



by Steve Martin

Are we feeding what we formulate? (part 1)

I'VE spent quite a bit of time lately with a non-dairy nutritionist. Doing so with someone who has a strong background in large-scale animal agriculture, but not much dairy industry experience – or should I say “baggage” – has led to many good conversations.

Walking around a dairy with someone who knows the fine details of cattle reproduction and nutrition, but not as much about the daily logistics of these subjects in a dairy environment, has been very valuable. It has been an exercise in being reminded about the pure science of these subjects, as opposed to simply pushing them through the unique workings of a large commercial dairy.

We have probably all had the experience of taking a non-ag friend or family member, or perhaps a school group, on a dairy tour. In these instances we get many questions like, “why do you do that?” When those same questions come from an individual who has a deep understanding of cows, but not the “dairy way” of doing things, you often have a hard time coming up with good answers.

Many of these questions and conversations have obviously centered around nutrition. It has been a bit like a several months-long audit of the way the dairy industry feeds cows and the particular way that our consulting group builds and implements diets.

There have been several positive outcomes from these discussions. Chief among them is improving the process to be sure that what we build with great detail in our nutrition model actually ends up being consumed by the animals.

This effort has been well received by, and even spurred on by, our clients. In short, we are working harder on the various steps between the computer and the bunk to improve performance. We have moved the phrase “ration quality control” to the front of many conversations. Of course, this is not new for us nor for the industry. There are many efforts in our industry from various groups focusing on this, and it is important that this conversation continues.

There are several opportunities for failure between the computer model used to build a diet and the cow's mouth. Among these is a second computer, and then a combination of diesel, steel, people and a clock.

The author is the founder of Dairy Nutrition and Management Consulting LLC, which works with dairies and heifer growers in Texas, New Mexico, Kansas, Colorado, Washington, California and South Africa.



The point of this column ties back to several of my previous columns. I think of subjects like using the shaker box, analyzing TMR samples, using linear programs, feeding minerals, using premixes and alfalfa hay versus silage. All of these have the common goal to plan, build, mix and deliver the best diet for the animals. But how good are we at implementing all of this?

That was the really big question from my non-dairy cattle expert.

The result? We are doubling down on the details of ration implementation. We have already found some items of interest that could be better. Let's start with the necessary but cumbersome task of ration entry.

We have long used a system for our clients to routinely verify that the recipes in place in the various on-farm feed management software are the same as we have formulated.

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Ration entry errors are more common than one might think. One of the most common shortfalls relates to temporary ingredient changes to address a short term ingredient issue that no one remembered to change back. Others may simply be a key-stroke error. These things must be verified – and often. The major area of effort, though, relates to the mixer wagon. This involves so many things that are crucial to each individual mixing environment and each ration.

My favorite course in graduate school was rumen kinetics, taught by my major professor. He had a keen interest in how different particles

and ration ingredients progressed through the rumen and the rest of the digestive tract. In the lab we would treat various feed ingredients with markers that we could later analyze for. These marked feeds would be consumed by heifers that had cannulas at various points along the progression on the GI tract. The final samples would be the manure.

Little did I know then, as a beef-focused grad student, that I would be using the principles learned in that class and those research projects to evaluate the mixing logistics of a 30,000-pound load of dairy total mixed ration (TMR).

Rumens are amazing

As we feed dairy cows nutrient-rich TMRs I often ponder the fact that the beef cow grazing native pasture across the road has the same rumen physiology, but is consuming a very different diet. How can both of them work in the same rumen? As I drive past a feedyard on the way home I am even more thoughtful about the low roughage diet those cattle are consuming. How can these different diets all keep animals healthy and productive?

In the dairy world we have an animal that needs enough quality nutrients in her ration to make large quantities of milk while at the same time remembering that she is a capital investment that has a long life in front of her. How can we look at the beef cow that is consuming a large volume of poor quality forage, and then think about the knives and high RPMs in our TMR mixer, and reconcile all of this?

Our goal as dairy nutritionists is to build diets that encompass all of these principles. The correctly-built ration includes enough large roughage particles to keep the rumen healthy, while also including the right blend of the more nutrient-rich, smaller grain particles to offer fuel

for milk production.

One of the things I like about the shaker box is that it gives us a picture of the strata in the rumen. The top shelves illustrate the rumen mat that floats on top, and the bottom pan material illustrates the liquid phase at the bottom of the rumen. Keeping those ratios in check will improve the cow's health and her production results. Not that you could shake out the beef cow's grazed diet, but to think about its length along with the other extreme of the low-roughage feedlot diet gives us the bookends of these various diets.

We have to look at the TMR mixer as the tool to arrive at the correct proportion of each particle size. When a TMR arrives at the bunk, it must be in a physical form that is long enough to not offend the roughage requirements of the rumen, while at the same time being short enough to not be sorted and allow for the high volumes of intake needed for high milk production.

The shaker box results give us a very nice way to be sure the long particles aren't either too much or too long. It also separates out the small particle fines and offers an opinion as to the amount and size of them.

I think we should always lean toward protecting rumen health and cow longevity. However, cows are not always the best at remembering their need for larger roughage particles that insure a healthy rumen. We need to help her there. As we build TMRs we must have an adequate amount of these larger forage particles, but present them in a way that insures she will eat them. Cows have an amazing ability to sort a mixed ration and eat what they prefer. The correctly built TMR reduces this risk.

In next month's column we will delve into some of the details that respect the nutritional needs of a dairy cow and how to push those through a 30,000-pound TMR mixer and end up with a good ration. We will discuss the people side, the machine issues, and the final delivered TMR.

In reality, the steps of implementing a correctly formulated diet are far more complicated and error-prone than building a diet in the nutrition model. I can be very precise and detailed sitting behind my laptop in a comfortable chair with a cup of coffee in hand. The question is, can I work along with my client to be sure this balanced ration ends up being consumed by the cows? If we can connect all of the dots in that complicated process, then we will surely be feeding for the bottom line.