Straight to the Bottom Line 11/1/13

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Title… Developing a Sound Feed Ingredient Analysis Plan, Part III

This month we will complete the three part series on implementing a strong ingredient analysis program for a dairy. We have discussed some basic issues related to the analysis of various materials and looked into the difference between NIR and Wet Chemistry. Now, we will discuss what nutrients are the most important for various ingredient types. It can be a little intimidating for a dairy producer to know what boxes to check on a lab submission form. The choices are many and not all nutrients are useful for all ingredients.

The most basic analysis is certainly the determination of moisture content. With the plethora of wet ingredients we feed to dairy cows, this step is crucial. Every sample sent to a lab must be selected for moisture/dry matter analysis. Unlike other specie group nutrition efforts, the entire dairy nutrition world is built on dry matter as opposed to as fed. In most cases, the next nutrients to consider are ADF, NDF and crude protein. For nearly every forage or byproduct ingredient, knowing these three nutrients will describe most of what needs to be known about how to feed that ingredient. The ADF and NDF portion describes the amount of various fiber fractions in the product. This is needed for determining its digestibility. Crude protein is a measure of nitrogen. To go deeper, you might add protein solubility to the list. On the fiber side, most labs now offer a further analysis to determine not only how much ADF/NDF is in the feed, but also the digestibility of that fiber. This is called NDF-d. So, on most forages and byproducts, selecting the tests for ADF, NDF, NDF-d and then adding crude protein and protein solubility will be sufficient.

Forages like alfalfa and grass species are well described by the approach just detailed. Corn silage, though, needs an additional step or two. When considering corn silage, you must think of it as two very different feeds blended together. The corn stalks are like a big grass plant where we are primarily interested in the protein and fiber. Hopefully though, half of that corn silage pile is valuable corn grain. So, when analyzing corn silage, we need to add a starch determination to the list.

There has been significant activity in recent years concerning starch rate. The goal in this effort has been to more fully describe the rate at which starch is fermented in the rumen. In most dairy diets, starch carries the burden of supplying energy to the animal. So, the dynamics of how that starch is digested can have a big impact on production. Efforts in the lab and in the nutrition modeling software programs have allowed for more accurate feeding of starch. This improvement has implications not only for production, but also for cow health. No matter if it is corn in silage, flaked corn, high moisture corn or earlage, determining the starch content and rate is important.

Now, let's talk about some important nutrients for a few byproducts. Remember that when certain nutrients are extracted from feed material for human consumption or fuel production, the nutrients that remain are all concentrated as a result. Staying with the starch discussion, let's first consider what byproducts might still contain some starch. Knowing the starch levels in these will greatly improve your ability to feed them and assess true value. The three most common byproducts that have variable levels of starch are hominy, corn gluten feed and wheat midds. Starch content in these three can vary from the upper teens to almost 50%. Knowing the exact level is crucial. Another nutrient that is concentrated in various byproducts is fat. The three ingredients that come to mind for fat analysis in the

lab are hominy, distillers grains and brewers grains. These can have 9% to 12% fat content. The vegetable fat in these ingredients can be troublesome in a lactating diet and must be considered. The other ingredient class that is concentrated when starch is removed from ingredients is minerals. First and second in this list is sulfur and phosphorus. Sulfur levels in glutens and distillers need to be monitored. Even canola meal can have unusually high sulfur content. In high byproduct inclusion rations, sulfur at the diet level can become a problem for cow health. Phosphorus content in byproducts like distillers and gluten has garnished much attention due primarily to potential accumulation in the soil.

So, for most byproducts, the lab analysis should contain the fiber information from ADF/NDF, crude protein and, in some cases, fat, starch and probably sulfur. Knowing these items will allow for accurate economic evaluation and correct feeding of the product.

One more note should be made on the mineral subject. We know that the transition period of a dairy cow from the dry pen to the milking string is crucial for profitability. One factor that relates this success to the forage lab is the importance of mineral balance to these transition cows. As a result, forages and byproducts used in close-up cow diets need more full mineral analysis. Potassium is of critical importance here but magnesium, calcium and sulfur are important as well. It is probably best to have these mineral tests run with wet chemistry as opposed to NIR.

Knowing what tests to ask for on what ingredients will help you have better information to more accurately feed your cows. Knowing more about the true content of forages and byproducts will help reduce overall feed cost. And paying for tests that don't apply to a particular ingredient type is a waste of money.