed to prevent further toxin growth.

4. **Add the appropriate enzyme or toxin-binding agent.** Binding agents are clay products capable of reducing the adsorption of the toxin in the gastrointestinal tract by attracting the mycotoxin by way of an electrical charge. These types of agents are quite effective in binding and tying up polar mycotoxins. Less polar toxins can only be degraded by the use of enzymes. Enzymes have the ability to break up the functional groups of the mycotoxin, rendering them intoxic and completely harmless. It is most effective to use a product that combines both the adsorption and enzymatic decomposition properties. BSC has 3 different products available that can be added to the premix as needed.

Moldy corn can be a serious problem when fed to swine, but it can be dealt with. If you suspect your corn contains mycotoxins, avoid feeding it to breeding stock and request your BSC representative to examine the feed. If you know your corn is contaminated, call your BSC representative to further discuss the use of mold and toxin binding agents.

1. Croppest Website.
www.omafra.gov.on.ca/croppest
2. Hog Update Volume 11, Issue 4. Mycotoxins
3. Hog Update Volume 16, Issue 2. Impact of Fusarium Mycotoxins on Livestock Performance

HOG UPDATE is published in the interest of helping hog producers become more profitable. We welcome your comments.

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