



Season 2 Episode 1 – Using Poultry Litter

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Announcer:

The Alabama Crops Report Podcast, your trusted information source for Alabama agriculture.

Scott Graham:

Hey, everybody. Welcome into season two of the Alabama Crops Report Podcast. Scott Graham, and Katelyn Kesheimer behind the mic. Katelyn, how's it going?

Katelyn Kesheimer:

Good. I'm excited to be back again for season two of our podcast, which means people are listening to us somewhere.

Scott Graham:

Yeah. That's what they tell us anyway.

Katelyn Kesheimer:

Well, we'll keep doing it. So ...

Scott Graham:

All right, well today we've got Dr. Rishi Prasad. Rishi, how's it going?

Dr. Rishi Prasad:

It's going great. It's a great year. And I'm excited about this year.

Katelyn Kesheimer:

Yeah. So we're in February of 2022. And we're going to talk about fertilizer today. When that comes to mind, I keep thinking about all the talk the last couple months about fertilizer prices. What do you recommend for how to deal with those prices that are at an all time high right now?

Dr. Rishi Prasad:

Yeah, I mean fertilizer prices are definitely, they're skyrocketing and high over the past several months now. And this is a very different and a unique year because the same fertilizer that you purchased last year, now you have to pay the double the amount of money for nitrogen or for phosphorus. So it's going to be a very challenging year for the producers because they have to come up with a game plan on what is the best option for them in terms of management practices.

Scott Graham:

So Rishi, we know something that you do a lot of work with is with chicken litter and stuff. And I'm going to tell a very brief story that's going to sound a little embarrassing for me, but just bear with me. So last week, Dr. Arrows Francisco and I were coming back from a meeting in Tuscaloosa county, and he had heard you speaking somewhere. And when Arrows was describing to me what your talk was, it clicked in my head of, hey, when we're short on nitrogen, we can increase nitrogen production, we can try to make more. With chickens, we can't really make them produce more, I'll say litter, and we'll try to stay-

Katelyn Kesheimer:

Very scientific here.

Scott Graham:

Yeah, well, you can't just make them produce more litter, right? Are prices going to be affected by what I assume will be a higher demand in litter?

Dr. Rishi Prasad:

Yes, absolutely. Right now it's a demand versus supply game. A lot of producers are kind of moving towards reserving litter from the poultry growers in an anticipation that some of these higher fertilizer prices that are in the market, they can compensate by adding or using litter itself. Higher amount of litter does not necessarily mean that you can compensate all the nitrogen requirements of the plant just by using chicken litter. That's not going to happen. And one of the important reason is, litter has most of the nitrogen in organic form. If you look into the composition of litter, it is made up of the spilled feeds, the chicken poop itself, which has creatinine, and urea, and ammonia, and these get converted into simple nitrate and ammonium and that's what the plant

needs. And mineralization is the factor that drives the break down of these organic nitrogen compounds into simple nitrates and ammonium.

Dr. Rishi Prasad:

So if you put or apply too much of litter in an anticipation that you are trying to cut down on your fertilizers, probably that's not going to work out really well because the more the litter you apply, that litter has to break down as well. And the microbes that are in the soil, they are the ones that break that litter. So necessarily, if you're putting too much food to the microbe, it doesn't mean that they're going to chew it and break down it in the same rate. So you have to be careful when it comes to applying a lot, versus what is the most appropriate rate in terms of litter application.

Katelyn Kesheimer:

Let's talk about rates then. If you're applying chicken litter, how much should growers apply?

Dr. Rishi Prasad:

So one tone of chicken litter has 60 pounds of nitrogen, 60 pounds of phosphorus and around 40 pounds of potash, but they are total and not the plant available. So they are total. Most growers typically apply two tons of chicken litter, two to three tons. And I feel like that is right rate to apply. You necessarily don't need to apply six tons or eight tons or dump like truckloads of litter on your ground, just so that you don't need to apply any fertilizer, and that's not correct. Two tons in my mind and the research that I have done, it seems like it does good. Because again, you have to think that litter not only supplies nitrogen, but it also supplies, phosphorus and potassium as well and the micronutrients.

Scott Graham:

Are we talking specific crops here or just in general or?

Dr. Rishi Prasad:

In general, I will say. But I mean, corn has a much higher nitrogen requirement, whereas cotton may not have that high as corn. But what I just said that you cannot use only litter to supply all the nitrogen needs of corn because the rate at which the plant demands the nitrogen is very different for corn. Corn is a hungry and a thirsty plant. We all know that. And when you apply chicken litter for corn production, the litter has to break down first and the release rates of nutrients are very slow. So initially it may happen that the amount of nutrient that is released from the litter may match the plant demand, but once the crop reaches knee high stage, the daily nitrogen requirements are like almost to a pound every single day. And just relying on litter to supply that much of nitrogen probably is not a good idea.

Katelyn Kesheimer:

You mentioned the litter has to break down, is there a set time you should apply that before the crop goes in the ground, or the crop reaches a certain growth stage?

Dr. Rishi Prasad:

Litter typically is applied before planting. And I would like to provide very important information here and that is, litter, what we have seen if you apply two to three weeks before planting, that's the sweet spot. And that's where most of the plants get benefited out from litter application. Six months prior to planting probably is a really bad idea for several reasons, because the time you apply litter, depending upon the weather condition, it starts breaking. And if you are applying, say, for example, in winter months, you know what happens in Alabama in winter months, we get a lot of rain. So if you're applying litter in winter months, basically most of the nutrients probably they're washing away from your field. That's why I say like two to three weeks before planting is the sweet spot for getting the maximum benefit from litter application.

Scott Graham:

So, one thing I've noticed as I've been kind of riding around during meeting season here is, you see just big piles of chicken litter in fields. Are we starting to have some breakdown there? Does that have any effect?

Dr. Rishi Prasad:

Yes, absolutely. I mean, most of the producers, they pile the litter in their field and definitely it kind of kicks the composting process because you are keeping it in a certain place piling high. There are a lot of microbes that are present naturally in the litter and they keep decomposing the organic matter. The problem is, most of the nitrogen that is present in the litter, they are highly volatile just because the pH of the litter, the starting pH is very high. It runs around somewhere between eight and nine.

Dr. Rishi Prasad:

So when litter, which has a high pH. At high pH, most of the ammonium does not exist as ammonium it exists as ammonia gas, and that's the reason whenever you go to a litter pile you smell the ammonia gas that is coming out of the litter pile. So stockpiling litter in the field for several months probably is not a good idea because you lose the nitrogen value out of it. And if you are thinking of applying litter just for the nitrogen value, I will say that you need to discount at least 75% nitrogen out from the total nitrogen because composting during that process, you lose a lot of nitrogen. But the other nutrients like phosphorus and potassium, they will be retained. They're not going to go anywhere.

Scott Graham:

If I get some litter from a chicken coop in East Alabama, should we expect similar levels of nutrients as in North Alabama or, and should we test them?

Dr. Rishi Prasad:

Absolutely. This is a really great question. Litter composition varies quite a bit. I have a piece of ... We did a survey throughout the state and we collected litter from several houses. And there's a wide range of nutrient, especially in the numbers. Say for example, the nitrogen ranges all the way from 34 pounds per ton to 66 pounds per ton, that's a doubling number, right? Same thing with phosphorus. We see the numbers all the way from 38 pounds per ton to 59 pounds. And then potassium, we see somewhere around 46 pounds to 73 pounds. That's a lot of variation. So grower one thing should understand, whoever is buying litter is, they should check with the poultry producer how long the litter stayed in the house before it was cleaned. Did they clean after six or seven flocks or did they cleaned after like a year or two years or three years?

Dr. Rishi Prasad:

Many poultry producers are kind of moving towards practice where they're cleaning houses after three years. But then there are several incidences, like say for example, there's a disease incidence and that forces a poultry grower to clean their house. So if, say for example, you purchase a litter and unfortunately you did not ask the grower when it was cleaned and it was a fresh litter, probably you are not going to get a lot of nutrient value out of it. The bottom line is, if the litter is in the house for a longer time period, the nutrient content, especially nitrogen, phosphorus and potassium goes up. So with every flock of chicken raised, the nutrient content keeps building up. So it's always a good idea to buy a litter which is older, that has just stayed in the poultry house or chicken house for at least two years.

Katelyn Kesheimer:

Other than time, is there any way growers can test it to see how much nitrogen, phosphorus and other nutrients are in there?

Dr. Rishi Prasad:

There are no rapid tests unfortunately. Growers need to understand that they need to take a composite sample, pull out a representative and composite sample and send it to a testing laboratory or animal waste laboratory and get the nutrients analyzed before even they plan to apply. I have seen in instances where the litter came back like less than 1% nitrogen, 1.5% phosphorus, and maybe 1% potassium. That litter is probably not the best. I mean, it is going to cause problems if that litter is applied in a corn field, you will see that the corn field will turn yellow pretty quickly, because there is not enough nutrient in that kind of litter. But if you test the litter and you know for sure that the litter has 3% nitrogen or 4% nitrogen, then you have a case exactly how much you are putting in with the amount of litter that you applied.

Scott Graham:

And we just had Audrey Gamble on in our last episode, but so you can send to campus here at Auburn to the normal soil testing lab, your poultry litter. Okay, that's good to know.

Dr. Rishi Prasad:

Yeah. You can send to the Auburn soil testing lab, and there are some commercial labs as well. They also test the poultry litter and they can test there as well.

Scott Graham:

And when they test, are they giving you the percent available to the plant?

Dr. Rishi Prasad:

No, most of the commercial lab, they tell you the total. The total nitrogen or phosphorus or potash. The available part is a tricky one, and that varies quite a bit. And it varies between the soil types, it varies between the environment as well. The work that we have done, where we are trying to understand that how much of the total is truly available? And we see quite a bit of variability, like say, for example, in North Alabama, silty clay loam soil, we have seen up to 37% of nitrogen present in the litter is released and is available to the plant within the first 30 days after application. With phosphorus, we have seen up to 21% and potassium, we see up to 86% of the total potassium is available within the first 30 days after application.

Dr. Rishi Prasad:

But this entire number changes if you move from like a silty clay loam soil to a fine sandy loam soil. In sandy loam soils, we have seen up to 22% of nitrogen is available within the first 30 days. 61% of phosphorus is available within the first 30 days and almost 35 to 92% of potassium is available within the first 30 days.

Dr. Rishi Prasad:

So in a nutshell, we see that most of the potassium, like almost 90% of the total potassium is available to the plants within the first 30 days. Nitrogen availability is highly variable, and that depends upon the soil type, the weather conditions. And of course the pH, pH is a big one. So if you want to get the maximum benefit from the chicken litter, especially the nitrogen, if you surface apply it and then incorporate it either through discing or if by rain, if it can be incorporated, you preserve or reduce the ammonia volatilization losses. There are some other research that have looked into subsurface application. And in fact, the USTAARS, they have developed a subsurface applicator where they inject the litter around two to three inches deep in the soil surface, and they have found the nutrient benefit from such kind of litter application.

Dr. Rishi Prasad:

Typically litter is broadcasted, but when you broadcast your kind of spreading a ton in the soil, versus if you are concentrating it near the root zones. So if you concentrate the litter, either through a subsurface banding, or even through a band application. I mean, I don't know of any farm equipment that can do a surface banding, which are commercially of level at this stage, but USTAARS are developing some of these equipments that can do a subsurface banding. And research says that concentrating the litter close to the root zone provides the maximum nutrient benefit.

Katelyn Kesheimer:

All right, Rishi, as we wrap up here, and a lot of growers are getting ready to plant and maybe think about fertilizer. What are your top tips for growers who are using chicken litter in 2022?

Dr. Rishi Prasad:

Yes. My first top tip is the growers should not completely rely on chicken litter to meet their nitrogen demands. They should be thinking about doing like a split application. We have done research on cotton where we applied two tons of chicken litter as a pre-plant application. And then at first a score, we applied nitrogen fertilizer ranging all the way from 25 units of nitrogen to 90 units of nitrogen. And what we have found is 55 units of nitrogen is the best rate at the first score stage. So this is the right here. If producers are planning to cut down on their fertilizers and still they're planning to use chicken litter, my recommendation would be to use litter two to three weeks before planting. And when the crop reaches the first score, they can come back and apply around 55 units of nitrogen through any commercial fertilizer.

Dr. Rishi Prasad:

In corn, we have seen like, if the grower is applying two tons of chicken litter as a pre-plant application, they can apply 125 unit of nitrogen at the V6 stage. And in a common term, we refer it as knee high stage. And that's where we have seen that the yield peaks out, meaning we have not seen yield advantage of applying more than 125 units of nitrogen at knee high stage. So this year is the year where fertilizers needs ... If price is a factor and definitely it is, they need to cut down fertilizer at the first score for cotton and at the knee high stage for corn. So that's the game plan that should be there this year if you are planning two tons of litter as a pre-plant application.

Scott Graham:

And so I think you can hit this a little bit before, but say we do have some folks who are going to try getting chicken litter for the first time. At the end of the day, they need basically some kind of a spreader to get it out. And I'm sure they can use any normal spreader that they use and either some light tillage or rain or an irrigation or something to get it incorporated. And you don't necessarily need all this fancy stuff to knife it down in we just need to get it spread out.

Dr. Rishi Prasad:

Right.

Scott Graham:

And get it in the soil.

Dr. Rishi Prasad:

Absolutely.

Katelyn Kesheimer:

And make sure to ask your source how old the litter is, because the older, the better, correct?

Dr. Rishi Prasad:

Right. Older, the better and make sure that you do send the litter for testing and get the numbers because you need to know how much you're applying. Don't just believe or rely on just looking at the litter and saying like, man, because salt and sugar they both look same, but taste different.

Katelyn Kesheimer:

That's really good advice, Rishi. Do you have anything else you want to share with our growers today?

Dr. Rishi Prasad:

I guess I have covered all of it and yeah. I mean, if any particular grower has any questions specific to litter, they can reach out to me.

Scott Graham:

And during the season we're putting out our newsletter where we try to get information out. And if you use any social media or anything like that to put things out if you want to plug that?

Dr. Rishi Prasad:

Yeah. I have a Facebook page. We call it as Alabama Animal Waste and Nutrient Management Facebook page. And that's where we post most of the time on any of the research update that we have or any new topic that we would like to tell. So check out, Alabama Animal Waste and Nutrient Management Facebook page, it's a big one, mouthful one, but it's-

Katelyn Kesheimer:

Probably a great source for information.

Dr. Rishi Prasad:

Absolutely.

Katelyn Kesheimer:

Especially for some people on the first time. Well, thanks so much for joining us today.

Dr. Rishi Prasad:

Thank you for hosting me.

Scott Graham:

Yeah, this was great. And as always, thank you to our listeners. I appreciate you all for tuning in. Hopefully we'll be able to continue to bring good timely information as we go into season two of the Alabama Crops Report Podcast. And as always, if any of us can ever be any help at all, please let us know.

Speaker 1:

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