Feed Mycotoxin Contamination: A Growing Concern for European Cattle Producers

European cattle producers are being warned that the rations they feed to their cows are increasingly likely to be contaminated with multiple mycotoxins.

Global animal health and nutrition company, Alltech, has analysed more than 800 samples of European ruminant feed from September 2014 to July 2015. The results show that corn silage is now trending at high risk for mycotoxin contamination, which contributes to a higher risk for total mixed rations (TMRs) – presenting very real challenges for farmers striving to achieve optimum productivity.

However, myths still persist about the threat of mycotoxins to ruminant animals. Some have suggested they are not an issue for cattle because the rumen flora will break down these toxins from mould growth in feed ingredients; however, an increasing weight of scientific evidence now counters this misconception.

According to Dr Max Hawkins, nutritionist within Alltech’s growing global Mycotoxin Management Team, whilst the rumen can break down mycotoxins to some degree, it is actually a saturable process.

“The action of rumen bacteria and protozoa on mycotoxins is pH-dependent and does need the right microbe to be present to break down any given mycotoxin. Rumen microbes are not ‘multi-taskers’; they either act from a nutritional standpoint or break down individual mycotoxins. They can’t necessarily do both jobs. And sometimes the substrate left after denaturation can exert even more toxic effects than the original mycotoxin that went into the rumen,” explains Dr Hawkins.

The fact is, moulds and their associated mycotoxins are ubiquitous in the environment. And whether due to pre-harvest infestation of feed materials by Fusarium species, or from post-harvest contamination of stored forages, grains and other TMR ingredients with moulds such as Penicillium or Aspergillus, the threat to animal performance is very real, even in the best-run cattle herds.

These hidden thieves are likely to be responsible for numerous undiagnosed health issues in cattle, even when growing or harvesting conditions are reasonable. In extreme cases they can cause lethargy, abortion storms, severe scouring, sudden milk drop and even liver damage. However, for the majority, the result of mycotoxin presence is more likely to be seen as a subtle problem. The symptoms will be many and varied, but the outcome in all cases will be reduced animal productivity and higher costs, leading to lost profits.

Mycotoxicosis in ruminants can manifest itself in a variety of ways, but often you will not see signs when you walk around a pen of cattle.

Often the impact on cattle is a result of exposure to multiple mycotoxins at relatively low levels – but don’t dismiss the threat just because you can’t see any obvious problems,

Turning to the origin of these threats to optimum cattle productivity, Dr Hawkins highlights the impact of climate change.

Climate change and feed storage practices seem to be starting to influence the range of moulds occurring in farm feed stocks. In addition, with traditional tilling and crop rotation practices diminishing in many developed countries, mould contamination is persisting year-on-year. And where moulds grow, mycotoxin contamination follows.

Factors that affect mycotoxin production in fermented forages include plant stress prior to harvest, packing density, moisture, oxygen exposure and face management,”

The latest European data emerging from Alltech’s 37+® mycotoxin programme (which has the ability to test for more than 37 mycotoxins in feed ingredients) evaluates the change in mycotoxin numbers and levels over time from harvest through storage. By analysing the number and levels of mycotoxins present, the programme can provide a risk equivalent quantity (REQ) of the increase in risk to dairy and beef cattle, and calves, from harvest to feed out.

Thanks to the increasing number of various feed samples we are now collecting around the world, we have a great dataset and can pool it to benchmark annual trends, but also be able to sort it by region or feed ingredient,

For example, the most prevalent mycotoxins found in corn silage were Type B trichothecenes, fusaric acid and fumonisins.

There’s no doubt that corn silage is more contaminated than grass silage with an average of 5.6 mycotoxins per
Clinical Studies

sample, according to our latest data. We can also say that more than 83 per cent of the corn silage samples tested show a moderate or high risk for dairy cattle; less so for beef animals. Calves, however, are at very high risk.

Number of Mycotoxins per Sample – Corn Silage, Europe

Alltech 37+ Corn Silage Risk Assessment (Dairy/Beef/Calves)

It must be stressed that grass silage is not risk-free with respect to mycotoxin contamination. “Although we can say grass silage would present a low to moderate risk generally, we did find Penicillium in 45 per cent of samples, which could be problematic and contamination could increase still further as we move towards winter.”

If the TMR samples tested throughout Europe, more than 60 per cent contained at least three mycotoxins. Type B trichotheecenes, fusaric acid and Penicillium were particularly prevalent and suggest potential negative impacts on feed intake, rumen function growth rates, gut health and the immune response.

Number of Mycotoxins per Sample – TMR, Europe

The TMR monthly average shows a definite increase over time, originating from a low risk to well above a high risk. In fact, the trend since February 2015 has demonstrated a much higher REQ level in cow health and performance – and this clearly needs to be managed with strategies to mitigate against this higher risk.”

When it comes to managing the ubiquitous mycotoxin challenge in farm feed stocks, appropriate risk assessment is really the best way forward for worldwide cattle producers, along with greater awareness and extra vigilance at all times.

At Alltech, we really see it as a three-stage risk assessment process starting with understanding through analysis. Armed with the knowledge of what your mycotoxin challenge looks like, your feed management process is examined via an Alltech MIKO audit, which is based on HACCP principles. It is important to understand that further mycotoxin contamination can occur at critical points in the process from feed harvest/delivery right through to storage. These critical control points act as triggers for action, so when challenges are discovered during the audit, action can be implemented rapidly to better manage an existing mycotoxin challenge and reduce the chance of further contamination.

Alltech’s MIKO audit starts with examining the grains and other feeds stored on the farm, looking for evidence of mould growth and exploring issues such as where the feeds are stored (e.g. whether they are exposed to rain and humidity) and their delivery pattern. Company representatives also use temperature probes and thermal imaging cameras to look for hotspots that indicate potential mould activity.
This builds a picture of the potential threat and allows us to make practical recommendations such as storing feeds a metre from a wall to prevent moisture accumulation. When feed is stored adjacent to an external barrier, it is more exposed to the heating and cooling of the wall and this presents a mycotoxin risk. Ensuring all the feed is removed and the floor/walls are cleaned before new loads come in is essential to prevent cross-batch contamination and spoilage. In fact, the control of moisture during storage is the single most important management tool to keep mycotoxins under control.

On ruminant livestock units, the on-farm assessment then looks at forage storage, examining similar issues with respect to corn and grass silage in the clamp. We also look at pit face management and daily removal rate – whether the forage is shear grabbed or simply pulled from the face with a loader – silo structure, additive usage and packing density.

We tend to tell cattle farmers that if you can push your fingers into the clamp face easily, there’s too much air in the forage, and this will potentially increase mould growth. Silage clamps should be really well compacted to drive out this air, and good quality covers with plenty of weight in them are essential in this respect.

Following the MIKO audit, Alltech provides farmers with a written summary report. The company can also build a better risk assessment picture through analysis of the levels of different mycotoxins actually present in the farm feeds using its 37+® mycotoxin analysis programme.

Once we have processed all the data from the farm visit, we are then able to offer a diagnostic assessment based on a percentage score. This ranges from 80 per cent plus, which suggests an excellent mycotoxin management plan is already in place; between 40-80 per cent, which suggests some improvements could be made. From 40 per cent and below there is a high risk of mycotoxin contamination. Alltech representatives also offer advice on how to improve the management of stored feeds.

For further information about the mycotoxin contamination of European feed stocks, the recorded video of the 2015 European Storage Mycotoxin Analysis webinar can be found on the Alltech dairy and beef knowledge hub. See: http://members.alltech.com/dairy-knowledge-hub/ and http://members.alltech.com/beef-knowledge-hub/

Max Hawkins holds a bachelor of science degree from Western Illinois University and a master of science degree and doctorate in animal science from the University of Tennessee.

Upon graduating, Hawkins taught and directed a land development project at Morehead State University. He then taught livestock production and nutrition management and coached the livestock judging team at California Polytechnic State University. He was named director of genetic outreach for the National Swine Registry, where he developed and oversaw the field staff programme.

Hawkins moved to Continental Grain Company, Wayne Feeds, as a technical consultant, providing nutritional support to sales staff and large customers. He then continued his efforts with Hubbard Feeds. Most recently, he was a technical sales representative with Micron Bio-Systems. Currently, he serves as a nutritionist for Alltech.