

Develop a well-thought-out plan to sample feeds

by Steve Martin

IT IS an interesting exercise to make a list of things you have changed your mind about over time. This may be topics related to life in general or something particular, like our business. We all evolve in our thinking as we gather life and business experience to challenge our previously held notions.



Martin

After working in the dairy nutrition business for nearly 30 years, I have changed my mind and thoughts on more than a few things. I guess this is to be expected, especially after your school of “hard knocks” education follows a college education. This journey, at times painful, reminds us to pay closer attention when our elders share their wisdom.

One of these about-faces in my nutrition approach is the value of testing rations at the bunk. For much of my career, I have tried to see the value in what could be called the last step of ration quality control. I struggled with how to handle the many times I have taken such samples to find the results lacking. What should you do when the lab analysis does not come close to the nutrient report from the ration software?

Searching for an answer

When trying to speculate about a disappointing ration analysis, how would you know where to start? The most obvious step would be to call in the feeder for a meeting about the importance of loading accuracy, adequate mixing time, and overall attention to every detail when building loads of total mixed ration (TMR). But wait, though this training and retraining always has value, could it be that the feeder actually did a top-notch job with that load? Who is next in the potential blame game?

Another reason I avoided TMR testing early on was because I made the mistake of checking the literature from the academic world regarding the proper way to ensure we are taking representative samples. Yes, this matter has been studied, peer reviewed, and published.

Without all of the details, the process involves arriving to the bunk before the feed wagon and placing sheets of cardboard, plastic, or other material on the feeding floor in multiple places along the bunk. It's tough to follow a procedure that involves combining these samples, perhaps a 5-gallon bucket, some

amount of stirring, pouring out, cutting, dividing, and finally arriving at a representative sample that can fit inside a plastic bag. No wonder nobody wants to try this!

To be sure, if I was the feeder in the surprise meeting in the dairy office with the owner, manager, and nutritionist after looking at the ration report and the lab analysis, my first question would be, “Who took the sample?”

It is a valid question!

As regularly proven by our routine shaker box analysis, dairy rations are comprised of a variety of particles ranging from powder to pieces of hay as long as 3 inches. This is the reason for the lengthy description of the “correct” way to take a TMR sample. Suffice it to say, the feeder has a valid question, and the person taking samples should be trained in how to do it as accurately as possible.

A practical sample

To avoid the journal-approved method of getting a representative sample, I have used the following suggestion to help train dairy employees on the best way to take samples. If you had a laser beam that could literally cut out a 3-inch cube of ration from the inside of the freshly fed bunk, that would be best.

Since you don't have a cutting laser beam, the next best thing may be to reach your hand into the middle of the ration, squeeze tight a small handful, rotate your wrist, and carefully place the feed into a bag. Repeat this a few times along the length of the bunk and send the entire sample to the lab. If the sample is not too big, the lab can grind the whole sample, reducing the risk of particle separation.

Again, this approach is not journal-approved and is not adequate for peer-reviewed studies. However, it is a reasonable approach to real-world TMR sampling.

One extra suggestion could be added to this task when sampling rations with a large amount of long hay. In this situation, when you pull your tight handful of TMR out of the middle of the bunk, you will likely have some long hay pieces sticking out. Pulling these out goes against the laser-cutting cube principle. On the flip side, leaving them in will likely cause higher-than-expected fiber results from the lab. My answer is to have a pair of scissors handy and trim these longer hay pieces as close as possible to the feed inside your hand.

It should be mentioned that this same approach can be mostly applied to sampling forages and grain mixes. For these samples, I think the wrist rotation helps to keep the fines in the sample. Also, feedstuffs such as corn silage,

which have various particle sizes of very different nutritional material, require this careful step.

Remember, several small, tight handfuls are the key. Be sure you are not sending large samples of rations or feeds that make it difficult or impossible for the lab to dry and grind these without first needing to take a subsample. Subsampling raises the risk of error!

Two reasons

I truly think that loading errors and poor sampling might account for the majority of disappointing ration lab analysis. These, however, are not the only pitfalls in the process. If we expect the ration analysis to be as we have planned, this assumes we know that the nutrient information in the ration software are matched to what the dairy has on hand.

I had a situation recently in which some heifer rations ended up lower in protein on some lab results. In this situation, the feeder was off the hook. After some investigation, we found that one of the forages and one of the by-product protein ingredients were both around four points of protein lower than predicted levels.

What about ingredients?

The situation with these heifer diets reminds us of the importance of forage testing and by-product ingredient testing. Depending on the number of rations at a particular location and how many forages and by-products, each dairy or other feeding operation should develop a strategy on ingredient and TMR testing that best addresses the most notable risks.

Sampling ingredients like corn and soybean meal is less important than the potentially more variable ingredients like gluten, distillers, and brewers. Depending on what is known about forages, including things like what cutting, which year, volume of inventory, and other aspects of harvest, forages may or may not need frequent testing.

Clearly label

Ingredient identification in the feeding area is a big help in reducing the chance of delivering inappropriate rations. If a TMR sample were to show a lower-than-expected protein level, could it be an instance of ingredient confusion?

We have several clients who have both corn gluten pellets and canola pellets on site and often in the same rations. These ingredients look similar, and both the truck driver delivering the ingredient and the feeder could easily confuse the pair. There is always a risk of the feeder putting exactly the correct amount of the wrong ingredient into a particular mix, and there is no approach in the

on-farm feeding software to catch this error.

How many times might the delivery truck put a load of gluten into the canola bay? Signage can help with this situation. However, in most commodity feeding area setups, completely removing this risk is nearly impossible.

As we think about nutrient results for grains, by-products, and commercial feeds, there are other factors at play. These ingredients have tag guarantees for various nutrients, chief among these being protein and fiber. If TMR lab results containing these products miss the mark, and if purchased grains turn out to be the problem, there is probably accountability through each state's feed control officials to address the situation.

We've talked up to this point about measuring nutrients in rations and feeds. What about testing for anti-nutrients, toxins, and so forth? With substances like nitrates, mycotoxins, mold, and the like, we tend to focus on testing individual ingredients.

I often wonder if this is the right approach if you don't test all of the ingredients. To make this more questionable, we often send in samples of various ingredients and determine our concern based on reference tables that have very wide ranges of differing risks based on the level of the anti-nutrient and the class of animal being fed. It might be a better approach to sample the final diet and compare risk levels in what the animals are actually eating.

Nitrates would be a good example here. You may test your most likely offending ingredient and base your decision on that result. But, what if several other ingredients have lower levels of nitrates that when added together with the biggest offender's contribution, you end up with a ration that is dangerous for the animals? Screening the diet for these risk factors can lead to individual ingredient testing to find the source of the problem.

Each dairy or feeding facility should have a well-thought-out plan to test both ingredients and final rations. Adequate training for feeders as well as sample takers will aid in this sampling process being a valuable effort for the dairy.

The goal is to offer some level of checks and balances to the important process of formulating, loading, blending, and delivering rations. When everyone in this process knows that there is a quality control function in use at the bunk, it seems the attention to detail is better. We will never make this process perfect, but a thoughtful plan for sampling both ingredients and rations will increase our chances for success. 🐄