



# NUTRITION NOTES

Innovation + Research from Kent Nutrition Group

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## UNDERSTANDING FORAGE FIBER EVALUATION

*Jim Moseley, Dairy Nutritionist*

Corn silage harvest is well under way and speculation is rampant as to how good the crop will be. It's pretty easy to see that yield will be good, but assessment of quality is more difficult. Whole plant moisture is normally a good indicator of the crops dry matter. However, with most areas experiencing above average number of growing degree days, grain is likely to be more mature than normal. Husks are browning while the rest of the plant is still very green. Since the grain will likely be harder and more difficult for cows to digest, it will be important that kernel processors be properly adjusted. Later, lab analysis of fiber and digestibility will tell the real story of how good the 2018 corn crop is.

Fiber science is much different from what it was just a few years ago. Gone are the days of crude fiber concern. Despite the feed industry being required to guarantee a crude fiber maximum, ruminant nutritionists seldom consider it when building diets. The fiber of first concern is Neutral Detergent Fiber (NDF), more specifically aNDF. This fiber fraction is the cell wall components that support the plant and allow forages to stand. It is aNDF that remains on a filter after boiling a sample in a neutral detergent solution containing amylase. Amylase was added in the 1990s to improve results. Then within the past several years an "a" was added to its description to differentiate samples treated with amylase. When testing for aNDF much of a feed's ash is included, therefore the aNDF of feeds contaminated with soil tend to overestimate fiber content. To prevent this, a step has been added to correct for the ash in the aNDF residue. With this ash subtracted we are left with a aNDF fraction containing only organic matter (aNDFom). This more precisely predicts the forage's true fiber content.

Another aspect of fiber is its digestibility. The aNDF fraction is composed of digestible and indigestible fractions. It has been determined that after 240 hours of in vitro digestion, all on the aNDF that could potentially be digested, has been. That which remains undigested is identified as uNDF240. This fraction occupies space in the rumen and as its level increases, it begins to limit dry matter intake. Optimal intake of uNDF240 appears to be between .35 and .40 percent of the cow's body weight or for a 1,500 pound cow, 5.25 – 6.0 pounds of dry matter. Several years ago there were a lot of corn silages testing high in uNDF240. Levels were so high that cows were unable to consume typical amounts of feed and as a result did not milk well.

Physically effective fiber (peNDF) is the NDF fiber fraction that stimulates chewing and contributes large particles to the rumen's floating mat. Diets high in peNDF stimulate rumination and saliva production. Too much peNDF increases physical fill and reduces intake. Too little doesn't stimulate chewing, resulting in less saliva production, depressed rumen pH, and probable milk fat depression. Initially its level in feeds was determined by running an NDS analysis on the fiber that doesn't pass through a 1.18 mm Ro-Tap sieve. The currently accepted method is the use of the Penn State Particle Separator (PSPS). The current version of the PSPS makes use of 3 screens (18 mm, 8 mm, and 4mm) and a pan. A forage's peNDF is determined by multiplying the total of what is collected on the 3 sieves times the aNDF content of the feed. This is imperfect, but better than using the peNDF values stored in a database. A database cannot account for the wide variation in forage particle size.

Currently there are studies being done attempting to evaluate the interactions between uNDF240 and peNDF. Specifically, if peNDF were too high, could fine chopping compensate? This would lower peNDF and increase rates of passage and promote better utilization of poor quality forage. Conversely, if the diet were low in peNDF, could more of a high uNDF240 forage be added to compensate? Recent work done at Miner Institute in Northern New York looks promising.

We may not be able to visually evaluate the corn crop when it comes out of the field, but thanks to improved understanding of forage fiber and updated lab techniques we can send samples to a forage lab for relatively quick evaluation. Since fiber represents a large portion of a ruminant's diet, it is extremely helpful to better understand aNDF, uNDF240, and peNDF. This understanding has helped ruminant nutritionists better utilize farm grown feedstuffs and fine tune diets.

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