MAKE THE MOST OF YOUR ALFALFA QUALITY TESTING

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There are many variables involved in testing for forage quality. Is Relative Feed Value (RFV) or Relative Forage Quality (RFQ) a better quality measure? Did testing involve wet lab analysis or near infrared reflectance (NIR) spectroscopy prediction? When and how were samples collected?

Here are a few basics of forage testing and what you should look for - and expect - when sending samples to the lab in order to receive the most accurate results possible.

What makes a good test?

Most forage producers and nutritionists agree that, at a minimum, a good forage quality test should include accurate values for protein; neutral detergent fiber (NDF); neutral detergent fiber digestibility (NDFd); ash; the macro-minerals calcium, magnesium, phosphorus, potassium and sulfur; and a calculated energy value (plus starch and starch digestibility for grain-containing silages). From these values, RFV, RFQ, and total digestible nutrients (TDN) can be calculated.

Today, wet lab (and *in vitro* digestion) analyses are commonly used in conjunction with the testing method of NIR spectroscopy, which predicts the values of various forage nutrients using reflected wavelengths. Many labs have a database of wet lab results that they correlate with NIR data to get prediction equations that are then used to determine forage nutrient values. It usually takes hundreds of wet lab assays to get an NIR prediction equation for components such as protein or NDF. Acceptable prediction of NDFd, however, usually requires thousands of assays. Creating a large database of well-distributed wet lab analyses is costly, so NIR predicted values can be less accurate at the extremes of NDFd. If sample data are lacking at the extremes of NDFd, samples of poor digestibility tend to test higher than they should, while highly digestible forages tend to test lower than they should.

Should you always use the same lab?

The short answer is yes. Even though a number of producers want to compare results between labs, I recommend sticking with one. Every lab has some analytical and NIR prediction biases for a number of reasons, which makes comparing results among labs difficult. If you send an alfalfa sample to six different labs, you'll likely get six different predictions for NDFd. Determine what measuring standard you're going to use and stay with it.

What factors should you focus on?

Most forage producers and plant breeders realize that many things can affect forage quality. The more significant factors fall into one of three categories: genetics, environment (includes factors such as rainfall, temperature, and elevation), and harvest management. Growers can't do much to control the first two, but they can control the way they harvest their crops. If forages are harvested at the proper maturity, they're going to have high protein, average to lower NDF, and higher NDFd.

What can affect forage quality measurements?

Maturity. Maturity and yield are always competing with each other. If you're pushing for tonnage, you're going to sacrifice quality because you'll harvest at a later date and a more advanced maturity. In some cases, producers can control when they harvest, but other times weather delays or equipment problems dictate otherwise. With genetically engineered reduced-lignin alfalfa, however, this tradeoff does not apply. Harvest can be delayed, achieving similar to improved forage quality over conventional alfalfa, while yield potential is optimized.

Harvest losses. From the time the crop is cut to the time it's put into a silage bunker or hay shed, quality will be lost. With alfalfa, this usually means loss of leaves. The mechanical harvest methods used and the amount of handling of the alfalfa can lead to varying amounts of leaf loss. Insect and disease pressure can also add to leaf loss, and cause defoliation and/or yellowed, unhealthy leaves. This loss of leaves will reduce digestibility, forage quality, and yield potential.

Fall dormancy. Fall dormancy ratings affect lignin content and NDFd. For example, in northern Michigan, an alfalfa variety with an FD2 rating will, on average, have a higher NDFd (in part because the lignin content is lower), with a moderate amount of tonnage generated. In Texas, growers who plant alfalfa with an FD9 rating will, on average, get higher tonnage but lower NDFd.

Number of cuttings. In Wisconsin, growers will typically get three to five cuttings a year; California growers will get up to nine cuttings annually. Each of those cuttings is a little different in quality because the environment varies during each period between cuttings.

Sample frequency. Many growers will take one sample and be either elated or disappointed about the test results. Field variability can cause one sample to be great and another to be poor, which makes collecting multiple samples from various locations imperative. Using satellite imagery can provide insights as to the areas of their fields that are generating higher-quality and lower-quality alfalfa, as well as higher-yielding and lower-yielding alfalfa. Knowing this information can help identify areas for sample collection. Bottom line: The more samples taken from a field, the more representative lab test results will be.

Sampling method. Scissor-cut samples help growers see the full potential of their alfalfa crops, but if samples are only taken from a small area, field variation won't be accounted for. Sampling from the bunker or from bales will indicate the quality of the alfalfa that livestock will actually be consuming. Farmers who collect both sample types will have a good idea of their harvest losses due to lost leaves and drying, and this could indicate ways to improve.

Should you use RFV or RFQ?

Most people in the forage industry use RFV and TDN to evaluate alfalfa. RFV is calculated from acid detergent fiber (ADF) and NDF measurements and doesn't take digestibility into consideration. TDN is a little better and can be calculated in two ways: off of ADF, which doesn't include the digestibility of anything; or through a summative equation, which does take the digestibility of protein, fat, NDF, and non-fiber carbohydrates into account. If a lab has the ability to predict these four components, a TDN calculation by a summative equation is pretty good. The problem is, most calculations of TDN estimate (rather than measure or predict) the digestibility coefficients for protein, fat, and non-fiber carbohydrates. In such cases, therefore, TDN is really only reflecting differences in NDF digestibility. This makes RFQ a better choice.

RFQ is not perfect, but it's the best measurement we have to get a holistic view of forage quality. It is gradually becoming more recognized in the marketplace. RFQ is a better number than RFV because it takes into consideration protein, ash, ether extract (fat), NDF, and NDFd. In addition, there is a coefficient in the equation used to determine RFQ that requires entry of the lab average for alfalfa NDFd. This helps account for biases in NDFd among labs. While there are still some lab biases that go into an RFQ calculation, it comes closer to objectively evaluating alfalfa than anything else that's currently available. And growers are realizing that it's more important to be compensated for higher forage quality than for yield alone.

RFQ is probably the best test that we currently have, not only within a lab but among labs, for assessing the quality of alfalfa.

Work with your team to achieve optimal results

As every grower knows, achieving the highest-quality forages takes a lot of diligence and hard work. Work with your agronomist, your nutritionist, the staff at your testing lab, and anyone else on your team to grow, harvest, and test your forages to the best degree possible. Work with one lab to avoid frustration with comparing test results among labs. And use RFQ as the best test for quality assessment.