

Testing Hay

Shelby Filley

Regional Livestock & Forage Specialist

Sampling Feeds

Nutrient content of feeds not only varies among different feed types, but also varies with different batches (hay lots, grain shipments, growth stage of pasture, etc.) of the same type of feed. The objective of sampling forages and concentrates is to obtain “representative samples” for laboratory analysis to estimate the value of feed for livestock. Accuracy depends largely on sampling method and lab technique. Having dependable samples can prevent unwelcome surprises. It is important to identify the sample by date, cutting, forage or concentrate type, pasture location, and owner before shipping the sample to the lab.

Forages may be sampled as hay or standing pasture. Sampling methods include mechanical coring of bales with a hay probe, pulling hand-grab samples from bales or windrows, pulling hand-grab samples from the standing forage, and clipping standing forage samples. Rapid feeding and turnover of grains and supplements may reduce the value of analyses compared to analyzing larger batches fed over a longer period of time. However, analyses completed even after the ration is consumed can detect seasonal differences that may influence future use. Remember: the keys to accurate sampling of feed are to sample consistently and mix the samples thoroughly, especially if you plan to divide them.

Baled hay – There are several methods for sampling baled hay. The best technique is to use a mechanical coring probe made specifically for this purpose. The serrated edge is placed on the side of a hay bale that is most resistant to puncture (usually the round side of a round hay bale or the small end of a square bale) and a sample is obtained by drilling with a brace. The sample should be as representative of the composition of the hay bales as possible. The process is repeated on several hay bales within the sampling lot. Hay from different fields or cutting times need to be sampled separately. A forage probe can be purchased or borrowed from the Extension Office.

Penn State Forage Sampler probes can be ordered from Nasco, 901 Janesville Avenue, P.O. Box 901, Fort Atkinson, WI 53538-0901 (Phone: 414-563-2446). It is made of stainless steel with a replaceable hardened-steel cutting tip. The tube is 18" long and cuts a core 0.75" in diameter. The probe is available for use with an electric drill or hand brace (order separately) and must be disassembled and emptied between each core. Extension adapters are available for deeper sampling.



An older traditional method of obtaining forage samples is the hand-grab technique. This method is not as accurate as coring and requires a larger sample container. Hand samples do not provide consistently reliable results.

Choosing a Laboratory

“A List of Analytical Laboratories Serving Oregon (EM 8677)” is a publication available in your county Extension office or on the Internet (<http://extension.oregonstate.edu/catalog/html/em/em8677>), and contains contact information for labs that analyze forage samples. Prices and sample submission guidelines may differ among laboratories. Call the lab prior to taking the sample. Lab fees start around \$30.00 per sample and increase depending on analyses requested.

Analyses (Lab tests to run)

There are many possible tests to perform on forages. Results for moisture, protein, and energy are the important endpoints of your forage analysis. Ask the lab to run the required analyses to give you this basic information. Standard analyses include percent dry matter, percent crude protein, and percent acid detergent fiber (ADF) and percent neutral detergent fiber (NDF). Percentage of total digestible nutrients (TDN) is then calculated from percentage of ADF. Periodic analysis for basic mineral content is also helpful. Other analyses are nitrate nitrogen and trace mineral composition. Due to increased cost associated with non-standard analyses, these should only be requested when truly needed.

Laboratory Method

“Wet chemistry” is a term used when feed is analyzed using chemical solutions to directly measure plant components. This method is a well-recognized and accepted way to measure the components of feed.

“Near Infrared Reflectance Spectroscopy (NIRS)” uses light transmitted through the sample to estimate the components of the feed. The estimates are made using mathematical equations based on previous “wet chemistry” data. Large amounts of data from many reference samples are required in order to make accurate equations for estimating feed components in this manner. While some forages lend themselves well to NIRS and some laboratories have compiled the necessary data for accuracy, this is not always the case.

Be sure and discuss the use of wet chemistry vs. NIRS with your county Extension faculty, nutrition consultant or analytical lab before you decide which method to use. NIRS is usually less expensive and may be available overnight. Some labs can run wet chemistry samples overnight, others take longer.

Test Results

See the publication “Understanding your forage test results” for information on interpreting results (<http://extension.oregonstate.edu/catalog/html/em/em8801>). A list of hay test results for many areas of Oregon can be found on the Oregon Nutrition Compendium website at <http://oregonstate.edu/dept/animal-sciences/OregonFeedComp/index.htm>. See also, “Douglas County Hay Survey” at <http://extension.oregonstate.edu/douglas/haysurv.pdf>.