

NOT CHASING UNICORNS: HIGH NDFD IS POSSIBLE IN HIGH-NDF FORAGES

Matt Lippert, University of Wisconsin Extension Dairy Agent, Clark & Wood Counties

When formulating dairy rations, more concentrated nutrient options are often preferred. For example, years ago ear corn was the most popular grain option, before the industry moved on to shell corn. Then 44% soybean meal lost ground to higher protein options, and ingredients high in specific amino acids (blood meal, porcine meat and bone, etc.) now compete with commercial products that provide only the essential amino acid in a nearly pure form.

There are various reasons for this trend. If the ration is deficient in one specific nutrient, correcting the deficiency is done most easily by adding the specific nutrient rather than an ingredient that may provide other non-related nutrients at the same time. Quality control and consistency are often cited as advantages of using the more purified forms. Nutritionists like the consistency that comes with shell corn, compared to the variation in starch, protein, moisture, etc., that comes with high-moisture snaplage.

Consistency, the lack of unknown variation, has become very important in modern high-performance lactation rations. Farms that deliver more consistent rations will typically be rewarded in higher production and better herd health – all other factors being equal.

This trend is not yet as pronounced in forages, but it is coming fast. The value of the consistency of corn silage as compared to haylage is understood and one of the reasons for an increasing utilization of corn silage in the lactating diet. Forages deliver a very critical nutrient: fiber. More specifically, forages deliver needed effective fiber.

Our quality ranking tools – Relative Forage Quality (RFQ), Relative Feed Value (RFV), Net Energy for Lactation (NEL), etc. – tend to drop with increasing fiber. The reason is logical, but not always entirely correct. Fiber is lower in energy than the other main energy sources in the diet: fat, starch, sugar. Energy makes milk, so more fiber is lower quality. However, cows are not like chickens or hogs and require fiber – quite a bit of it. Forages that have the right type of fiber are valuable.

Often, the more fiber in a forage, the lower quality that fiber will be as well; but there are exceptions. It is the exceptions that I would like to encourage you to think about, such as grasses grown in the very cool ends of the season. Examples include oats harvested in October or November, triticale harvested in May, and the very first pasture grasses of the season. These can be high in neutral detergent fiber (NDF) but also high in NDFD (digestibility). These forages will deliver very high levels of consistent-quality NDFD.

Remember, when you walk into the feed mill, the most concentrated products command the highest value. It is time we think about this on the farm as well. When short on forage (through drought, frost, wet weather), high-NDF forages will meet the fiber requirement more quickly than alfalfa or corn silage.

The concentration that I suggest you look for has high NDF combined with high NDFD. If it is just high in NDF but not digestible, it is just bedding.

Another thing to consider: these high-NDFD forages can be grown at any time of the year, but some of the best are harvested in fall or early in spring – times we don't usually associate with producing high-quality forage.

Am I just chasing unicorns? Do high-NDF feeds, which are also high in digestibility, actually exist? Consider the Figure 1 data set from Dairyland Laboratories. Feeds centered on 50% NDF +/-1 % unit – relatively high-NDF feeds.

Note that by the time alfalfa matures to 50% NDF, it averages 20 points lower in NDFD30 as compared to grass forages.

Figure 1. NDFD30 average & range for several common forages, selected between 49% & 51% NDF.

	Average	Min	Max	n
Alfalfa hay	39.41	35.05	50.70	37
Grass hay	59.97	49.17	65.80	46
Alfalfa haylage	45.82	35.97	58.19	122
Grass haylage	64.56	56.97	72.48	118

Dairyland Laboratories, Arcadia, WI. Nov. 2022.

Rock River Laboratories' data of feeds over 50% NDF, not considering forage type (hay, silage, grass, legume, etc.,) shows that high-NDF feeds can also be high in digestibility and that there is great variation of digestibility among these high-NDF forages.

Figure 2. NDFD & Total Tract NDFD (TTNDFD): Average, standard deviation & maximum values for high-NDF forages.

NDF	aNDF	NDFD30	St. Dev.	Max NDFD30	TTNDFD	Max TTNDFD	n
50-55	52.63	46.28	7.02	78.52	45.82	72.32	2389
55-60	57.39	43.16	6.97	67.48	41.81	63.38	2594
60+	63.49	39.24	7.14	62.02	37.12	60.21	1655

Rock River Laboratories, Watertown, Wisconsin. November 2022

This Figure 2 data set shows that while there are critical declines in digestibility as fiber increases, there are still some very high digestibility forages at higher NDF levels and the variability of digestibility persists as measured by the standard deviation even at very high NDF levels.

The lab results are in. High NDF and high NDFD are not mutually exclusive. Feeds that have both characteristics do exist, unlike the speculative nature of the existence of unicorns. There are significant losses for feeds over 60% NDF for NDF digestibility, but there are many examples of highly digestible fiber from feeds over 50% NDF.

It's a fine line to produce forage suitable for lactating cows with high NDF and high NDFD, but it is some of the most important feed you can make. Depending on how much digestibility is lost, eventually it is best used as bedding or left in the field building organic matter.