**Mycotoxin Matters Podcast ep 2 V2**

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Female: 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: Hi. I'm Nick Adams, Global Director of Alltech's Mycotoxin Management Program, and today, I'm joined by Dr. Dulmelis Sandu.

Dr. Sandu began working with Alltech in March of 2017. She received her Master of Avian Medicine from the University of Georgia Poultry Diagnostic and Research Center in December of 2016. She received her Doctor of Veterinary Medicine from St. George's University in Grenada in 2015, and her Master of Science with a focus on poultry nutrition from Oregon State University in 2008. In August of 2017, she received her certification by the American College of Poultry Veterinarians, which specializes in poultry medicine, health, and management. Dr. Sandu enjoys working with customers in the broiler, layer, and turkey industry where she continues to provide her expertise and technical support.

In this episode, we want to get Dr. Sandu's expertise on why mycotoxin exposure should be considered as one of the potential causes in cases of suspected immunosuppression in animals, and in particular, poultry. Dr. Sandu, welcome to Mycotoxin Matters.

Dr. Sandu: Hi, Nick. Thank you for having me. I'm delighted to be here. Hopefully, I can impart some of my wisdom when it comes to linking veterinary medicine and mycotoxins.

Nick: We're certainly looking forward to your input, Dr. Sandu. Maybe we start with the first question around perhaps giving us an overview of your experience with mycotoxins based on your experience as a poultry veterinarian. When did you first become aware of mycotoxins as a potential issue on farm? And how do you think that's evolved in recent years?

Dr. Sandu: This question, it's always something that is generated when I go out to the field. People ask me, "How do you know that it is mycotoxins that you're dealing with and how can veterinary medicine help in regards to diagnosis of field cases of mycotoxicosis or even low levels of mycotoxins?" That is very difficult to determine, but I do know that mycotoxins are something that are constantly a challenge particularly in food animal production. I do see that mycotoxins can be an issue in the swine industry, in the cattle industry particularly when it comes to even some of the transference from the dairy cow into the milk.

In poultry, Nick, that's not any different. We do see cases of aflatoxicosis, for example, being transferred into the egg. We do see occasionally some instances where there are low levels of mycotoxicosis and there's program failure, not necessarily a direct link to any specific mycotoxin, but we do know that they're there. This is something that we can see every time that we test grains. They come back positive for mycotoxins. As a veterinarian, I do know that this is a challenge. I always have it in the back of my mind whenever I go see a case and there's no other explanation for it and it keeps coming back. Perhaps there's a cyclical cycle associated with it and I'm able to see that it comes and goes, the waxing and waning, if you want to call it. There's no direct link to anything, but then you test the feedstuffs and they come back positive for mycotoxins.

This is something that as a veterinarian, I keep in the back of my mind, and I'm constantly trying to see whether or not there is a link. I think that we will be able to see even more of this in food animal production as we learn more about mycotoxins and all the links that are associated with even low levels of mycotoxins.

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Nick: When we think about mycotoxins, we often think about key symptoms like reduced feed intake, but you talk about more subtle ways in which mycotoxins are affecting the bird in your blog. What could producers be looking out for on a regular basis such that things don't get to the point where something like reduced feed intake is the first sign of a potential challenge?

Dr. Sandu: Yes. One of the things that I've come to realize is that I don't usually see acute mycotoxicosis out in the field. That is not something that I'm typically seeing like I would go out to a farm and say the birds are backing off feed. That's pretty obvious because you can look at the birds' feed intake and determine there's a decrease in feed consumption. Then when there's a feed change, you see the birds going back to the feed, so maybe there is something there. Then when you test the feed, you determine there are mycotoxins present. That could be the most likely cause as to why the birds backed off feed in the first place.

That's not usually what I'm seeing in the field. What I'm seeing is more of that chronic, low level of exposure where there is either one or multiple contaminants in the feedstuffs, not necessarily the birds backing off feed, but consumption seems well. Weight gains are appearing to be to the point that the company doesn't necessarily suspect anything, but there may be other symptoms like intestinal issues or even mild cases of immunosuppression where your vaccine program may not necessarily be the most efficient. It's not necessarily something that would be very significant for you to notice. It would be more of a subclinical, chronic challenge, and that's what I'm seeing the most.

Now, there may be other underlying causes in addition to the chronic, low levels of mycotoxin exposure. However, we do know that even at low levels, there are additive, synergistic, and antagonistic components to mycotoxin exposure. So it doesn't necessarily mean that one mycotoxin may be causing an issue, but there are multiple mycotoxins at play that could be causing or adding to the issues that we're seeing out in the field. So when I say subtle effects of mycotoxins, the producers may not be necessarily keen to it or in tune or being able to notice it all the time, but they do know that their programs are not where they necessarily need to be. That would be a subtle way of mycotoxicosis exposure, and that's what I'm seeing the most out in the field, Nick.

Nick: All right. Dr. Sandu, you mentioned the use of mycotoxins within various pharmaceuticals, and perhaps penicillin is a great example of this. Maybe it also highlights the potential ways in which mycotoxins can have an impact within the body. What are some of the things that mycotoxins are potentially impacting at the level of gut health and immunity, for example?

Dr. Sandu: We do know that mycotoxins, these metabolites can be used in pharmaceuticals and they do help in certain instances. For example, when somebody undergoes an organ transplant and they need medicine to immunosuppress the system so that it doesn't attack necessarily their new transplanted organ, we do know that there are some metabolites that can help with that. In food animal agriculture, particularly in poultry where we see intensive rearing practices and the immune system has to be top-notch, you don't want that immunosuppression. You want the immune system to be at its full capacity and full potential because the birds are going to be exposed not just to environmental factors like weather, sea changes, temperature changes, those kinds of things, even ammonia levels, which already cause some level of immunosuppression and stress in the flocks.

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You're now also exposed to disease components, which the birds may be exposed to just either by the nature of viral, bacterial, and even protozoal exposure. So it's really important to have a top-notch immune system and adequate weights in your immune organs so that you can develop the right response when it comes to a period of stress.

With mycotoxins, it is no different. We do know that mycotoxins tend to be teratogenic, so it affects the progeny. If you want to look at it at a breeder level, we do know that mycotoxins can cause issues later down the road particularly with the baby chicks. They are also cytotoxic, meaning that they will affect different cells in the body, cells that have very specific functions and are supposed to either clear disease processes or build the right immune cells so that you are able to battle in a way whatever disease process comes up at you. We do know that mycotoxins tend to affect those systems and they do like the rapidly dividing cells.

This is particularly important when it comes to gastrointestinal health because we do have a lot of rapidly dividing cells in the gastrointestinal tract. It is very important to have those cells to be fully functioning, to be able to mount right immune response, to be able to absorb nutrients from the gastrointestinal tract. It becomes a very important part of the bird's immunity at the gastrointestinal level. But we also know that the other organ system that has rapidly dividing cells is the immune system. When mycotoxins affect the signaling and communication that those cells are supposed to have to mount the right immune response and the right immune reaction, what we see is that mycotoxins hinder that; therefore, you have failure in DNA synthesis, RNA synthesis, protein synthesis, even the cascade signaling that is supposed to take place. All of that is going to be hindered; therefore, the bird is not going to be able to mount the right immunity not only at the gut level but also in general, so that bird will become immunosuppressed.

Nick: So we're really seeing mycotoxins impact the very basic levels of the bird. When we look at regulatory levels of mycotoxins such as aflatoxin as well as advisory levels of mycotoxins such as DON, we typically see that feed is below these levels when tested. What does this tell us in relation to the potential impact on the bird? Does it mean that there will be no negative effect from the mycotoxins, for example?

Dr. Sandu: Not necessarily. Again, it goes back to that low level chronic exposure. That's the concern that I have where the feedstuffs may not necessarily be testing above a level that you can safely say I'm not seeing a lot of issues at these levels. However, you're constantly feeding that. The other thing is that there are situations where the feedstuff location that you tested may not necessarily have a high level of mycotoxins, but then you test another batch within the same crop or even at a different location and you may have a hot spot of either aflatoxins or DON or even other mycotoxins in addition to those. What I'm seeing is that yes, typically we do have those low levels of mycotoxins.

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However, we go back to the synergistic and additive effects that these mycotoxins have and may not necessarily be having an effect per se. But at those low chronic levels, the longevity of the time that the birds are exposed then they do start having some sort of side effects. Now, when it comes to regulatory levels, we do know that there is a cap in regards to how much, for example, aflatoxin can be in the milk or even in the eggs. But we're not seeing that there is a lot of -- I think it depends a lot with the amount of contaminants that are present in that year's feedstuff. What we're seeing is that every year it varies, so it may not necessarily be a year where aflatoxin may be high. However, it may be at low levels and we still need to keep that into consideration.

Now, what does that mean, that there will be no negative effect? I don't necessarily think so. Remember that we're still having issues with the other components that are associated with intensive rearing practices that are going to be adding to the stress in that bird. Therefore, having another component come in such as low levels of aflatoxin or low levels of DON, it will have some sort of effect. Now, whether or not that effect can be measured in the field, that's a different question because sometimes, we're not able to really determine that mycotoxins, especially if we're thinking that they're within the normal limits, that they're causing any sort of effect. In fact, it's the opposite. What we're seeing is that there are mild symptoms that could potentially be there, but we don't necessarily know where to pinpoint the causation of it.

Depending on what kind of bird you're rearing whether it's broilers, turkeys or layers, you will have a length of time where you either will see this issue and then it goes or you'll be with this issue for a longer period of time but you're not able to really pinpoint it. It's a little complicated because yes, you're within normal limits, but you don't really know where to pinpoint the cause of your problems and they may not necessarily be just due to mycotoxins. They can just be a combination of all these other issues in addition to the low levels of mycotoxins.

Nick: Yes, it certainly seems the concept of needle in the haystack is somewhat descriptive in this regard. It's a very complex issue. Maybe that leads into the next question. From your experience, Dr. Sandu, what are some of the best elements of mycotoxin control programs that you've seen in the field in recent years as clients have tried to manage this issue?

Dr. Sandu: There are multiple things that can be done, Nick. I've seen control at various levels and I've seen no control of mycotoxin programs at any level. Honestly, it depends on the company's protocols, but it can start as early as crop rotation and having the right crop and soil components to decrease some of those fungi from developing in the first place. I know that that part is extremely difficult. However, it is part of the management of decreasing mycotoxin contaminants, so we can start at the very beginning.

There are other components that we can do. When we harvest the grains, we can apply certain additives to decrease some of the fungi from being developed even in storage. However, we do know that once that fungus is there and the metabolites are produced then they're there forever, not necessarily going to get rid of the mycotoxin metabolites with processing or anything like that, but we can mitigate some of the increase during storage.

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The other thing that we can do is routine testing. Have it as part of your control program within your feed mill or even as you're obtaining some of these raw materials to make your feedstuffs. It's important that you at least have some sort of program in place where you're prepared to handle contaminated feedstuffs as it comes your way. Then you're able to either manage it in a way that you either dampen some of the levels whether it's through an absorbent or whether it is through dilution of the feedstuffs. There are various ways that you can deal with this. The other thing is just reject contaminated feedstuffs to begin with. That's another thing that I've seen other companies do where above a certain level, they will not accept the raw material to even enter their facility. That's another step that you can take towards control.

The other thing, Nick, that you can do is definitely if you're seeing that there's a pattern where there is towards the end of the year beginning of harvest of the next crop and you haven't gotten new harvest. One of the things that you can do when you know that you're at the bottom of the barrel, therefore, storage mycotoxins could always be a possibility, just add absorbents to help decrease some of those side effects that you can potentially get from using contaminated feedstuffs. Then of course thorough cleaning between old crops and new corn, for example, making sure that your bins are thoroughly cleaned and that you have a good program to implement good sanitation before you get that new corn coming in and potentially starting the cycle and contaminating it all over again. There are multiple things that can be done to decrease the mycotoxin level that comes into the birds feed to begin with.

Another thing that you can do is testing your shavings. That's another one that we easily overlook here and that's because that's not something that is routinely done. But one of the things that we see in the field is that birds love to forage and they eat a lot of shavings. So it would be ideal to also include in your program testing of your shavings to see whether or not you're going to have exposure via that way. There are multiple components that can be done, but the main thing is to have a vertical in place, and that is very company-dependent.

Nick: Dr. Sandu, many thanks. That's great information. I really appreciate you taking the time to join us on Mycotoxin Matters today.

Dr. Sandu: Thank you, Nick. Thank you very much for having me. It's a pleasure.

Nick: That was Dr. Dulmelis Sandu, a poultry veterinarian for Alltech based in Athens, Georgia. We spoke with her today from the United Kingdom. We thank you very much for joining us on Mycotoxin Matters.

Female: We hope you enjoyed listening today and we 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 knowmycotoxins.com.

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