Is 150 RFV Good Enough Today?

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Thirty years ago, forage testing and the formula for Relative Feed Value (RFV) were being introduced to farmers. The guideline was 20-30-40. That was based on forage testing of 30% ADF (acid detergent fiber) and 40% NDF (neutral detergent fiber) which would be 150 RFV with 20% crude protein (CP). This was considered a good goal for the forage quality needed for feeding lactating dairy cows. Thirty years is a long time in terms of research advances in feeding cows and forage analysis. In this time period, we have come to a greater understanding of fiber analysis; incorporating the role lignin plays as an indigestible fiber component. We also have herds producing 50% more milk/cow/year than 30 years ago. Relative Feed Value was changed to Relative Forage Quality (RFQ). The question in 2015 — "Is 150 RFQ high enough for high producing dairy cows today?"

Under the RFV system, ADF was used as an indicator of digestibility and NDF was used as an indicator of intake. While NDF is still used as a good indicator of intake, ADF has proven to be less reliable in predicting digestibility. RFQ uses NDF Digestibility (NDFD) to account for DMI and true total digestible nutrients (TDN), and is calculated (Moore and Undersander, 2002a) as: RFQ = DMI (% of BW) × TDN (% of DM) ÷ 1.23. The TDN in RFQ measures the total energy consumed by the animal, not just fiber, but also CP, NDF, fat, ash, and NDFD.

Relative forage quality uses lignin to determine NDFD. This number is a percent of the NDF that is digestible in a given time period in the rumen. Thirty hour NDFD is a common figure used by nutritionists to estimate the fiber digested in the rumen to determine a reasonable energy value for the forage. Thirty hours is fairly representative of the average time forage spends in the rumen. NDF24 and NDF48 are also used, as well as uNDF240 which tells us the amount of NDF in a feedstuff that will not be digested in 240 hours or is considered indigestible NDF. On the forage test (Table 1), you can see values for many of these forage fiber measurements. These are numbers that will increasingly be used in discussions of your forage by your nutritionist. I have highlighted (green) values you will want to pay more attention to in the future.

Table 1. Legume forage test.

Dry Basis	%	Average	Range
Crude Protein %DM	20.33%	19.00	11.58 - 26.42
ADF %DM	31.11%	34.05	23.49 - 44.61
aNDF (w/ Na2SO3) %DM	40.18%	44.76	28.16 - 61.36
Lignin (Sulfuric Acid) %DM	7.80%	7.27	4.83 - 9.71
Lignin %NDF	19.56%		
uNDF240 %DM	26.38%		
NDFD 30 (1mm) %NDF	48.38%	41.28	25.10 - 57.46
IVTDMD 30 %DM	65.60%	74.84	65.04 - 84.64
AD-ICP %DM	1.27%	1.46	0.88 - 2.04
ND-ICP (w/o Na2SO3) %DM	5.22%	3.26	1.68 - 4.84
Protein Sol. %CP	36.31%	32.90	19.72 - 46.08
Fat (EE) %DM	2.80%	2.69	1.63 - 3.75
Total Fatty Acid (TFA) %DM	1.41%	2.04	0.98 - 3.10
Ash %DM 13.12%	11.29%		8.09 - 14.49

What are the RFV and RFQ values for the forage shown? As I have seen before, the RFV is higher (145) than the RFQ (138). It is possible to have a lower RFQ than RFV in pure alfalfa hay depending on the lignin content which can vary from cutting to cutting due to weather conditions that may or may not favor greater lignin production. Greater amounts of lignin lower NDFD. Is this forage good enough for high producing dairy cows?

If you look at the forage summaries below, you will see while we are hitting our original average of 40% NDF, a large percentage of the total forage tests at Dairyland Labs are lower than 40% (Figure 1). This would indicate that a growing group of alfalfa producers are consciously cutting their alfalfa at lower maturities in order to lower NDF and increase NDFD (Figure 2). If we are trying to achieve NDFD values over 50%, we clearly have to cut earlier. Dairy producers have found that this quality of alfalfa produces more milk and they can feed more of it. It also fits nicely with higher corn silage diets.

On the horizon is lower lignin alfalfa. This alfalfa will be about 10-15% lower in lignin which will improve NDFD and RFQ. This could be a major improvement in forage quality for high producing dairy cows in the future. It might be a "BMR" of alfalfa. Our experience with it so far is limited but it is worth considering. The question will be — "Will you continue a 4-cut system and aim for higher quality or consider a 3-cut system for more yield of similar quality that you have now?" I believe many dairymen will stay with the 4-cut system. Doing so should enable them to harvest 175 RFQ alfalfa hay/haylage, likely the new number we will be shooting for.

Figure 1. NDF forage summary.

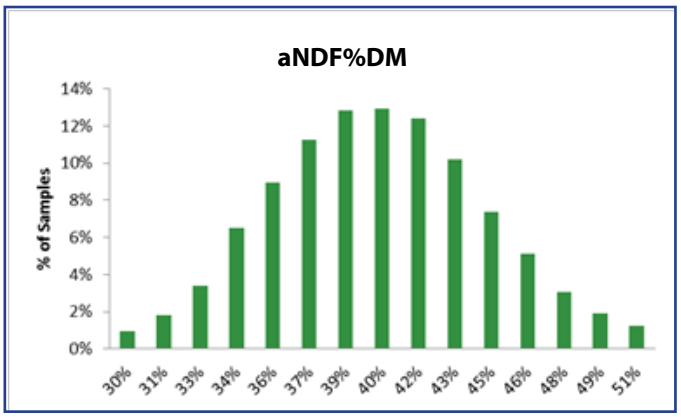

Figure 2. NDFD forage summary.