Forage Quality Testing - Accuracy is in Your Hands

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Whether buying or selling hay, knowing the quality of forage is paramount to pricing. Hay sampling is likely the most important aspect of forage quality testing. Accuracy is in the hands of the sampler. A pinkie-sized ground-up sample, weighing less than a gram, must represent tons of hay from a variety of fields. At the lab, this gram is sub-sampled from approximately a half pound of material provided by the sampler, so it is critical that the sample accurately represents the hay being tested. Whether the sample accurately represents a stack is the responsibility of the sampler.

Weather damage and delayed harvest have significant effects on hay, especially alfalfa. The proportion of protein and fiber of leaves and stems are very different and are influenced by harvest stage and conditions. To determine nutrient quantity/quality, the forage sample must represent the leaf to stem ratio, as well as weed composition of hay. Both can vary considerably across and between fields. Aside from supply and demand issues, accurate analysis of forage can be the single greatest determinant of price. Following proper protocols will help the sampler obtain a fair, representative sample.

When sampling protocols are followed closely, different samplers can repeat lab measurements within a reasonable range. These protocols are fairly universal, but do vary slightly from region to region. Here are some important steps and guidelines for taking alfalfa hay samples:

- **Identify a single lot of hay** – Lots must be from the same cutting, variety and field. Lots must be at the same stage of maturity and harvested within 48 hours of one another; do not mix lots. Lots must not exceed 150-200 tons. If differences in quality are known, separate into different lots.
- **Choose a good, sharp coring device** - The coring device should have an inside diameter of at least 3/8" and no more than 5/8". The cutting edge should be at right angles to the shaft and kept sharp. Dull probes will cause material to be pushed out of the core. Do not use an open auger or corkscrew-type device; using these devices can selectively sample leaf or stem parts.
- **Sample at random** – To the extent possible, walk around entire stack and sample bales at various heights. Do not avoid bales or choose others; sample at random. Try to obtain cores from a broad group of bales within the stack.
- **Take enough cores** - Per lot, sample a minimum of 20 bales (1 core/bale). Take more cores (20-40 bales) in larger lots or if the hay is highly variable.
- **Use good technique** - Probe the ends of bales, near the center and at least 12-18 inches into the bale. The probe should be at a right angle to the bale end. Do not slant the probe or sample from the sides.
- **Handle samples properly** - Combine cored samples into a single sample and store in a sealed freezer bag. Do not expose sample to heat or direct sun. Send to the lab quickly; moisture estimates are particularly prone to change in the sample before it gets to the lab.
- **Not too big, not too small** - The sample should weigh ~½ lb (220 grams). If a larger amount is retrieved, the diameter of the probe may be too large. Many labs will not grind a large sample, which defeats the purpose of careful sampling. Samples that are too small will not adequately represent the hay lot.
- **Split samples correctly** - If interested in testing the performance of a lab, send a fully ground and mixed sample to another lab. Never split an unground sample. Reputable labs will return a ground sample for further testing if desired (avoid labs which are unwilling to do this).
- **Avoid 'grab sampling' processed hay** – It is difficult to accurately sample alfalfa hay after it has been ground. Leaves and stems separate in the pile and the powdery leaves may fall from hands as samples are obtained. Typically, a difference of 3-7% comparative fiber analysis and 1-2% crude protein can be seen between samples of hay before and after it has been ground.

Research shows, if these simple guidelines are followed, reliable results can be obtained. Nonetheless, a minimum of +/- 0.5% variation in results is normal and should be expected due to typical variations in sample and lab practices.