



## Non-Forage Fiber Sources for Dairy Rations

By Ryan Sterry, Extension Regional Dairy Educator

Reviewed by Matt Lippert, Extension Educator Clark and Wood Counties

Abnormally dry conditions are raising questions on what to do if forage inventories remain limited going into winter 2023-24. Before hitting the panic button, farmers are first encouraged to do a forage inventory to determine what is already on hand. Secondly, the jury is still out on the remainder of this growing season and what later alfalfa cuttings and corn silage might yield. However, now is the time to begin discussions with your dairy nutritionist on different scenarios to plan around limited forage inventories.

One option to look at when forage yields are short is byproduct feeds high in fiber, also referred to as Non-Forage Fiber Sources. Examples of non-forage fiber source feeds are listed in Table 1. Most often

Table 1. NDF% book values NASEM Dairy 8: Nutrient Requirements of Dairy Cattle 2021	
Feed	NDF%
<b>Forages</b>	
Legume silage, immature	38.7
Cool season grass silage	62.1
Corn silage - typical	40.9
<b>Alternative sources</b>	
Alfalfa meal	42.9
Beet pulp (dry, no molasses)	46.9
Brewers grains, wet	49.3
Canola meal	29.0
Citrus pulp, dry	24.1
Corn gluten feed, dry	35.7
Cottonseed meal	28.1
Cottonseed, whole	50.6
DGS modified	27.1
DGS wet	31.7
Soybean hulls	66.7
Sunflower meal	40.2
Wheat midds	38.7

these feeds cannot replace all forage fiber in the ration but can offset some of the ration's Neutral Detergent Fiber (NDF) needs. Their use should be determined on a case-by-case basis, as they vary in availability, price, and how they work with other ration ingredients. On the plus side, there may be opportunities to lock in prices on these feeds to manage around market volatility. The energy, protein, and fat content of these feeds needs to be considered as well in terms of how they fit with other ration ingredients, or if one of these other factors must limit their inclusion rate.

Ration fiber is most often measured by the percent NDF. Maintaining adequate fiber in the ration is important for maintaining rumen pH and cow health. This includes managing to prevent displaced abomasum's, acute acidosis, and subacute acidosis. Milk fat test depression becomes a concern if fiber becomes limited in the ration and / or ruminal acidosis occurs. Providing some longer fiber particles is also a consideration to stimulate cud chewing and rumination. Rations can also be too high in NDF, which limits Dry Matter Intake (DMI) and milk production. In

early lactation and for high producing cows this can in turn lead to body condition loss and metabolic problems. General guidelines for ration NDF are a minimum of 28 to 35%, with the lower end of the range for early lactation cows, and upper end of the range for late lactation and dry cows. A minimum of 20% NDF from forage is recommended for early lactation cows and increases as lactation progresses.

Before replacing forage with a non-forage fiber source consider your feed delivery and bunk management practices. This includes whether rations are mixed with a TMR or if cows are component fed, any sorting issues at the feedbunk, the amount of highly fermentable ration starch fed, and the accuracy in mixing and delivering the desired ration to the feedbunk. Simply put, lower forage diets increase the risk of slug feeding. Rapidly fermented feeds, such as high moisture corn, may need to be limited in the ration. The addition of a dietary buffer may also be advisable. Non-fiber carbohydrate (NFC) levels should also be considered in low forage diets, with high NFC levels also having the potential to contribute to rumen acidosis and low-fat test. For some herds, it may be best to feed a greater percent NDF than the minimum recommendation as a safety factor.

Table 2 provides example feeding limits for selected high-fiber byproducts (adapted from Howard, W. T. 1988. Here are suggested limits for feed ingredients. Hoard’s Dairyman. March 25, 1988. p. 301.)

Ingredient	Suggested limit lb DM per cow per day
Alfalfa meal	5-10
Beet pulp	8-12
Brewers grains	5-10
Canola meal	5-10
Citrus pulp	5-10
Corn gluten feed	10-15
Cottonseed hulls	5-10
Cottonseed meal	5-10
Distillers grains	5-10
Linseed meal	5-10
Malt sprouts	5-10
Soybean hulls	8-12
Sunflower meal	5-10
Wheat midds	8-12
Whole cottonseed	5-8

**Resources:**

Feeding strategies when alfalfa supplies are short, University of Wisconsin

<https://fyi.extension.wisc.edu/forage/feeding-strategies-when-alfalfa-supplies-are-short/>

Formulating dairy cow rations, University of Minnesota <https://extension.umn.edu/dairy-milking-cows/formulating-dairy-cow-rations#fiber-1680461>

Extending forages and use of non-forage fiber sources, Michigan State University

[https://www.canr.msu.edu/news/extending\\_forages\\_and\\_use\\_of\\_non-forage\\_fiber\\_sources](https://www.canr.msu.edu/news/extending_forages_and_use_of_non-forage_fiber_sources)