Mycotoxin Matters #38 Harvest 2023

**SPEAKERS**

Dr. Max Hawkins, Dr. Radka Borutova, Martin Minchin

**Martin Minchin** 00:23

Hello, everyone and welcome back to our latest episode of Mycotoxin Matters. In today's episode, we're going to take some time to look at the results of the 2023 Alltech harvest analysis that our teams have been working on across the different regions recently. As well as discussing some of the key insights across the past year, we will also explore how feed and livestock producers can most effectively manage what is a dynamic challenge over the coming months. Joining me today to discuss the topic are two of Alltech's mycotoxin technical specialists, Dr. Max Hawkins, who is based in the USA and Dr. Radka Borutova, who supports our European team from her base in Slovakia. Max and Radka, thank you for joining us today.

**Dr. Radka Borutova** 01:04

Hello.

**Dr. Max Hawkins** 01:05

Thanks for having us.

**Martin Minchin** 01:07

Radka, we will begin with you and I think you know giving us some context and for those people who are maybe coming new to the Alltech harvest programmes or Alltech Harvest analyses, would you like to give us a bit of background actually what are the analyses and why we do it and then equally why are they an important source of information for people who get that information subsequently?

**Dr. Radka Borutova** 01:35

Yes, I will try to be quite short. So, the Alltech harvest analysis if you talk about the European one or the North American one is definitely the analysis of newly harvested raw materials. If we talk about small grain or we talk about straw we talk about forages, this is the analysis of these raw materials just right after the harvest. They are analysed in our Alltech 37 + lab for 54 different mycotoxins, mostly in in case of European harvest analysis. Indeed, there are maize grain samples which have been analysed by the SGS company and the samples have been analysed for seven and less mycotoxins so it very much depends which raw material we're talking about. Which mycotoxins were tested in it, and what is the objective? In my opinion, the most important objective is to give our customers but basically anybody who deals with animal feed or with animals, feeding the animals, the most up to date, and the most recent information about the mycotoxin considerations of raw materials, which were just harvested. So we don't talk about the analysis of different raw materials throughout the entire year. That would be quite useless information. We think the most important information for those who are dealing with raw materials with finished feeds with the animals on farms is to know what is the mycotoxin contamination of newly harvested grains which they are about to purchase, they are signing contracts, they are deciding from which countries they are going to buy what. Information from Alltech, from the harvest analysis can give them the idea and give them the power to take the right decision at the right time. It needs to be very, actually quite quick. That's why really try to do these harvest analyses very fast. So just right after the harvest, we did the sampling, we did the analysis. And the final report is at least in Europe, the final report is issued before the end of the year. So, they still can take the best decision. A good example could be now. I will give examples so people can understand what I'm talking about. This year, in Europe, we were having like two types of small grain. One is barley and the other one is wheat. You can decide which one you use for your finished feed. You can decide to buy barley, I buy wheat, if you have the information from Alltech about mycotoxin analysis this year, you will definitely go for the wheat because the wheat is showing much, much lower mycotoxin contamination than the barley. If you have this information, imagine you have this information before you take the decision to purchase. You can be the winner. If you don't have this information, and you buy barley, probably you will have much more problems with the animals than if you would buy wheat. That is the kind of information we provide to our customers. It's in my opinion, that's the biggest value of the harvest analyses.

**Martin Minchin** 05:18

That's a great introduction Radka. And you've touched briefly on it in one of your points there. But in terms of sample collection and testing, and it's a question, I think it often comes up when we talk about the harvest analysis. How are those samples collected? I mean, are they randomly taken off farms? Or are they taken off farms where there may be perceived challenges with crop quality?

**Dr. Radka Borutova** 05:44

Definitely, the samples are taken randomly. So, we, of course, will always have farms and always have problems, if there's problems that are likely through mycotoxins or not, this was not the objective of the, for example, European harvest analysis. We were not going to farms, where the farmers were having obvious problems with mycotoxins. No, we went to feed mills, we went integrators, we went to the farmers, our objective was to get freshly harvested grain, or let's say prepared forage or harvested straw, for example. But to do it very quickly, that was the objective, to have the sample quickly, not to look at the farm and their problems are no problem. So, the samples were really randomly selected. And of course, if we talk about the country, then we were trying to collect it from as many points as possible, country wise, so that they are not from only one or two spots in the country, but that we covered the country as good as possible.

**Martin Minchin** 06:51

Great. I think speaking now of countries, we can maybe move into looking at some of the details from each of those regions where we did carry out the harvest analysis this year. Max, you tend to take care of a lot of North America and then extending down into Brazil and Latin America as well, which are obviously becoming big sources of grain into regions like Asia. To begin then in terms of the region analysis, would you like to give an overview from what would be the analysis in USA, Canada and then what we can see happening in Brazil as well please?

**Dr. Max Hawkins** 07:27

Yeah, the USA is a little bit of a tale of two seasons or two regions. Corn silage in the western plains and the Northern plains was, that corn had pretty much went through some drought stages early, it wasn't challenged with a lot of moisture. It came out relatively mycotoxin low in terms of risk. But as we moved eastward, particularly east of the Mississippi, into the Mississippi Valley, Ohio valleys on into the northeast, that crop was challenged more with rain, delayed harvest, they remain in the field longer, and the incidence of fusarium mycotoxins increased rapidly and drastically. And we're seeing that effect today. Corn grain in the US followed a bit of the same pattern. Relatively low risk coming out of the droughted areas. The Southwest Plains has a high risk of fumonisin as it always seems to, but as we moved eastward, the incidence of particularly deoxynivalenol or DON, and zearalenone, went up exponentially. And we're seeing some extremely high-risk levels of DON through the Ohio Valley and on into the eastern portion of the US. Canada, a bit of a story, some similarities. The risk is much higher in Eastern Canada, Ontario, Quebec, the Maritimes much wetter, a wetter growing season a wetter fall, and therefore corn silage and corn grain, a much higher risk of fusarium mycotoxins. DON is going to be very high-risk factor in that portion of Canada. And we're starting to see some concerning levels of zearalenone, particularly in corn grain, so the impact to the swine industry may be quite significant. Western Canada less risk. We see the fusarium mycotoxins lower occurring, but when they are present, the risk seems to be relatively significant or upper moderate to high risk, the specie with the greatest risk is going to be swine and that's because of DON and zearalenone presence and levels. The forages are pretty, there may be some risk that shows from fusarium toxins but by the time we get that forage included into a TMR for beef cattle or dairy cattle, we have a very manageable risk level that shouldn't present a serious or significant challenge. British Columbia occur on the western edge typically a source that has higher levels of T2 HT2 and that was a bit of the story this year. Particularly in some of the corn silage, grass silages are relatively free of mycotoxin risk. But as always, those forages storage is going to be a key issue. So, we'll see how that moves forward. South America, some data on Brazil, the Brazil crop went through a bit of a drought challenge, this year extreme heat and therefore we when we get into those situations aflatoxin b1, produced by Aspergillus mould is always a concern. And there are some concerning levels of aflatoxin in some of the first crop Brazilian corn approaching 200 parts per billion on aflatoxin b1. So that makes a great limit as we move that corn around the globe. It can be quite challenging how we get to use that corn if we really get to use it at all. Fusarium challenges are somewhat lower, particularly from deoxynivalenol and T2 HT2. But fumonisin, due to the heat and dry weather, fumonisin is pretty much always a concern coming out of Brazilian crop. And then zearalenone has really had an uptick in that first crop of Brazilian corn this year. It was present almost 75% occurrence and levels upwards of 750 to 800 parts per billion. So, as we move that around, zearalenone, because it can act synergistically with deoxynivalenol we get that complication with digestive process and zearalenone always, always a significant impact on reproduction. So as we get into the monogastrics, that risk becomes much greater.

**Martin Minchin** 12:55

Great overview. Thank you, Max. Radka, shifting across to Europe and it's probably no secret by now that it's been a challenging year there and driven a lot by the wetter than normal conditions across northern Europe. Can you give an insight into what that is then meant for crop quality and mycotoxin development alongside that?

**Dr. Radka Borutova** 13:20

Yeah, I would like to just summarise the risks for ingredients because so many data. So, if we talk about barley, straw, forages if we talk about grass silage or maize silage, and this would be of higher risk for all animal species. The most prevalent mycotoxins of course, type B trichothecenes, type A trichothecenes. But the most prevalent mycotoxins in all of these ingredients, very interesting is the emerging mycotoxins. Always., about 90% of samples containing these troupe of mycotoxins, wheat is an exception this year. Wheat is of low risk for all animal species, but still emerging mycotoxins the most prevalent mycotoxins also in wheat, and interestingly the most risky mycotoxins in wheat, this would be type b trichothecenes and other Penicillium mycotoxins, but still, the levels are low when we talk about the other penicillin mycotoxins compared with the grass silage. Yeah, if we talk about forages very risky, very high levels of type b trichothecenes, the other penicillin mycotoxins especially about the grass silage, and fusaric acid as well. Maize. Maize grain was not that bad this year. It's I would say moderate risk for poultry and poultry and swine and lower risk for ruminant like the dairy cows. But I checked the countries, and I was like where the most risky samples were coming and it's very interesting they are coming from Russia and Ukraine. So probably maize from Russia and Ukraine this year would be more risky than the maize coming from the continental normal Europe. And the number one mycotoxin in maize, deoxynivalenol. Number two T-2 toxin and zearalenone as well, but these data are coming from the SGS. So, the maize grain was analysed for seven and less mycotoxins.

**Martin Minchin** 15:32

Great, thank you Radka. I think that's again a good wrap up of the summaries in terms of the various regions focusing specifically on that harvest period. But I'd like to maybe shift a little bit Max and Radka toward the amount of data in general we are capturing with all 37+ and Alltech RAPIREAD. You're all looking at this data pretty much each day, you've got to pull it up on your computers, in terms of your experience with that data and what you're seeing across the past few years or even the past 12 months. Is there anything interesting within that that we should be watching out for? We're obviously hearing more and more about emerging mycotoxins, Radka you just spoke about that one but you know, if we look across a period of time would you say outside of the harvest specifically that there is anything interesting in that data that we should be keeping a closer eye on?

**Dr. Radka Borutova** 16:30

Well, the emerging mycotoxins in my opinion, we find because we are looking for them. They were probably always here. It's not a secret. They are there and we find them very often. But if we compare the toxicity of this group of mycotoxins it's comparably lower than the toxicity of type B, type A trichothecenes, aflatoxins, the major groups of mycotoxins so yeah, they're a little bit like scarecrow somewhere, but we shouldn't be that much scared of the emerging mycotoxins. They are highly prevalent. So almost every sample contains emerging mycotoxins, but they are not that risky than DON, T-2 toxins, aflatoxin, fumonisins or the other mycotoxins. So, in my opinion for European samples would pop up are, and that's also not new but the commercial labs are not analysing very frequently for the other Penicillium mycotoxins. That's what Alltech 37+ lab is doing. That's why we know that wheat was contaminated with some other Penicillium mycotoxins, that grass silages contain some high levels at highly risky concentrations of the other Penicillium mycotoxins if you didn't analyse for the other Penicillium mycotoxins we wouldn't know. So, in my opinion, more than the emerging mycotoxins would be the Penicillium mycotoxins, which are more risky. It has huge impacts on the animal health, like the dairy cows for example. So that would be, what's something that popped up and is different to previous years would be low aflatoxin levels this year. It's good news. But we also have to report good news, in my opinion. So, this year, we are not so much threatened by the aflatoxin B1 as we were the past two years, which were really very bad aflatoxin years in Europe. So that's good news. But it's something very interesting this year for me that aflatoxins were so much suppressed in 2023.

**Martin Minchin** 18:44

That will certainly come as good news to many Radka, considering the aflatoxin challenge that has been prevalent over the past few years. Max, Radka has shared a lot of insights there. Would you have anything to add to that, from your experience, I guess, looking at both the North American data but also further afield?

**Dr. Max Hawkins** 19:01

A little bit along the same line, we do see a lot of emerging mycotoxins. Okay. As Radka stated, nearly every sample has at least one emerging mycotoxin in it. A little bit surprising to me this year, I saw probably the first alarming level of emerging mycotoxin coming out of the southern portion of the US and that was moniliformin at quite high levels in corn grain, which can be a considerable concern to poultry, due to its impact on heart health. The other factor we did see probably a little more aflatoxin in the US and Canada, particularly upper Midwest and on into the southern portion of the Western provinces of Canada from aflatoxin b1. It's strictly drought situation related. Okay, we don't see it highly occurring, but we see it in pockets where the drought was the most severe and most impactful. So, it's just something that we put the we don't wave a red flag at it, we wave a yellow flag and those species, particularly dairy cattle, because of the impact aflatoxin M one on milk quality, we caution them quite significantly to do some testing, okay, don't say you're gonna have a problem, but you need to make sure you don't have a problem. The only other thing that really pops out to me and it's, it's kind of happened after the fact. Okay, western portion of the Corn Belt, extremely low mycotoxin risk in grain and silage. Since then, they had late season rain, and they bale a lot of corn stalks or corn stover, however you want to talk about that. That received a lot of late season rain after harvest, and those stocks laid in the field and exposed to that rain. And the samples that we have tested to date are extremely high and DON and in zearalenone. And we've already had some significant impact feeding corn stalks in dry cow dairy TMRS. And we haven't seen the impact yet feeding them to beef breed cows for winter feed. But we know that's coming with those carrying that high level of risk. Also, late season hays that got rained on, same situation. So even though their main harvest was relatively free of mycotoxin risk, other feeds that they heavily rely on went through that weather impact challenge and mycotoxin risk is quite high.

**Martin Minchin** 22:11

Some really good nuggets of information there, Max. And I always think of one of your quotes around you know the quality of your grain or forage you will never be better than when it's actually coming in at harvest. So thinking about that and looking ahead at the months to come and managing the storage challenges that will present themselves what then should users of forages and grains be thinking about as we look I guess, post-harvest and opening the silos and forage clamps into the springtime and beyond.

**Dr. Max Hawkins** 22:43

All right, in the US we're already hearing issues with freshly opened forages, pits and piles and as they're beginning to open those up, we're seeing the result of poor fermentation and poor packing. Right now, it tends- the situations that are being brought to my attention are more pocketed along the edges and that type of situation not a full blown across the whole face of the pit or the face of the storage facility. But I know that those days are coming. Now this year, one of the blessings of this extreme cold weather we're having is that will tend to stabilise those piles of forages. Okay. But I know as springtime comes, this cold weather may just be delaying the situation that we're going to have to deal with in late March and into early April. As ambient temperatures warm, those piles will come to light and what's in there will start to take off and do its thing and that can be anywhere from fusariums to Penicilliums, to Aspergillus, they can all start to function within those piles. There is not a pile of inert ingredients, it is a living breathing thing, so we just have to monitor that very closely continue to take samples from the corn grain standpoint, particularly corn grain. Drought put people in a mind that "maybe my corn's coming out the field pretty dry." Some of it was pretty dry. Like 14 15% There was a lot of corn that was harvested that was 18 to 20%. Was that adequately dried as it goes into storage? Here again cold weather will help stabilise those grains. If we turn on aeration, freeze the centre of that grain in the bins that is really going to help stabilise it. But eventually that cold effect will go away, and things will begin to take off. So, I'm very cautious as to what we're going to see as we begin to open some of these grain storage facilities later in the spring.

**Martin Minchin** 25:17

Max, Radka, thank you for all the work with these harvest programmes and for sharing again such valuable information today. If you're listening to today's episode and would like to understand more about the crop quality in your region or from a region where you may be purchasing grains, there is a full suite of resources available for you to download with a wealth of further insights. So, the links to this information and those resources will be included in the show notes where you access this podcast. Lots more to come this year. So, thank you once again for listening into Mycotoxin Matters. And we look forward to you being with us for the next episode.