

UNDERSTANDING FORAGE TEST

The lab report will contain two columns of information. Most nutritionists use the “Dry” column. The main reason for looking at the “As Fed” column is to see how much **Moisture** or **Dry Matter** is in the forage. If the hay has been harvested for some time, the moisture level should be around 10 to 13%. If moisture levels are above 18 to 20% there will likely be heating, molding and loss of feed value. If you’re testing haylage or balage the acceptable moisture level can be in the 40 to 60% range. It can definitely be too dry or too wet and drastically reduce the feeding value and palatability.

The next item in the dry column you give attention to is **Crude Protein**. The lab measures the nitrogen content of the forage and computes a protein value by multiplying the total nitrogen (noted further down the column) amount times 6.25. For the most part, it may range from 4% for very mature, straw-like grass forages up to 26% for legumes or very immature grasses that have had nitrogen fertilizer applied to them.

If the forage you’re testing has been baled slightly wet and has the tobacco brown appearance and aroma you may choose to test for **Available Protein**. This percentage will give you the true amount of the protein in the hay that will be available to the animal.

Acid Detergent Fiber (ADF) is closely related to the digestibility of the forage. The higher the ADF, the lower the energy value. Good quality legumes will run ADF values in the 20’s to mid-30% range. Grasses will range from the low 30’s to mid-40’s.

Neutral Detergent Fiber (NDF) gives the best estimate of the total fiber in the forage. It is closely related to animal intake. The more NDF a forage has, the less the animal will eat. Grasses contain more NDF than legumes at the same stage of maturity. Ranges for legumes will be in the high 30’s to mid to upper 40’s. Grasses will mostly fall in the high 50’s through the 60’s. NDF values above 70% will have low intake and are candidates for anhydrous ammonia treatment.

Total Digestible Nutrients (TDN) is the commonly used value to measure energy in beef cow diets. It represents the total of digestible crude protein, carbohydrates and fat. Leafy, immature legumes run the highest on energy with TDN levels going into the mid-60’s. In contrast, mature, grasses can drop nearly 20 percentage points below that to the mid-40’s. Decent hay for lactating beef cows needs to be in the upper 50’s or supplemental feed may need to be fed.

Net Energy Lactation (NEL) is another term used to measure the energy level in the forage for lactating cows.

Nitrate (% NO₃) The basic forage test will have a qualitative test for nitrates. Normally, none will be found and the report simply says “negative.” If a significant amount of nitrates are found, a % value will be reported that can run from 0.44 up to 1.76% and higher. See chart on next page for details.

NO3-N (ppm) : NO3 (ppm) : %NO3 Precautions

0 – 550 ppm:	0 – 2500 ppm:	0.00-0.44%	SAFE	Safe for all classes of cattle
550 – 1100 ppm:	2500 – 5000 ppm:	0.44-0.66%	CAUTION	Limit to 50% of dry matter
1100 – 3400 ppm:	5000 – 15000 ppm:	0.88-1.76%	DANGER TOXIC	Limit to 25% of D.M. Avoid feeding pregnant, lactating, or young animals
3400+ ppm:	15000+ ppm:	1.76+%	EXTREME TOXIC	Do not feed!

Relative Feed Value (RFV) is an index that ranks hay on a calculation of Digestible Dry Matter and Dry Matter Intake. The basis for the calculation is Acid and Neutral Detergent Fiber Values. As a guide, a 100 RFV would be seen in mature alfalfa hay. Most grass hays will fall below 100 RFV while the legumes and legume-grass mixes will run over 100, even over 200 when the forage is very immature and low in both ADF and NDF. Protein level of the forage is not considered in this index. RFVs below 80 normally will not meet many animal requirements for energy. The following table gives an abbreviated view of the nutrient requirements of several classes of cattle.

WHAT NUTRIENT NEEDS DO CATTLE HAVE?

Type of Cattle	Pounds		
	Dry Matter Per Day	% TDN	% Protein
1200 lb. cow mid-pregnancy	21	50	7.1
1200 lb. cow last 1/3 pregnancy	24	54	7.9
1200 lb. cow lactation avg. milk producer	30	58	9.8
1200 lb. cow lactation high milk producer	32	59	10.5
1120 lb. replacement heifer last 1/3 pregnancy	23	58	8.9
1120 lb. lactating heifer - avg. milk producer	27	62	10.4
500 lb. calf-gaining 1.5 lbs. per day	12.6	64	11.2
500 lb. calf-gaining 2.0 lbs. per day	12.7	69	12.8
600 lb. calf-gaining 1.5 lbs. per day	14.4	64	10.6
600 lb. calf-gaining 2.0 lbs. per day	14.6	69	11.9
2000 lb. mature bull gaining 0.5 lbs.	40	50	7.0

Note that only mature bulls and mid-pregnancy cows can handle forages with 50% TDN & 7 % crude protein. The forages harvested this year seem to be running lower than normal in both TDN and protein. Check your hay to see if supplemental energy or protein are needed for your cattle to perform to your expectations.

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