



# Extension Extra

ExEx 4001  
Update March 2002  
Dairy Science

COLLEGE OF AGRICULTURE & BIOLOGICAL SCIENCES / SOUTH DAKOTA STATE UNIVERSITY / USDA

## Take an Accurate Forage Sample

by Myers Owens, *Extension dairyman*,  
and Nancy Thiex, *professor of Station Biochemistry*

Successful livestock production depends largely on the feeding program; and what you should feed depends on an accurate analysis of the forage portion of your ration.

The accuracy of forage analysis depends on the sample that you send to the lab. Samples must be representative of the feeds being fed. Poor sampling will result in misleading values, higher feed costs, and reduced performance. In many feeding programs, the sample is the weak link. The results of the lab tests will be useful only if the sample accurately represents what your animals will be eating.

Keep in mind that every field and every cutting will be different.

### Sample each lot

Sample each field and each cutting. Quality varies with forage species and mixture, stage of maturity, rain damage, harvest loss, insect or disease damage, and season. Do not attempt to combine hays of different qualities or cuttings into one composite sample. The test results will not be meaningful because you will not be able to duplicate the original mixture accurately enough when feeding the forage.

Take a good, random set of samples from each lot. The final (composite) 1- or 2-quart sample will represent several tons of forage. And remember where you sampled; write down the location of each lot in the barn or silo or stack for easy reference when feeding.

### How to take samples

Baled, loose, or chopped hay

1. Test each forage lot separately. Each composite sample should be from only one cutting on one field.
2. Take about 25 to 30 widely separated samples from each lot. The more samples taken, the more representative the composite sample and the more accurate the results will be.

3. Use a hay probe. Don't rely on a knife or a fistful of feed twisted out of the handiest bale or off the surface of the silage. That will not be a representative sample. We recommend a Utah State Forage Sampler because its auger tip helps pull the probe into the hay, therefore requiring less effort. (It can be purchased from Judy Gale, 595 East 4th North, Logan, UT 84321.) Or check with your county Extension agent; he may have one you can borrow. If you have electricity available, the Penn State Forage Probe (NASCO) is a good choice. Whatever hay probe you use, it will be much better than no probe at all.

4. Insert the hay probe full depth from the side into the center in big round bales and into the middle of the butt end of small bales. That will give you a representative sample of both stems and leaves.

5. Use the hay probe for loose and chopped hay also.

6. Mix the 25 to 30 cores in a clean pail and place in a tight, clean, plastic or paper bag or other container.

7. Label each container clearly with your name, address, the sample number, forage mixture, stage of maturity, and date harvested.

### Haylage and silage at harvest

1. Test haylage or low moisture silage, grass, corn, and other silages.

2. Take samples as the silage is placed in the silo at harvest. Silage that seeps should be resampled upon feeding.

3. Collect three to five handfuls of haylage or silage from the first load of the day in a plastic bag and put it in the refrigerator or freezer immediately.

4. Follow the same procedure for several loads of forage throughout the day. When the silo is filled, combine the

samples and mix well to obtain a representative sample of the entire silo.

5. Repeat for each field if more than one field is harvested in any one day.

6. Punch holes or cut notches in yellow or white plastic strips to identify the forage lot, and feed the strips through the blower at the end of each lot. Write down your hole or notch combination on your sample sheet, and you will be able to identify the lots later as the feed is unloaded.

### Ensiled material from storage

Sampling of ensiled material as it is being fed is less satisfactory than sampling at harvest because it may be harder to identify specific lots and because of the time lag in getting lab results back.

1. Collect a 1- to 2-quart sample while the unloader is in operation.

2. Do not collect the samples from the spoiled material on top of the silo. In upright silos, wait until 2 to 3 feet of silage have been removed.

3. Collect samples during feeding or while filling the silage cart from both morning and evening feedings of the same day.

4. Mix the samples thoroughly, place in a clean plastic bag, and seal.

5. Store immediately in a cold place, preferably a freezer, until mailed or delivered to the lab.

6. Label the bag clearly with your name, address, the sample number, forage mixture, stage of maturity, and date harvested.

### Where to send samples

Fill out a "sample information sheet" for each lot, answering all questions. You can get these sheets from your Extension agent.

Keep haylage and silage samples frozen in an airtight container until you send or deliver them to the lab. When mailing, put

the samples in insulated bags, if possible; but avoid mailing over the weekend. If samples are delayed in transit, bacterial decay might change the results of the analysis.

Take or send the "forage sample information sheet" along with the samples to Analytical Services, Station Biochemistry; SDSU, Box 2170; Brookings, SD 57007 or to any other reputable lab.

### Using the forage analyses

Chemical analysis of forage is of no value whatsoever unless you use it. Forage analyses help you balance rations more accurately.

A dry matter estimate is needed to compare feeds and formulate rations, since water, while essential for livestock, provides no nutrients and dilutes the value of a feed.

Protein analyses should be used to determine the amount of protein you may have to add for a balanced daily ration that gives profitable milk or meat production. Overfeeding and underfeeding are both costly, but underfeeding is usually more expensive.

Forage analyses may cut costs and increase profits in two ways:

1. If you underestimate the protein content of your forage by a mere 2%, the excess supplemental protein in the grain mixture will cost you \$9 to \$10 per ton of grain.

2. If you overestimate the protein content of the forage, you may be feeding an inadequate level of protein. A 0.44-pound shortage in crude protein may be corrected by feeding 1 pound of soybean oil meal. If all other nutrients are adequate, the added protein from the soybean oil meal will produce 5 to 6 pounds more milk. Depending on the price of soybean meal, spending 10 to 13 cents may return 50 to 70 cents worth of milk.

Adapted from University of Wisconsin publication A2309.

Reference to products does not constitute endorsement nor discrimination against those of similar design not mentioned.

**This publication and others can be accessed electronically from the SDSU College of Agriculture & Biological Sciences publications page, which is at <http://agbiopubs.sdstate.edu/articles/ExEx4001.pdf>**



Issued in furtherance of Cooperative Extension work, Acts of May 8 and June 30, 1914, in cooperation with the USDA. Larry Tidemann, Director of Extension, Associate Dean, College of Agriculture & Biological Sciences, South Dakota State University, Brookings. SDSU is an Affirmative Action/Equal Opportunity Employer (Male/Female) and offers all benefits, services, and educational and employment opportunities without regard for ancestry, age, race, citizenship, color, creed, religion, gender, disability, national origin, sexual preference, or Vietnam Era veteran status.

ExEx 4001 - 150 copies printed by CES at a cost of 6 cents each. June 1986; updated March 2002.