

Forage Analysis: What Numbers Do I Need

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One of the more common questions I receive with regard to analytical testing of forages and other feedstuffs is, “I have the sample, now what do I test for or what analysis package should I select?”

The basic components that nutritionists need to evaluate a feedstuff or develop a ration are dry matter or moisture, crude protein, an estimate of the energy content of the feedstuff — Total Digestible Nutrients (TDN), Net Energy for Maintenance (NEm), Net Energy for gain (NEg), and the macro minerals, Calcium and Phosphorous. These are the most basic numbers that are required but including some additional analyses in the report can give us additional insight into the quality of the feedstuff or improve our ability to predict animal performance, which is the primary reason we analyze feedstuffs.

I recommend that the report include acid detergent fiber (ADF) and neutral detergent fiber (NDF). The amount of NDF in forage reflects the amount of cell wall contents (hemicellulose, cellulose, and lignin) within the sample. The NDF fraction is often associated with the respective bulkiness of forage and is correlated with dry matter intake of the forage or feedstuff. Therefore, the amount of NDF may be used to estimate the expected dry matter intake associated with the forage. The ADF number represents the amount cellulose and lignin within the forage and is correlated with the respective digestibility of the forage. In general, a higher ADF value is associated with forage that has a greater proportion cellulose and lignin and would likely be a more mature. Additionally, the ADF fraction is used to calculate the energy estimates TDN, NEm, and NEg that appear on the report. There are a number of different mathematical equations that the testing laboratory may use to calculate these numbers, based on the type of sample (corn silage, alfalfa, grass hay, etc.). If the ADF is included in the report, the nutritionist can adjust or recalculate the energy estimates if necessary.

If the forage will be fed in combination with a byproduct feed such as wet distiller’s grain, including an analysis for sulfur can be beneficial if the forage will be used in a growing or feedlot ration. Additionally, if the forage is a known nitrate accumulator (forage sorghums, sudangrass) or may have been stressed due to drought, including a nitrate analysis should always be considered, especially if the forage will be fed to pregnant cows.

Most analytical laboratories have a number of different analysis packages which encompass the most common procedures or numbers that a nutritionist or producer needs to know about their feeds. These packages will typically include the basic procedures (DM, CP, TDN) and then add on specific analyses such as NDF, or the Macrominerals (Ca, P, Mg, K, Na, Cl, S). Some laboratories may group analysis packages by the type of sample (Forage, vs. mixed ration) or production purposes (dairy vs. beef).

The objective of analytical testing of forages and feedstuffs is to improve our ability to meet the animal’s nutrient requirements and ultimately predict animal performance. The unequivocal best method of evaluating the quality of a feedstuff is feeding the feedstuff to an animal and evaluating performance over a set period of time, under a specific set of conditions. Since that would not be cost effective or timely, analytically evaluating feedstuffs in a laboratory is the next best thing and although it is not perfect, it is unequivocally better than the “this looks like really good stuff” method of evaluating feedstuffs.