



by Steve Martin

Ration building and implementation

I HAVE recently found myself using the term “building rations” for the task of ration formulation. We tend to use terms like “balancing” and “formulating” to describe the art and science of combining feed ingredients into what we call diets or rations. It’s mostly a variation in terms depending on your background, but these words do mean things.

There is a certain creativity in combining raw ingredients into blends that meet animals’ demands for growth and milk production. This effort is made even more complicated when economic realities enter the picture. I like the word building.

This month I want to explore the steps of the process that involve building a diet. Next month I will discuss how that plan is effectively put into place by the producer. Neither step is more important than the other and both are critical for success.

I think the term balancing is a good one, as it describes the mathematical process of considering each ingredient’s contribution of nutrients to the total. This can be as simple as using algebra or the Pearson Square to combine two ingredients for a desired protein level. Or it could be basic weighted average math in a spreadsheet to combine several ingredients into targeted nutrient levels.

In today’s world we use a highly complicated model that uses dynamic calculations where everything impacts everything else and it is all done within an economic component. We would simply call that process “modeling.” In the end it is still math, but as I often say, it’s math we can’t do in our heads.

Most people like to build things. And just like every other building process, the work involved in building rations is filled with details. It is paying attention to details and the further steps involved in successfully implementing a newly built diet where success lies.

In fact, the set of details involved in diet formulation is no more important, technical or difficult than the next step of moving it from the nutritionist’s computer to the feed bunk.

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Just like a building contractor must pay attention to details of materials, people, machines, permits, etc., the ration building and implementation process has many details to be managed, checked and rechecked.

Let’s discuss a few of the quality control checks along the way when building and feeding rations. No one wants a house that doesn’t meet code or look nice, and we for sure don’t

part 1 of 2 parts

want a ration in the bunk that is haphazardly designed and poorly implemented. Cows and the balance sheet would pay the price for that mistake.

Let’s first consider the initial needs before the nutritionist can get started. These include details about the animals being fed. Not just if they are growing or milking, but how much of what kind of milk are they producing? Or what is the goal for daily gain? Knowing actual body weight with either one is critical and often overlooked. We can also describe further details like pen conditions, activity and even weather to the model. These must not be overlooked and must be updated over time.

Analyses are critical

The next set of details is more difficult and time consuming. For a ration building process to be real and not simply academic, it is crucial that the ingredient analysis of the items in the diet be real.

Every nutrition program “comes out of the box” pre-loaded with a plethora of ingredient “book-value” nutrient levels. Using ingredient lab analyses to make those levels real is crucial and maintaining them is what takes so much time. Realizing that you have just completed a full ration building project, only to find out the most recent forage analysis was not used, is very frustrating.

Forage and ingredient analysis is a big deal if we want to do this right. The detailed math the model does is way over-rated if nutrient analyses used are not up to date. There is also an art to the science of managing forage and ingredient analysis.

With nutrient fluctuation in forages and by-products as the norm, using a running average analysis is probably wise. We also must look at

every lab result with a degree of caution, because the ingredient analysis process has a few error risks that must be considered.

Here is a point to remember where the real world of a dairy departs from the classroom: Even though a full forage and ingredient analysis library is filled and ready to go, you are still never 100 percent sure that the ingredients loaded at the farm are the ones loaded in the model. Discretion is necessary to be sure that the most likely potential error is considered.

Account for variability

An example of managing these potential errors relates to the attempt to support good cow health. Consider a by-product that has variable fiber content. If that ingredient is a significant source of important fiber in the ration, it is wise to use the low-end of its fiber range in the model. This way as fiber fluctuates the move will potentially over-supply fiber to the cow. While this would be a potential risk for milk, it is better than a risk for cow health.

One last point on the model should be made. For key nutrients like various fibers, starch, protein, fat, etc., we must remember that they all impact the predictions in a dynamic model. It is the interaction of these details in each ingredient that make the predictions real. It is the predictions for milk and growth that are the drivers of the final formulation result.

So don’t complain too much about the forage analysis bill or the effort to gather, package and mail the samples. They are incredibly important. And one more thing: the sample submission form.

Many dairy producers look at a forage lab submission form no less confused than an 18-year-old looking at a 1040 tax form for the first time. Filling out the submission form correctly is a bear. But it is important. Always ask for help and set standards for routine samples.

Watch animal weights

Milk cow diets are always a little easier to be sure we are accurately describing the animal. Yes, there are seasonal changes that impact details in the model. In most production situations the cows’ weights are very

similar over time, but it is still worth checking – particularly if heifers are getting younger and younger as they enter the milking herd.

Growing heifer diets seem, though, to need the most detail describing the animals and situations at the time. Has the breeding age changed? Are they walking further? Are they on a full-bunk or a limited-bunk time approach? What is the percentage of daily body weight intake? Have pen conditions changed, or are you preparing for a blizzard? All of these must be described well to the model to have the best results.

If we are not careful we will end up with a different ration for every month of a heifer’s life. At the same time, considering things like breeding age, pregnancy verification and other animal dynamics make for logical breaks in diets and better allows the formulation to match the animals’ growth needs.

Information is power when building diets. No matter if it is details about the animals or the things you plan to feed them, all are important.

Communication and attention to detail is the next step in being sure we are all on the same page in delivering good nutrition to our animals. Yes, there may be a few extra phone calls or texts and a couple of revisions along the way to end up at the best possible place for the ration. Much of this goes on behind the scenes and that is okay. Every detail does not require a conversation.

Next month we will follow this process as it leaves the nutritionist’s computer and arrives at the dairy or heifer yard. Here you will find a different set of pitfalls and risks to be aware of. A good nutritionist is keenly aware of these risks and works with the producer to mitigate them and feed successful rations.

This is a start to finish process. I often think about this as I pour milk in my coffee while building a ration, or finish a carton of milk and cinnamon roll from the hotel as I pull onto my first dairy of the day. It is always good to remember the end game. Keeping these details front and center is the best way to be sure that when we build diets we are truly feeding for the bottom line.