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DS24

Testing Forages for Accurate Ration Formulation [1]

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When formulating diets for dairy animals, the chemical analysis of all ingredients must be known. Average chemical analyses for many feedstuffs are published. While these "book values" can be used to build a ration that approximately meets the animal's requirements, it is not recommended. The variability in nutrient concentration among harvests and loads of feedstuffs is so great that the room for error is substantial. The nutrients required to support a certain level of milk production are very detailed and managerial efforts to meet those requirements also must be detailed.

Two things must be kept in mind when collecting forage samples for chemical analysis. First, a sample that is *representative* of the lot of feed delivered or harvested must be obtained. Secondly, the forage must be sampled and analyzed often enough in order to insure that the correct analytical values are being used in ration formulation. Obtaining a representative sample from baled hay or a bunker silo takes time and effort. Special equipment is needed for sampling baled hay. Observe the following guidelines for sampling forages stored as hay or silage.

Hay

A hay core sampler is usually necessary to collect a cross-section sample from baled hay. These are made to operate with an electric drill or hand brace. Several hay corers are being marketed nationally. A brief description and source for three are:

1. "California Belly Buster" is a heavy-duty corer that is 18 inches long with a 1/2-inch internal cutting diameter. Malm Metal Products, P.O. Box 4299, Santa Rosa, CA 95402.
2. Penn State forage sampler is an 18-inch probe with a 3/4-inch internal diameter. Serrated teeth, used for cutting through the bale, are replaceable. Nasco Farm and Ranch Catalog, 901 Janesville Ave., Ft. Atkinson, WI 53538. Phone: 1-800-588-9595.
3. Forageurs hay probe with canister is 24 inches long and 9/16 inches internal diameter. A canister is attached for collection of forage as it is cored. Forageurs Corp. 8500 210th St. West, Lakeville, MN 55044, 612-469-2596.

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Start drilling into the butt end of small rectangular bales and into the rounded side of large round bales. If the outer layer has weathered, pull away one to two inches before drilling. Animals will usually avoid this hay as well when eating. Drill to the full length of the probe when hay is loosely baled and to half the length of the probe when bales are tightly made. Core from 10 to 20 average-looking bales so that one load or harvest of hay is adequately sampled. If a core sampler is not available, reach inside each bale and remove a handful of hay.

Silage

Sampling the forage as it is going into the silo gives an approximate analysis of the forage. This analysis can be used to formulate rations when the silo is opened initially. However additional sampling should be done when the silo is opened due to chemical changes which take place during fermentation such as changes in moisture and crude protein content. When sampling a bunker silo, sample the "face" in 10 to 12 places avoiding spoiled or dried-out areas. For sampling of upright silos, pass a bucket under the unloader periodically until a bushel of silage has been collected. Silage in plastic bags can be sampled by making small slits in the bag every 10 to 15 feet, grabbing a handful of silage, and taping the slit with a strong tape such as duct tape.

Regardless of the form of stored forage sampled, mix the forage thoroughly and place a representative sample immediately into a plastic bag and seal it. There are numerous chemical laboratories to choose from.

All three labs use a near infrared reflectance spectrophotometer for nutrient determinations, yet the New York lab offers the choice of wet chemistry analysis in addition. Only the New York lab provides complete mineral analysis and that by wet chemistry. All labs usually provide results in less than one week.

Optimally, wet forage should be tested for moisture weekly and for nutrient concentrations monthly. Remember to take representative samples and keep good records of which analyses go with which forages. Dairymen with top-notch feeding programs analyze their forages on a routine basis to maximize production and profit.

Table 1.

Three laboratories that analyze forages are:	
Ona Research CenterRt. 1, Box 62 Ona, FL 33865 813/735-1314	Mailing bags and forms are available through your county extension office. Analysis is $8 per sample.
Florida Dairy Famers1301 West Main Street Avon Park, FL 33825 813/452-0433	Mailing bags are not supplied. Cost is $10 per sample
DHIA Forage Analysis Laboratory730 Warren Road Ithaca, NY 14850 607/257-1272	Postage-paid mailing bags are made available by the New York lab. Cost of analysis ranges from $12 to $29 depending upon tests run.