

Tips for Collecting Hay Samples for Nutrient Analysis

The analyzed nutrient composition of hay is only as accurate as the sample you send.

Accurately identify the species composition of the field harvested to get an accurate estimate of total digestible nutrients. Nutrient content is determined through direct methods; whereas, total digestible nutrient (TDN) is an indirect estimate based on equations developed through feed trials.

Test each lot of hay. A lot represents hay harvested from each cutting within a single field under similar harvest conditions. Harvest date, plant species, fertility and weather can all result in variations within and between fields and cuttings.

If testing each lot of hay is unlikely, testing across hay lots requires sampling each lot as if they were being sampled on an individual lot basis to avoid an inaccurate estimate of overall hay quality. After sampling each lot, each lot's sample can be combined and mixed thoroughly so the larger lots represent a higher percentage of the sample, see the table below.

Effect of sampling across hay lots on total digestible nutrients.

Lot	No. Bales	Percent of Total Bales	Sample Size Bales/lot (30%)	Total Digestible Nutrients
1	30	15%	9	64%
2	30	15%	9	58%
3	140	70%	42	52%
Non-weighted Average¹				58.0%
Weighted Average²				54.7%

¹Non-weighted average TDN reflects an inaccurate estimate of TDN that could occur if the same number of bales were sampled from each lot.

²Weighted average TDN reflects a more accurate estimate of overall hay TDN because the hay sample is proportional to the size of each lot (64 x 0.15 + 58 x 0.15 + 52 x 0.70)

Core samples (Figures 1 and 2) are preferred over grab samples. Even with hay that is not weathered, multiple core samples will contain a better distribution of plant material, which will result in a more accurate assessment of nutrient composition. Take samples from the end of square bales and from the side of round bales and stacks.



Figure 1. Core samples should be taken from the sides of large round bales.



Figure 2. Core sampling devices: (1) Penn State Forage sampler, (2) Colorado Hay Probe and (3) Star Quality Multi-sampler

Thirty (pure stand) to 35% (mixed grass stand) of the bales must be sampled to accurately estimate the nutrient composition of the hay. Research at the University of Arkansas showed differences up to 5% TDN when as little as 5% of bermudagrass bales were sampled within a single hay lot (Figure 3). A minimum of 6 individually core sampled round bales are necessary to have sufficient sample size for an analysis. Sample size should represent the larger of the two, either 6 bales or 30 to 35% of bales.

Place core samples in resealable food storage bags or brown paper bags (i.e. lunch sack) for collection and submission for shipping.

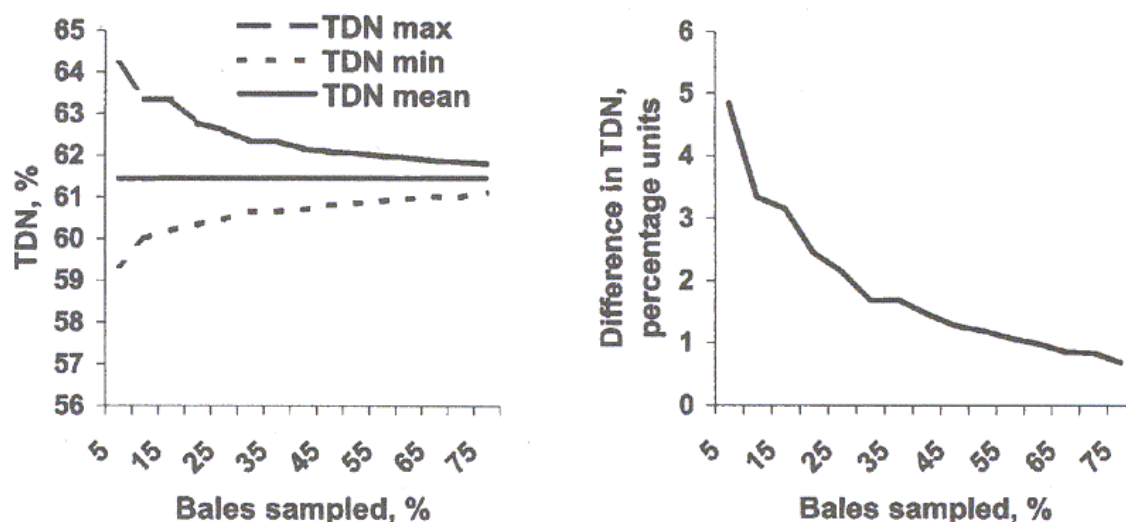


Figure 3. Effect of sample size on bermudagrass TDN (Milliken et al., AR Animal Sci., 2003).

Hay that is stored outside should be sampled just prior to the feeding period. Angle the core sampling tool in an upward direction when sampling large packages stored outside. This will help to avoid creating a passage for water to the inside of the package. Avoid sampling excessively weathered material. The sample submitted should reflect what the cattle are going to be eating, not wasting.

Hay that is stored inside can be sampled at storage or prior to feeding with the exception of hay that was harvested wet. Hay quality diminishes during storage if harvested at less than 80 percent dry matter.

Submit the samples to the laboratory of your choice. If you choose to send your samples to the University of Arkansas Agricultural Services Lab, see Submitting a Forage Sample for Analysis for further instructions.