MANAGING MYCOTOXINS IN FEED AFTER HARVEST PART 2

MYCOTOXIN MANAGEMENT

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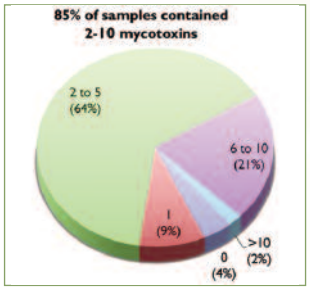
Every harvest season delivers a variety of challenges that farmers and producers need to address in order to safeguard the health of their animals and the quality of their feed. This season has already made its mark. Aside from the poor nutritive quality of harvested crops, issues with mould and mycotoxin contamination look set to continue.

2012's growing and harvesting conditions provided optimal conditions for mycotoxin growth. Perhaps the most widely talked about has been the surge in levels of aflatoxin contamination – threatening the livelihoods of producers, the profitability and the security of the industry as a whole. Milk discards and the associated financial losses to producers, together with concern over the safety of the feed and food chains, means that minimising mycotoxin contamination continues to be a top priority for Europe.

Aflatoxins, produced by Aspergillus moulds, grow on crops in the field or commodities during storage under excessively dry conditions. Aflatoxins are the most heavily regulated mycotoxins due to their highly toxic and carcinogenic nature. When ingested by dairy cows, between 1% and 6% of aflatoxin B1 in feed is converted to aflatoxin M1 (AFM1) and subsequently appears in the milk. This seemingly small rate of transfer is enough to have significant effects on the health and performance of animals and potentially compromise the safety of the milk supply. Symptoms of aflatoxin contamination in dairy cows include reduced milk yield and quality, decreased immune status leading to increased susceptibility to infection, reduced protein synthesis, liver damage and, most crucially, carcinogenicity (cancer causing).

Fig. 1. Number of toxins found in samples from Europe's 2012 harvest.



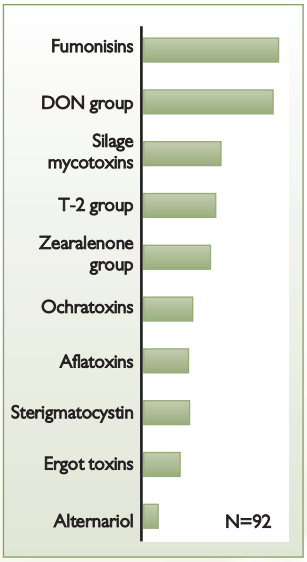


Fig. 2. Percentage detection of various mycotoxin groups in samples from Europe's 2012 harvest.

Due to its highly carcinogenic properties, the EU enforces a regulatory limit of 0.05ppb aflatoxin in milk.

While aflatoxin contamination is undoubtedly of major concern to both industry and consumers, it is important that producers remember that aflatoxin is only one of approximately 500 toxins that animals can be exposed to through the diet. Forages and grains are naturally contaminated with multiple mycotoxins, weakening the immune and detoxification systems of dairy cows and reducing the animals' capacity to deal with the more potent aflatoxins. Additionally, mycotoxins derived from Penicillium moulds (for example Roquefortine C, Patulin, Penicillic acid) have an antibiotic effect on beneficial rumen microbes, further reducing the detoxification capacity of the animal. Alltech's 37+ findings show the extent and the broad spectrum nature of the mycotoxins challenge in this year's harvest (Fig. 1 and 2).

Risk assessment

An effective mycotoxin management program should play an integral part in herd health management – promoting animal health and protecting producer profits. Methods for the simultaneous analysis of several important mycotoxins, such as liquid chromatography with tandem mass spectrometry (LC MS/MS) enables the rapid quantification of a greater number of mycotoxins at very low levels and thus covers a broader spectrum of potential contamination with different mycotoxins.

Alltech's investment in this technology through its 37+ Programme has allowed not only significant improvement in precision but also the analysis of complex matrices, such as silages and TMR.

Management tools

Recognising the impact of mycotoxins in dairy farms is often difficult since symptoms are non-specific and the synergy between mycotoxins adds another layer of complexity. Mycotoxins can cause acute health or production issues, however, in the majority of cases mycotoxins are a contributing factor to vague, chronic problems, including poor performance and higher incidence of disease. In addition to mycotoxin analysis, practical feed and animal management can reduce the risk posed to the animal and future instances of mycotoxin contamination. Alltech's MIKO (mycotoxin hazard analysis) Programme is a systematic audit or management tool for farms and feedmills. Based on HACCP (hazard analysis critical control points) principles, this programme involves the identification of critical control points and the establishment of corrective actions and appropriate monitoring procedures to mitigate the impact of mycotoxins.

Conclusions

- Mycotoxin contamination is inevitable, however, there are steps one can take in order to reduce the risk of impacting animal health and performance as well as producer profit.
- In order to achieve a better assessment of mycotoxin contamination, analyses should be conducted for a multitude of mycotoxins and their additive and synergistic effects must be considered.
- There is a need for implementing integrated strategies to counteract mycotoxin contamination in dairy herds and throughout the production chain, including mould growth and mycotoxin management.
- Continuous investment in analytical technologies that support a more complete understanding of a broad-spectrum mycotoxin challenge will promote technologies designed to mitigate the negative impact of mycotoxins on dairy farms. ■

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