Mycotoxin Matters podcast Episode #30

**SPEAKERS**

Dr. Max Hawkins, Aislinn Campbell, Nick Adams

00:02

Welcome to the mycotoxin matters podcast from Alltech mycotoxin management as mycotoxins present an ever increasing threat to livestock production, join us as we discuss these impacts and potential solutions, sustainable farming and our vision for a Planet of Plenty.

**Nick Adams** 00:24

Welcome to this episode of The Mycotoxin Matters podcast. My name is Nick Adams, global director for Alltech's Mycotoxin Management Team. And I am delighted to be joined today by Dr. Max Hawkins and Aislinn Campbell. Max has been on the podcast before and really needs no introduction. But Aislinn, it's your first time, you're very welcome. Maybe you can take a moment to introduce yourself to our listeners?

**Aislinn Campbell** 00:54

Hey Nick, thanks very much for having me. My name is Aislinn Campbell, and I am the InTouch nutritionist for Northern Ireland. So, my role is predominantly based on farm covering Northern Ireland and Donegal and a lot of my work is involved with mycotoxin management and nutritional formulation of diets for both beef and dairy farms.

**Nick Adams** 01:15

Wonderful, Aislinn, and thanks so much indeed. And that sort of gives us a little bit of a steer as to the topic today. And the topic today is really going to focus on a blog that Max has written and is available on knowmycotoxins.com, which focuses on what we're seeing with regards to mycotoxin contamination in silage, which obviously come through into our TMRs from both North America and Europe. And looking at the differences that we see in those mycotoxin profiles based on the conditions and forages that we're feeding. So, Max, maybe we could start with you and just give us a little bit of an introduction into what is it that you've seen with the analysis that you've been looking at?

**Dr. Max Hawkins** 02:10

Thanks, Nick, glad to be with you today. We see risk in dairy and beef TMRs on a global basis, but we narrow it down a little bit and look between the differences with North America and EU. Both of them still present risk. North America this year, it tends to be a moderate to high moderate risk. And that risk is primarily coming from the Type B trichothecene family or DON, deoxynivalenol, or substrates of that with the acetyl DON or DON-3-glucoside that's where the risks come from. So we get an impact on intakes, digestives upsets, rumen microbiome, more emphasis yet on embryo health, gut wall integrity, immune response and that's pretty much typically year in and year out for North America. Risk comes from the Type B trichothecenes group, just varying levels depending on weather pattern and weather impact. When we look at Europe, we also have risk to dairy and beef cattle that it comes from an entirely different family of mycotoxins, and it primarily comes from the Penicilliums. Penicillic acid, mycophenolic acid, even up to patulin but the greatest, the one that's the most occurring would be penicillic acid. And that primarily because we find it to be at very high levels in grass silages with a much higher prevalence of grass silage usage in Europe than in North America. If you break Europe down between grass silages and other fermented silages, we see exactly the same pattern as we do between Europe and North America. Whereas in Europe, grass silages, well average over the past five years are averaging over 500 parts per billion penicillium mycotoxins, occurring at about 60% of the time in those samples and an REQ of 430 plus, but if you look at other fermented silages out of Europe, penicillium only averages about 150 parts per billion. So 150 versus 538 it only occurs about half of the time 36 versus 60. And the REQ is only 196 versus 432. So, we get the same story that we do across continents as we do within a continent between Penicilliums and the trichothecenes groups, but that prevalence of grass silage in the European and its issue with stability and generating mycotoxins in storage, that gets to be where the real story is Nick.

**Nick Adams** 05:46

There's lots of information there Max and I'm going to try and sort of pick out a couple of pieces of that to follow up with, so, field versus storage and, forage type sort of maize or corn versus grass. So maybe you can expand on that what we're seeing then is a different picture, depending on whether we are a sort of maize, corn or sort of cereal, heavy input or whether a grass silage input. So those mycotoxins are coming from different places. And therefore, the risk is different. So maybe you could sort of touch on that field versus storage first, and then why?

**Dr. Max Hawkins** 06:34

Field versus storage. We talk about this often. And try to make references and justifications according to the way things turn out to be clear the mycotoxins come from the molds. So, that mold, even if we call it a storage mycotoxin, that mold arrives at the storage facility with the crop the day is harvested, right? Nobody sneaks in and adds more mold to it. So, it's just whether we can keep that and manage that fermented forage, manage the face get it packed right manage the face keep it minimized or remove oxygen penetration manage those spots of molds that do occur. It seems like that gets to be a little more challenging in grass silages than it does in say corn silage. And we do see Penicillium and corn silage don't get me wrong there but we don't see it near at the drastic levels. And so that storability how well that crop stores how easy it is to manage, and storage somehow is allowing a greater proliferation of Penicilliums which are a typical storage mycotoxin to become a much more significant matter.

**Nick Adams** 08:06

And as you said, then that's different to the corn silage, and the other cereal forages that you're seeing where we're seeing the trichothecene families that are really just coming in from the field in the first place.

**Dr. Max Hawkins** 08:22

Yes, and those the small grain silages will typically have close to the same issues as corn silage. We tend to work with a little narrower number of mycotoxins, then we will with corn silage, primarily in small grain silages we get a little more concerned with the type B trichothecenes and perhaps zearalenone every once in a while type A or T2 HT-2 toxins. But we tend to get not nearly as a significant amount of risk as we will with corn silage. And we don't get into that much higher, much more significant level of Penicilliums as we do with grass silages.

**Nick Adams** 09:09

So Max, if we focus in on those Penicillium mycotoxins and we are thinking about what we might expect to see in the field, in the cow. What are some of your thoughts in that regard?

**Dr. Max Hawkins** 09:25

Quickly, if I'm in conversation with those people who submit the samples, they're going to tell me that those cows are, we're going to we're going to be taking a drop in milk. So, our production may be down two, three, four litres per cow per day could be more than that. Intakes are going to be off somewhat. Rumination can certainly be impacted. Rumen microbiome and then one thing that we don't pay close enough attention I think with a lot of the Penicilliums is, we can still get into quite significant gut wall integrity and gut health issues. Penicilliums have a significant impact on liver function, and therefore we can get into magnified immune response issues. So somatic cell counts may be dramatically increased. Mastitis type issues can be certainly significantly increased. So, there's plenty of issues that can go along with Penicillium. It tends to run a little different farm to farm we, therefore we don't cookie cutter it across, we really need to analyze what the cows are telling us and match that up to the level of Penicilliums that we have present from the analysis.

**Nick Adams** 10:43

Thanks, Max. Aislinn, and if we come over to you, what have you seen, what's been your experience on farm over the past few years in dealing with that Penicillium challenge?

**Aislinn Campbell** 10:56

Yeah, so Nick I'd say a lot of my job over the last few years has turned more mycotoxin focused, we have seen increases in Penicillium toxins. A lot of the problems we're seeing is coming in our grass silage. A lot of the farms I'm working in, you know, we were getting production issues. And embryonic loss was probably one of the biggest ones that we were seeing. And particularly from a lot of my farmers were maybe moving on to say their first cut silage, which is generally a better cut of silage, and they would expect a performance lift in terms of milk, but we just weren't getting that and to lock up the clamp, the clamp was fine. Management was good. In terms of a nutrient assay, it was testing well, but we weren't just getting that performance lift. And then we started to see things like swollen hocks and then we started to get problems with embryonic loss, which is very costly to a dairy farm, you know, you've done the work in terms of getting the animal back in calf and then to have the embryonic loss. So that's kind of the biggest problems we are seeing. And as I said, the problem was to look at the grass silage clamp, it was okay, so it wasn't that we were dealing with moldy silage, but we were still getting big problems. And then it turns out that the grass silage was testing very, very high in Penicillium mycotoxins.

**Nick Adams** 12:12

And Aislinn, when you talk about some of those different symptoms, what sort of timelines would you see those symptoms over? Presumably, there's some sort of a staging of those different symptoms in terms of the speed. So, what are some of the early signs and then obviously, moving on probably some of the fertility ones coming a little later?

**Aislinn Campbell** 12:35

I suppose the first kind of ones that we would have seen was the fact that the cows were going on to I suppose an improved ration in terms of the quality of the silage was better and obviously the grass silage is making up nearly 50% of their diet. So, you know, that had improved, but we just weren't getting that production improvement in terms of improved milk. So that you would have expected a fair response fairly quickly moving on to that silage and we just weren't getting it. The swollen hocks probably happened fairly quickly. And obviously, the fertility does take a wee bit longer. But once the kind of the fertility issue started to set in, it was quite bad. The embryonic death is a massive issue in terms of fertility, and particularly, a lot of my herds in Northern Ireland are all year-round calving. And there's quite a lot of robotic herds as well, so that you need a certain allocation of cows coming in per month. And then obviously, with embryonic losses, you are disrupting your calving pattern. So generally, the toxin symptoms we were seeing relatively quickly, obviously the fertility takes a wee bit longer and takes longer to recover. But it wasn't taking long at all before we were seeing implications in the cows.

**Nick Adams** 13:45

Max, just coming back to you quickly if I can. Prevalence wise, is this something that we're seeing more of than we've seen in previous years?

**Dr. Max Hawkins** 13:57

Yeah, Nick, it has trended up five years ago, in grass silage we'd see Penicillium, about 19 to 20% of the time. In 2022, we saw it almost 65% of the time. So, we're averaging 60% over the past five years. So, you would have to say that we see it quite regularly.

**Nick Adams** 14:23

And Aislinn you would concur with that based on your experience in the field?

**Aislinn Campbell** 14:28

Yeah, I would definitely over the last number of years, the Penicillium thing has really taken off and the mycotoxin issues in cows are definitely becoming more prevalent.

**Nick Adams** 14:38

And as yet though, there's not seemingly a sort of smoking gun in terms of what is leading to this based on our experience thus far?

**Dr. Max Hawkins** 14:50

From my point of view, Nick, I, you know, you can't you'd like to say, yeah, it's exactly because of this, but I think it's a cause from multiple factors. I think this stability issue what I'm seeing on grass silage, it may be a little more fragile, a little more complicated than it is on some of the other fermented forages. So it's a point that we really need to look at a lot closer and pay a lot more attention to.

**Nick Adams** 15:21

Thanks, Max. And maybe Aislinn, last word for yourself. How have you dealt with this issue on farm? What have been some of the things that you've been able to do to alleviate the challenge?

**Aislinn Campbell** 15:35

I suppose we have used Alltech's 37+ lab which has allowed us to obviously test the forage for toxins and we’re also able then to get the correct feed amount and for the Mycosorb. So we've obviously started to include Mycosorb A+ into the diet at the correct feed rates. And then I suppose a few management issues in terms of you know, as Max mentioned, getting the clamp stability issue, I suppose to look at the clamp it looks okay. But it's maybe take a half a grab rather than going across the face in a couple of days, get it across it in a day or two, I suppose from that side of things, but I suppose the big one is to include Mycosorb A+ at the correct feed rate is what we've been doing to mitigate the issues.

**Nick Adams** 16:20

Fantastic. Thanks very much for joining us today, Max and Aislinn it's certainly a fascinating area, the contrast between what we're seeing, you know, across the different continents, the different countries within the continent in terms of the mycotoxin mix, based on that the forage types that we're feeding, but then also this Penicillium challenge that really seems to be raising its head within these grass silage based systems. Max, Aislinn, thanks for your time and your thoughts today.

**Dr. Max Hawkins** 16:53

Thank you.

**Aislinn Campbell** 16:53

Thank you.

16:58

We hope you enjoyed listening today and look forward to you joining us next time on the Mycotoxin Matters podcast. For more information on the topics discussed, please visit knowmycotoxins.com That's k n o w mycotoxins.com.