



Ridin' Herd

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Test forages for quality

All the rain received this spring in some areas was really appreciated and made for a good grazing season. In some cases it was a challenge to get hay in the bale without a lot of rain on it while in the windrow, and this reduces quality. Some producers waited for a “window of opportunity” to windrow and bale the hay. As forages mature, digestibility decreases because of the increase in fiber.

When designing diets using harvested feeds, many rations are balanced using average values, and these “book values” often result in over- or underfeeding certain nutrients. More economical and better balanced rations can be formulated using nutrient concentrations determined from feed analysis. In addition, nutrient “gaps” to meet the cow’s need can be more accurately determined and supplementation strategies developed.

How much can rain reduce yield?

There have been studies looking at the effects of rain on hay. Most of the studies are in reference to alfalfa. A study conducted recorded dry-matter losses as high as 22% when alfalfa hay was exposed to 1 inch of rain one day after being cut. Alfalfa hay never exposed to rain lost 6% of its potential dry-matter yield. Alfalfa hay exposed to 1.6 inches of rain over a few days lost 44% of its potential dry-matter yield.

In other studies, the effects of one- to seven-hour rains were examined on alfalfa hay. Here, dry-matter losses ranged from 4% to 34% and were greater the longer the rain lasted.

Grass hay often will not experience the same degree of loss as alfalfa hay, but will have some losses. The majority of yield loss in alfalfa hay is due to leaf loss. Grass leaves are not as easily lost.

Rained-on hay can lose quality due to:

- Leaching of soluble carbohydrates, proteins and certain minerals as rainwater falls on and moves through the cut forage.
- Increased and prolonged plant respiration due to the rewetting of hay above 30%-40% moisture. This leads to losses in yield, soluble carbohydrates and overall energy content.
- Leaf shattering and loss due to increased raking to dry the windrow after a rain. Frequent wetting-drying cycles also increase leaf loss.
- Microbial activity continues in wet hay, resulting in the breakdown of the plants and consumption of their nutrients. Mold growth can also occur.

Sampling feeds

Forage-testing laboratories will not accept a “grab” sample of baled forages. Baled forages need to be sampled using a forage probe. Most producers do not have a forage probe, but most extension offices will have a probe for you to use.

Get a representative sample for each “lot” of hay:

- Different cuttings of alfalfa need to be sampled separately.
- Early-season cut grass hay should be sampled separately from mid-season cut and late-season cut hays.
- Grass hay harvested at different locations needs to be sampled separately.

Place the entire sample from each lot into a plastic bag and seal tightly. Label the sample bag with your name, address, lot identification and type of material. Most testing labs

provide a description sheet to report this information and to request the desired tests. Place samples in polyethylene freezer bags, squeeze the air out of the bag, seal tightly and store in a cool location.

What tests are needed?

For beef cow rations, the following tests are available.

Dry matter: Percent dry matter (DM) is the percentage of feed that is not water. In contrast, moisture is a measure of the amount of water in the feed on an “as-is” or “as-fed” basis. It is important because moisture dilutes the concentration of all nutrients. Percent DM content plus percent moisture content of a feed always equals 100%.

DM content of a feed is an important number because beef cow diets are formulated on a DM basis. Using the DM percentage, the DM content is then converted to the amount of feed needed to be fed. As an example, if the diet calls for grass hay to be fed at 25 pounds (lb.) per head per day, and the hay is 15% moisture (therefore 85% DM), you would need to feed each cow 29.4 lb. per head per day ($25 \text{ lb.} \div 0.85$) to account for the water in the hay.

Percent crude protein: Percent crude protein (CP) measures nitrogen concentration in a feed. However, CP will measure both true protein and nonprotein nitrogen (N) because the actual measurement is %N. The new metabolizable protein (MP) system that was introduced in the *1996 Nutrients for Beef Cattle* published by the National Research Council (NRC) incorporates degraded intake protein (DIP) and undegraded intake protein (UIP, or bypass protein). Because near infrared (NIR) analysis does not measure DIP and UIP, use book values from the 1996 NRC.

Total digestible nutrients (TDN): TDN represents the total of the digestible components of crude fiber, protein, fat ($\times 2.25$) and nitrogen-free extract in the diet. This value is calculated from acid detergent fiber (ADF) in the NIR analysis. TDN is used to calculate beef cow rations where the diet is primarily forage.

Nitrates: Some feeds may contain nitrates that, when they reach a specific level, can cause toxicities to the animal. Nitrates in forages usually accumulate as a result of suboptimal conditions during the growing season. Summer annuals are an example of forages that can accumulate nitrates. Consider always testing summer annuals for nitrates.

Relative feed value (RFV) combines digestibility (ADF) and intake (NDF, neutral detergent fiber) into one number for a quick, easy, effective way to evaluate the quality of alfalfa and/or haylages. It is used primarily with legume or legume-grass forages. RFV is most valuable for formulating diets for dairy cows and not really useful in balancing diets for beef cattle. RFV has been used when marketing hay.

Measuring the actual digestibility of the fiber (NDF) component of forage provides a much better estimate of how the forage will perform in animal rations than does ADF. Fiber digestibility also affects potential intake. An index called relative forage quality (RFQ) has been developed as a replacement for RFV to provide a better index of how a forage will perform in an animal diet.

Final thoughts

The primary factor that affects forage quality is maturity at the time of harvest. Every year there are a lot of differences in forage quality, and forages need to be tested. Hay that has been rained on after being cut and while waiting to be baled will lose dry matter and quality. Cows need diets that meet their needs, especially after calving.

Continue to explore opportunities to reduce cow costs. Testing forages for quality will allow you to know the quality of the forages in the stack yard. If you know the nutrient needs of the cattle you are feeding, you can more accurately decide whether additional feeds or supplements are needed to meet the requirements.

