

Importance of Knowing Dry Matter Concentration When Buying (or Selling) Feeds

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If your cows are stranded in the middle of a desert, water may indeed be priceless; however, in most of the U.S., the water contained in feed has essentially no economic value, even though water is the most critical nutrient for milk production. We formulate diets on a dry matter (DM) basis because we assume cows can consume all the drinking water they need; we do not have to feed it.

The economic value of feeds is derived from the amount of energy, protein, fiber, etc. in the feed. When pricing feeds, water is considered a diluent of nutrients and the higher the moisture concentration, the less you should pay for a particular feed on an as-fed basis. Two silages with identical nutrient composition on a DM basis have different dollar values on an as-fed basis if their DM concentrations differ.

When buying or selling feeds, the DM concentration must be considered when deriving a price. For most concentrates, the DM does not vary greatly and can be ignored when pricing. For wet concentrates, such as wet brewers and wet distillers, DM should be considered when pricing. The DM concentration of hay can be variable, but generally, if hay is wet, it should not be purchased since it likely will spoil and have no economic value.

If hay is baled at DM concentrations that result in a stable product, the variation in DM is not enough to greatly affect the price. However, acid-preserved damp hay (approximately 75 to 80% DM) can be stable, but its price should be adjusted to account for the increased water concentration compared to dry hay (approximately 85% DM). Silage and balage vary greatly in DM concentration (ranges exceeding 30 percentage units of DM are not uncommon), and this variation will affect the economic value of the feed substantially.

To price wet feeds, follow these steps:

1. The buyer and seller have to agree on a price on a 100% DM basis. This can be done using a program such as SESAME™, which prices nutrients to estimate break-even commodity prices (see a recent edition of Buckeye Dairy News at <http://dairy.osu.edu> for nutrient prices), or it can be done by using market prices of similar feeds. If you are considering the purchase of wet distillers grains, you could use dried distiller grain prices. If you are buying haycrop silage or balage, you could use hay prices (make sure nutrient composition is similar).
2. If using similar dry feeds to price the wet feed, convert the market price of similar feeds to a 100% DM basis:

When using a dry concentrate:
DM price = As-fed price/0.90

When using hay:
DM price = As-fed price/0.85

3. Obtain an accurate value for the DM concentration of the feed of interest (see below).
4. Convert the DM price to as-fed price for the feed of interest:

$$\text{As-Fed Price} = \text{DM price} \times (\% \text{DM}/100)$$

Examples:

- Dried distillers grains selling for \$150/ton and wet distillers is 27% DM
DM price/ton of dried distillers = \$150/0.90 = \$167/ton of DM
Comparative price of wet distillers: \$167 x 0.27 = \$45/ton of as-fed wet distillers grains (this is the maximum value)



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- Alfalfa hay selling for \$250/ton and a truckload of comparable balage has an average DM of 52%
DM price/ton of hay = $\$250/0.85 = \$294/\text{ton of DM}$
Comparative price for balage: $\$294 \times 0.52 = \$153/\text{ton of as-fed balage}$ (this is the maximum value)

Other Discounts

In many cases, additional price discounts have to be applied to wet feed. Wet feeds are less stable than dry feeds and undergo greater shrink or storage losses. If you are buying wet feed and storing it under good conditions, then you should assume that about 10% of the feed will be lost (i.e., shrink) and that should be considered in the price. If storage method is less than ideal, shrink can be much greater than 10%. Moisture does not only dilute nutrients, it also is a good indicator of forage stability and overall quality.

Silage or balage that is too wet (<28% DM) may undergo a clostridial fermentation and have substantially less value than a well-fermented silage. Silage or balage stored too dry (>40% for a bunker silo and > 60% for balage) can suffer heat damage which reduces energy and protein digestibilities, and it often becomes moldy. Moldy, heat-damaged silage has little economic or nutritional value. Corn silage that is too dry (>40% DM) has those problems, plus the digestibility of the starch is also usually reduced compared to normal corn silage. Be cautious when buying silages that are outside the acceptable range in DM concentrations; simply accounting for dilution may not adequately value the feeds.

Sampling

Because price depends so much on DM, you must obtain enough samples to get an accurate estimate of the DM concentration of the feed. The DM concentration of corn plants do not change much over the normal harvest period so sampling 3 or 4 wagon or truck loads (spread over the harvest period) should be adequate. The DM concentration of mowed haycrops can change substantially over the day (wet in the morning and drier in the afternoon); therefore, more loads should be sampled. Sampling 1 or 2 loads every hour over the day should be adequate. A good sampling protocol for both corn silage and haycrop silage is to take about 10 handfuls from each load and place them in a bucket, thoroughly mix the material, and then take a subsample (smaller than a volleyball, larger than a softball). This process should be repeated for each load. The individual load subsamples can then be put in a bucket, mix thoroughly, and then take a subsample (smaller than a volleyball, larger than a softball) and assay that for DM (either by a lab or use of an accurate on-farm method). If running the DM assay on the farm, it would be a good idea to analyze two samples rather than a single sample.

Bale-to-bale differences in DM can be substantial for balage. You should core samples from at least 5 bales to obtain an accurate average value for DM. The 5 core samples should be thoroughly mixed in a bucket and the entire sample sent to the lab or assayed on-farm for DM.

Bottom Line: Water in feeds dilutes nutrients that have economic value. Adjusting for the water concentration in feeds will help price them more accurately which will ultimately improve the bottom line for both buyers and sellers.

Additional DIBS are available on-line at <http://dairy.osu.edu>.

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