

Straight to the Bottom Line – 1/1/11

By: Steve Martin

Are you frustrated by seeing \$250 corn in manure?

In last month's column, we discussed the frustration of seeing undigested corn grain in the manure of lactating dairy cows. As nutritionists and producers evaluate the consistency and overall apparent digestion of feed ingredients in manure, the presence of corn grain gets the most attention. When you consider how much corn is fed in most diets, it is a key objective to get as much of the energy out of the corn as possible. Last month, we talked about how processing and ensiling impacts the digestibility of corn grain. The most prevalent processing method in the dairy industry is probably fine grinding corn. Steam flaking will increase digestibility some as will aggressive processing of corn grain in silage via a kernel processor at harvest. These physical particle size reductions will improve the ability for the rumen microbes to do their magic on the starch before it exits the rumen. A couple of key numbers to remember; corn grain ranges from 70%-75% starch on a dry basis and the overall digestibility of corn grain is around 80%. The processing efforts we accomplish on corn grain will result in at best a few points of digestibility. Remember, we are not making strides that get us to 100% digestibility. So, regardless if you see some corn in the manure or not, there is still around 20% of the corn grain passing. When you flake it you probably won't see any of this 20% but when you grind it, you will. In general, for dry shelled corn and corn in silage, the goal has to be to process it as aggressively as possible.

What if we process it perfectly and still seem to be sluggish in milk and/or super high in fat test? Assuming that you have ruled out other dietary influences on milk production and are focusing on the corn digestibility, what issues should you be aware of? In a brief column such as this, it is impossible to examine this question completely. I do think though that producers need to be aware of recent advancements in the understanding of factors that limit the availability of starch in corn. For sure, it is safe to say that corn is not corn. Just like we recently moved away from crude protein to metabolizable protein and then to amino acids and from crude fiber to ADF and NDF some years before that, we are in the process of

moving away from crude starch. There are commercially available assays to help us determine the nature of the starch in our corn. These assays are primarily attempting to measure the rate of starch availability in the rumen. It is not so much the potential digestibility that is in question. The relatively high rate of passage in lactating dairy cows gives us limited time to work with. With the help of these measures, we can blend starch sources in a way to maximize the overall energy uptake from the diet and maximize the production of microbial protein.

Why is “corn not corn”? This is also a question with a really long answer! When I was a kid we ate lots of corn on the cob both fresh in the summer and from the freezer all year long. We all knew the difference between the “sweet corn” varieties and what we called “regular cow corn”. Little did I know then in 1970’s rural Alabama that I was tasting differences in corn genetics not so very different from variations in the biology of a corn kernel that may support 70 versus 75 lbs of milk in an otherwise identical diet. These differences can be in the physical hardness of the starch fraction or it’s interaction with proteins in the kernel. These issues of hardness and slowness in hydration reduce the rate of starch fermentation. Thus, the particle may pass out of the rumen before the energy in the starch has been harvested. By knowing what we have to work with, we can blend different starches as well as vary to total amount of starch in the diet.

Once again, the goal here is not a complete treatment of this complex subject. As producers, you need to be aware that corn is not corn. I think this is a developing story, so stay tuned. We cannot ignore this potential advancement in the use of our key source of energy in most dairy diets. With corn grain at or at least approaching \$250/ton we are all ears.