



Sampling of Feeds and Forages

Collecting representative samples is the first step to achieving accurate test results. Below, techniques are outlined to properly collect samples in various feeds, forages, and ingredients.

Sampling of Low Moisture Grains and Feeds and Commodities:

The easiest method of acquiring a representative sample of grains or feeds is to sample as the material is being transferred to the storage structure. This may be at harvest or at delivery. Because these feeds are low in moisture, the component values remain fairly constant during storage. A scoop taken at intervals during offloading or taken from several loads, and combined as a composite sample, will give a good representation of the quality of feed. The amount of material submitted should be approximately two hundred grams. Sampling from a storage structure is more difficult. A small sample taken over several days, during ration preparation, and combined to make one sample, is more acceptable than taking only one sample at one time. Another option is to sample at different times during feedout, perhaps every two weeks or monthly, and monitoring any variability. If it is possible to get into the structure safely, a grain probe can be used to sample around and across the structure. Avoid taking samples close to the wall of the structure, where mould or moist feed may be present. Samples can be submitted in zip lock bags clearly identifying the sample number, type of feed, date and analysis required.

Sampling Dry Hay and Balage:

The most important point to be made when sampling dry hay or balage in small or large bales, is that a hay probe must be used, if the analysis is to be of any value at all. Probes come in several models and most are effective. It is essential to use a probe to maintain the leaf to stem ratio of the forage mass. The leaf composition is also maintained as leaf shattering is eliminated. The use of a probe allows one to sample many bales to make a composite sample from the lot, and maintain an overall sample size that is still a workable volume (100 to 200 gm.). Hand grab samples taken from one or two bales are not representative of the entire lot. These types of samples do not allow wide range sampling, without producing sample volumes that are not easily handled by the laboratory. Grab samples also bias the results due to leaf shattering and leaf loss, and produce a sample that is predominately composed of stems. Sub-sampling may be necessary by the laboratory to reduce the volume of sample, which can further bias the results.



Core samples are taken from the butt end of square bales, large or small, extending approximately twelve inches into the bale. For round bales, core the rounded contoured edge or side of the bale. Wrapped bales will require splitting the plastic wrap to insert the probe, then taping the wrap when done, to seal the plastic. Ten to twenty cores should be taken, depending on the number of bales in the lot, and the consistency of the lot. Different cuttings and lots should be sampled separately.

Combine the cores into one sample either in a plastic pale, or directly into a sample bag, for submission to the lab. Separate samples should be identified on the bag, by sample number, forage type and mixture, cutting, date and analysis required.

Sampling of Wet Forages and High Moisture Grains:

Both high moisture grains and wet forages have been grouped together because of some considerations that involve both types of feeds, both involve fermentation processes.

Sampling techniques involved with these types of feeds are dependent on the type of structure in which each is stored. These can be upright silos, bunker silos and piles, and ag-bags or tubes. Balage would also be included in these feeds but that feed type has been addressed in the previous section.

Upright Silos:

When sampling from upright silos, there are a few options available. Each has its advantages and disadvantages. It is important to run the silo unloader for several minutes before taking a sample. This will strip away the drier material that has been exposed to the air and get to some fresh feed. From the pile of fresh feed, using a scoop, or cupping both hands together with fingers closed, scoop into the pile and lift up. Avoid grabbing samples from the surface. Place three or four scoops into a sample bag. Remove excess air by squeezing the bag, and seal it closed.

If a mixer cart is available, run the feed into the cart, mix for a few minutes and take a similar sample with a scoop or your hands, or collect several samples as the feed is being delivered.

A small sample can be collected each day, in a bag and frozen several days in a row. These samples can then be combined in a composite sample and submitted for analysis. This method has the advantage of sampling a larger section of the facility.

Bunker Silos and Piles:

Bunker silos and piles can be sampled similarly over several days by collecting samples from the mixer wagon or delivery conveyor. Bunker probes are also available. These are used to sample from the top of the pile. Extensions connect together to penetrate deeper into the



feed mass. This method can require a great deal of energy to accomplish sampling at several sites over the pile. The cores can be combined into one sample. Things to consider using this method for unprocessed corn silage, exclusion of cob and some corn may result if the diameter of the probe is too small.

A more common method of sampling is to sample from the face of the pile. A clean face should be maintained. Several handfuls of material can be taken from the face and combined. Visible differences in the feed should be noted, such as moisture, texture, colour, etc. The composite should be representative of the feeding mixture being delivered to the animals.

Fresh Forages:

Some controversy exists regarding fresh or fermented samples. Fresh samples are represented by wet forages (or feeds), that have not yet had time to undergo fermentation and are taken directly from the forage wagon as the structure is being filled. Fermented feeds are those that have undergone fermentation and reached a more stable state.

Some nutritionists prefer to sample fresh feed because it is easier to get a representative sample of the entire feed mass. A sample is taken directly from many loads as fields are being harvested, and combined into a composite sample. It is also necessary for the nutritionist to have some values to work into a ration formulation because this feed is being used immediately by the farmer. Other nutritionists prefer to sample after the feed has fermented (approximately two to three weeks after ensiling). This more closely represents the actual feed that the animal is receiving, and represents a more stable feedstuff.

Care must be exercised regardless of which practice is selected. If one is taking fresh samples, be cognizant of changes that are inevitable in the component values such as dry matter, fibre and mineral values and soluble protein. Also be aware of changes in the fermentation pattern of VFA's and be prepared to resample if necessary. The same advice holds true for any sample of fermentable feeds. Any obvious changes warrant re-sampling.

Agbags and Tubes:

Agbags or tubes require considerations similar to piles and wrapped forages. The face of the feed can be sampled when the bag is opened, or sampled during several days of feeding. Another approach is to sample along the length of the tube at ten-foot intervals, making small incisions from which to draw feed, then sealing over these cuts.

Regardless of the feed type, it is important to sample more than once during the year or season. Attention to changes in feed quality or animal performance is essential. Also, be sure that all of the information is consistent. Inconsistencies with respect to analytical data, animal performance, knowledge regarding the assumed feed quality, should be questioned. If these



inconsistencies cannot be explained, a good place to start looking for answers is with a new feed sample.

Sampling TMR's:

Total mixed rations are most easily sampled as they are being fed or delivered to the animals. Collecting samples with a scoop either from the already delivered feed or as the mixer is unloading will give a representative sample. Containers can also be placed along the manger or feed bunk to collect samples as the feed is unloaded. These can then be combined into one sample, or analyzed individually to give an indication of the mixing efficiency.

A similar practice is used by mills to determine the efficiency of their mixing process. Using 98% ground corn and 2% salt to make up a mix, the ingredients are mixed for the required length of time and then unloaded. Ten samples of 100 grams each are taken and submitted for analysis of sodium. From the analyses, a mean, standard deviation and coefficient of variation (c.v.) is determined. The c.v. should be ~ 7% for the mixing to be considered efficient.