

Scientists are developing a better understanding of the multiple mycotoxin challenge in modern dairy diets and how to mitigate the threat

What's your mycotoxin risk?

It's relatively easy to spot mouldy patches in a forage clamp and then feed a standard mycotoxin binder as an insurance policy. But effective mycotoxin management requires a more holistic approach, which involves tackling both visible and invisible threats. We go on farm to investigate.

text **David Butler**

Ever present in the farm environment and a potential threat to the health and productivity of even the best-run dairy herds, mycotoxins produced by moulds in feed ingredients should now be on every herd manager's radar. Climate change and feed storage practices are starting to influence the range of moulds occurring in farm feed stocks and with traditional tilling and crop rotation practices diminishing too, mould contamination is persisting year-on-year. Fortunately, analytical methods are improving at the same time, allowing scientists to detect the wider range of mycotoxin threats and develop new strategies to tackle them.

Multiple challenge

"It's clear that producers now face a multiple mycotoxin challenge in the typical rations they feed to their cows," says Alltech's Pedro Caramona.

He's part of the company's mycotoxin management team that is developing a risk assessment programme that allows producers to tackle issues far more cost-effectively. "The issue is no longer whether mycotoxins are present, but which are the most prevalent groups, how significant the levels are in a feed and, most importantly, what the impact is on a given species."

He explains that in pig and poultry diets the dependence on individual ration ingredients, such as cereals and soya (often imported), means multiple contamination comes predominantly from the field due to *Fusarium* mould growth. "But in ruminants the picture is more complex due to the evolving risk on farm during the feeding season from the growth of storage moulds such as *Penicillium* and *Aspergillus*," explains Mr Caramona.

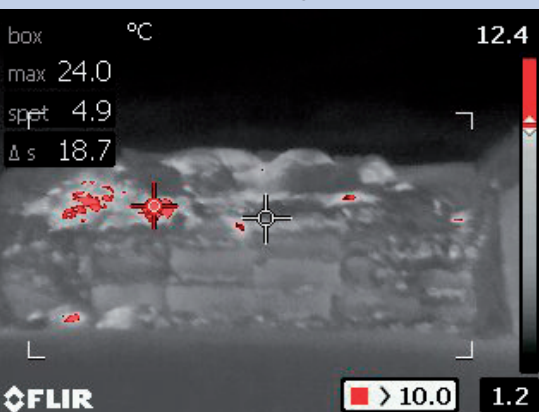
"Ruminant diets are exposed to a variety of different mycotoxins coming from home-grown forages, such as grass and maize silages, and purchased straights that are often imported from around the world. The mix of toxins in your average TMR is likely to be responsible for numerous undiagnosed health issues in dairy herds."

Growing enemies: Fusarium (pink) and Mucor spp (white) moulds often thrive in straight feeds stored in the open air

Risk assessment reduced adsorbent use

The use of a thermal imaging camera to highlight hotspots in the maize clamp was enough to convince Andrew Dale, from Newnham Farm in Shropshire, that there was a potential mycotoxin issue limiting the performance of his herd.

Thermal imaging: red 'hot spots' are an indicator of mould growth.



Mr Dale runs 360 Holstein Friesians on his 205-hectare unit and he says extracting every last gramme of nutrition from his home-grown feeds is crucial.

"All our cows graze, but we do also have to buffer feed cattle and I can't afford any reduction in feed efficiency year-round. The thermal imaging camera showed our maize was heating up in spots across the face of the clamp and this – together with an audit of our whole feed management system – suggested we needed to take action," he says.

"We introduced a broad-spectrum adsorbent to the ration to negate any damaging mycotoxins. Initially it was included at a rate of 100g per cow per day for a couple of weeks, but because our risk assessment was relatively marginal we were able to reduce the rate to 50g per head per day later on.

"This seemed to work and I'm confident



Andrew Dale: "We feed a broad-spectrum adsorbent to our herd"

we're on top of the problem, but we will continue to monitor and manage the risks associated with our particular feed management system and take action as necessary in the future," he adds.

Results from Alltech's 37+ harvest surveys in the UK and across Europe during the past three years – of both forages and other common winter ration ingredients – confirm that cows are being fed diets containing multiple mycotoxins. On average these surveys

found 6.7 different mycotoxins in every sample tested.

"We test for more than 37 different mycotoxins in feed ingredients," says Mr Caramona. "The most prevalent are Type B trichothecenes, fusaric acid, fumonisins and those produced by

Penicillium, such as mycophenolic acid, but it is the simultaneous presence of these different mycotoxins that increases the potential toxicity to the cow. Cow rations comprise many ingredients, so it is vital to assess the risks associated with the whole diet."

Problem areas: clamp shoulders typically show more obvious signs of mould growth



Pedro Caramona discussing different moulds





Alltech's Hayley Verney looks for 'hot spots' using a thermometer to measure the temperature of different areas on a silage face

Company representatives in the UK also take producers through a mycotoxin risk assessment process, which is based on HACCP principles. "Our MIKO on-farm 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. We look at whether they are exposed to rain and humidity, their delivery pattern and we also use temperature probes and a thermal imaging camera to look for hotspots that indicate potential mould activity."

Practical recommendations

Mr Caramona says that 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. "Making sure all the feed is removed and the floor and 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," he adds.

The on-farm assessment then looks at forage storage and examines similar issues with respect to conserved grass and maize in the clamp. "We also look at pit face management and daily removal rate, as well as silo structure, additive usage and packing density," says Alltech's Hayley Verney.

"I tell producers that if you can push your fingers more than two or three inches into the clamp face then there's too much air in the forage and this will potentially increase mould growth," he explains. "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."

Once the feed risk assessment is complete, cow performance is examined to build up a picture of their overall health and fertility. "On most units it's difficult to see any definitive evidence of cows suffering from mycotoxin problems. The signs may be many and varied, including sunken eyes, poor condition, low rumen fill and loose dung. But after you have gained a feel for the potential mycotoxin challenge from the feed assessment, you do get an inkling for how problems may be

manifesting in the cows, even though they may be quite subtle," says Mr Verney.

Diagnostic assessment

Following their MIKO audit, the company provides producers 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 a unit's feeds using its 37+ diagnostic 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%+, which suggests an excellent mycotoxin management plan is already in place; to between 40% and 80%, which suggests some improvements could be made; through to 40% and below, where there is a high risk of mycotoxin contamination," explains Mr Caramona.

"We also offer advice on how to improve the management of stored feeds. It is only then that we start talking about appropriate use of a proven broad-spectrum mycotoxin adsorbent – where necessary and at what feeding rate per cow – to negate any damaging effect on the health and performance of the herd." |