# Hay Quality for Different Classes of Horses

Hay is the most important part of the horse's diet and makes up 50-100% of the horse's diet.

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Horses eating low-quality forage

It is the best source of energy, protein, vitamins, minerals and, most importantly, fiber that is necessary for normal gut function in the horse. The quality of hay varies considerably between different loads of hay.

Hay is the bulk of the horse's diet. Grass or alfalfa hays, or a combination of the two, are good sources of roughage. Grass hay is generally higher in fiber and dry matter than alfalfa, but alfalfa may be higher in protein, energy, vitamins and calcium. Hay can be long-stemmed in hay bales. Many horse owners feed grass hay or straight alfalfa or a combination of grass and alfalfa to their horses. Grasses commonly used as hay are brome, orchard, and timothy. Long stem hay is the traditional baled hay. It is cut, cured, and baled. It can be bundled in 30- to 80-pound square bales or large, round or long square bales that can weigh tons. Horse hay needs to be of good quality.

Horse hay should be bright green, leafy and fine textured, with a fresh, pleasant aroma. Musty hay or other indications of mold or heating, and dust, weeds and other foreign material in hay can be unhealthy for an animal. Color is an indicator of

quality and nutrient content; good hay is a bright green. Most nutrients in hay are in the leaves, and leafy hay is a valuable source of food. Leafiness is influenced by the kind of hay, its maturity when cut, the weather conditions while growing and curing the hay, and curing procedures of the hay. Dust is objectionable in any feed for horses. It not only reduces the taste of the hay, it also aggravates respiratory problems. Avoid feeding moldy or dusty hay. This type of hay is unacceptable for horses.

**Quality of hay** can be measured in terms of qualitative and quantitative characteristics. Qualitative characteristics are most often visual appraisals. Quantitative characteristics are actual chemical measures of various nutrients and other components influencing nutrient amount and digestibility.

## Qualitative (visual) measures

Two primary factors that influence forage quality are nutrient concentration and nutrient digestibility. Both of these are heavily influenced by the stage of maturity of the forage plant. Most of the highly digestible nutrients in forages are present in the leafy part of the forage. Less digestible components are present in the stem. As a plant matures the stems thicken and the amount of leaves decrease. Therefore, the nutrient rich and highly digestible proportions of the plant decrease with age, while the less digestible and less nutrient rich part of the plant increase. The ratio of leaves to stems provides a simple visual measure of maturity that can be used to estimate digestibility and nutrient content when comparing different loads of hay. The degree of maturity can also be estimated by the appearance of the seed heads on grasses and flowers on legumes. When a plant becomes fully mature, its seed head/flower will be in full bloom. So you do not want hays with full seed heads.

These qualitative methods provide some estimate of maturity that is useful for making comparisons between different loads of hay. However, they do not provide any information regarding nutrient concentration. Therefore, the combination of visual and laboratory analysis will result in selecting hay that meets the nutrient needs of your horse. Qualitative measures may be used initially to narrow down what hay to buy. But quantitative (analysis) measures should be used to make your final decision.

## Quantitative measures

The first step to having a hay sample analyzed by a forage testing lab (quantitative measure) is to obtain a representative sample. To properly sample hay, a core sampler should be used (figure 1). Core samplers can be purchased at most feed and farm supply stores. Several bales (10-20) should be sampled and then pooled for final analysis. The amount of forage sent to the laboratory for actual analysis is approximately one pound. It is important to choose a certified forage laboratory. Hay/forage testing labs can be found by calling your County Extension Offices. The cost for analysis is ranges from $18 to $40.00.

Hay sample analysis generally takes a few days. Most analyses include the following information: Dry Matter (DM) (percent DM = 100 - percent water), crude protein, minerals (calcium, phosphorus, potassium, magnesium, etc.), acid detergent fiber (ADF) and neutral detergent fiber (NDF). Vitamins and some minerals (e.g. selenium) usually cost extra and must be requested in addition to the standard analysis. If you live in an area of low selenium soils, you should have the selenium content analyzed to detect and prevent possible problems. Safe limits for selenium is estimated at 2 ppm, and levels greater than 0.5 ppm can be toxic.

All of the analyzed items are nutritionally important, the key items to look for in forage quality are acid detergent fiber (ADF) and crude protein (CP). ADF is part of the cellulose and lignin content of forages. Cellulose is a structural carbohydrate found in forages that has very low digestibility in the horse. Lignin is an organic compound present in forages which is essentially indigestible. It also interferes with the digestion of other nutrients.

Therefore, the higher the ADF level, the higher the cellulose and lignin content and the lower the digestibility of the forage. ADF can also be used in conjunction with crude protein (CP) to determine a digestible energy (DE) value. The CP content and DE value are very important pieces of information when buying hay because energy and protein are the two primary nutrients supplied by hay.

Some analyses may contain estimates of the energy concentration of the hay, which are listed as Total Digestible Energy (TDN), Digestible Energy (DE), Metabolizable Energy (ME) and Net Energy (NE). These values are generally intended for use with cattle and should not be used for horses unless specifically stated that they have been calculated for the horse. If no energy concentration is listed on the analysis, then it can be calculated using percent crude protein and percent ADF with the following equation: DE (Mcal. /lb) = {4.22-0.11 (%ADF)] + [0.03632(%CP)] + [0.00112 (%ADF)2] } /2.2.

## Requirements

**The hay that you buy should meet your horse's requirements. Table 1 lists a range of crude protein and ADF values suitable for meeting the nutrient requirements of various classes of horses. Table 2 lists the range of Relative Feeding Values (RFV) that can also be used determine the nutrient requirements for specific classes of horse.**

**When buying hay, look at nutrient content and digestibility of forages using both qualitative and quantitative techniques enables the horse owner to select the best value hay related to cost and nutrient requirements.**

Table 1. Crude protein, acid detergent fiber and neutral detergent fiber requirements for various feeding classes of horses (expressed on a 100% dry matter basis). Referenced from Paul Siciliano Ph.D., Assistant Professor of Animal Sciences, Colorado State University.

| Feeding Class | % Crude Protein | % Acid Detergent Fiber | % Neutral Detergent Fiber |
|---|---|---|---|
| Maintenance | 10 | 37-40 | 50-65 |
| Breeding Stallion | 10 | 37-40 | 50-65 |
| Performance | 10-12 | 30-37 | 40-60 |
| Broodmare | 12-18 | 30-37 | 40-60 |
| Growing Horse | 14-18 | 30-35 | 40-5 |

Table 2. Relative feeding Value (RFV) ranges for different feeding classes of horse: RFV= [(Digestible Dry Matter X Dry Matter intake) / 1.29]

| Feeding Class | Relative Feeding Value (RFV) |
|---|---|
| Maintenance | 83 - 112 |
| Breeding Stallion | 83 -112 |

| | |
|---|---|
| Performance | 93 - 150 |
| Broodmare | 115 -152 |
| Growing Horse | 115-152 |