

# Producing the Best Alfalfa or Grass Hay for Horses

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Horse owners today are a more sophisticated group. They have more information at their disposal and demand the highest quality forage available. The purpose of this article is to address what type of alfalfa and grass hay is currently desired by equine enthusiasts and what concerns they have regarding quality, availability and costs. While most horse people are recreational users, they have become more aware of physical and chemical evaluation of their hays, and as such would like to know that costs/unit of nutrient supplied meets or exceeds the expectations. Further, in recent months, the fear of not being able to purchase hay even at a price has become one of their greatest fears. In Arizona we have seen retail prices of typical 3 wire bales of alfalfa and Bermuda grass rise from \$14 to \$20/bale. Further, in the last 10 years we have seen a shift in type of hay demand by horse owners from alfalfa based programs to feeding significantly higher levels of Bermuda grass hay. Local retailers indicate that this shift has increased their need to supply Bermuda grass at a rate of about 2 to 1 over alfalfa. Further, for the first time in nearly 30 years alfalfa hay costs/bale in Arizona has risen over what Bermuda grass/ bale is.

Horse owners are now concerned about availability of hay (any hay at any price) and what alternatives are available; higher nitrogen content of alfalfa; extreme Ca:P ratios, enteroliths (stones in the gut) and blister beetles to name a few. Horse owners want fine stem and textured hay; green color; aromatic smell; good leaf/stem ratio and product that is free of dust, dirt, mold, weeds and other foreign materials. They want hay that has a minimum of 8% Crude Protein for grass and 15% Crude Protein for alfalfa. Their preference is for hay with fiber characteristics: Acid detergent fiber (ADF) at 28 to 35% and Neutral detergent fiber (NDF) at 38 to 50%. Additionally, many owners want to know non-structural carbohydrate values. Horse owners demand excellent quality and are putting more pressure on the retailers, brokers and growers. The concerns with supply and demand make horse owners very nervous as they hear about both the dairy industry and exportation markets competing for hay availability. Also, they are aware of environmental impacts such as droughts, higher costs of production, transportation and recent reports of less hay being

grown as farmers are turning to more profitable cotton and corn crops. In Arizona it is estimated that over 300,000 acres were in hay production in 2010, but then hay production acres fell in 2011 to 250,000 acres. All are factors impacting costs and market availability.

Ultimately, as an equine nutritionist the importance of feeding horses adequate amounts of high quality forage is critical. Roughage should be the basic component of all equine diets. It is generally important that good quality roughage is fed at no less than 1% of body weight daily, however most equine diets include 50 to 100% forage. Many nutritionists like to achieve maintenance requirements from hay and realize that young growing horses, gestation and lactation in mares as well as performance horses are likely to need various supplementations above maintenance to meet daily requirements. Table 1 shows typical nutrient requirements for various classes of horses, 1100 pound mature weight.

Recent statistics from the United States Department of Agriculture and the Arizona Statistics organizations indicate that more than 28 million tons of alfalfa is being grown in western states with Arizona hay producers contributing 2.2 million tons of this alfalfa. Other hays grown in our state contributed in excess of 180 tons of annual production. Considering that the average Arizona horse consumes about 3.5 tons of hay annually, horse owner hay usage contributes more than 30% of the total hay produced in our state. This trend is similar in other western states where dry hay fed is the rule rather than the exception.

The nutritional content of hay varies significantly depending upon plant species. Typically there are three types of hays normally found in Arizona and are classified as legume (Alfalfa), grass (Bermuda grass) and cereal (Oat). Some growers are creating mixed blends of hays which usually are Alfalfa/Bermuda grass. The nutrient composition of these hays will generally be somewhat similar in energy content, but protein, mineral and vitamin contents can vary depending on species of plant and the manner which the hay has been harvested. See Table 2, Nutrient Composition of Arizona Hays.

Table 1: Nutrient Requirements of Horses (1100 pound mature)

Class	Crude Protein (g)	Digestible Energy (Mcal/day)	Calcium (g)	Phosphorus (g)
Maintenance	630	16.65	20	14
Growing (12 mo)	846	18.8	38	21
Lactation	1535	31.73	59	38
Intense Work	1004	34.48	40	29

(From NRC, 2007)

Table 2: Nutrient Composition of Arizona Hays

Hay Type	Crude Protein (%)	Digestible Energy (Mcal/lb)	Calcium (%)	Phosphorus (%)
Alfalfa	16+/-2.5 (13-19.5)	1.04+/-0.06 (0.94-1.16)	1.34+/-0.09 (1.1-1.8)	0.2+/-0.07 (0.18-0.26)
Bermuda grass	10.9+/-3.2 (6-16)	.89+/-0.7 (0.79-1.0)	0.41+/-0.16 (0.2-0.68)	0.19+/-0.04 (0.14-0.28)
Oat Hay	(6-10)	.87	0.35-0.5	0.1-0.3

ADF% of Alfalfa was 32 (range of 31-46); Grass 32 (range of 28-38); Oat hay 35 (32-39)  
 NDF% of Alfalfa was 38 (range of 31-46); Grass 54 (range 45-59.7); Oat hay 52 (44-57)  
 RFV for Alfalfa was 143 (range 107-187); Grass 101 (range 83-129); Oat hay 103 (87-122)  
 Data from Arizona Nutritional Management Seminar, 2007.

So is one type of hay better for the horse and do horse owners have preferences? It generally comes down to personal preference, hay availability and cost of nutrients provided. Current trends in Arizona are horse owners appear to be feeding significantly less Alfalfa hay as compared to Bermuda grass hay. The perception is that grass hay provides their horses with a closer combination of nutrient requirements without some of the adverse concerns of feeding alfalfa as the sole forage while allowing their horses a slower consumption pattern. Many horse owners are trying to create feeding management programs to more closely "mimic" grazing behavior (eating little meals, frequently).

From a nutrient content alfalfa almost always offers more nutrient value per pound than other forages. However in recent years hay producers have listened to Arizona horse people and the composition of Bermuda grass hay has improved. As stated in the previous paragraph many horse owners believe that alfalfa is "too rich" for their horses. Clearly, alfalfa is higher in energy content and protein value as compared to Bermuda grass. Further, alfalfa is higher in calcium and quite similar in phosphorus content as Bermuda grass. For growing horses as well as broodmares alfalfa can be a very desirable hay to include in these classes of horses when fed with an appropriately balanced concentrate supplement. The wide calcium to phosphorus ratio often found in alfalfa does bring concerns to those feeding young growing horses, but with appropriate supplementation this concern can be overcome. The use of alfalfa hay for the broodmare and/or the performance horse may actually be an economic advantage for owners of those classes of horses.

Within the last 5 years in Arizona both blister beetle and enterolith concerns have occurred and horse owners have backed away from alfalfa use. Hay producers need to realize the potential problems associated with both of these alfalfa related syndromes and manage hay fields to ensure hay is free of beetles while helping educate clients. The number of horses afflicted by either of these conditions is relatively small in our state. One observation regarding enteroliths is with the increased drought conditions and changes to water tables this may contribute to development

of stones regardless of forage type fed as water mineralization patterns have changed.

The most important factor that determines the nutritional value of any hay is the stage of maturity when harvested. The more mature a plant is, generally relates to a lower nutritional value as fiber components increase. The availability of protein is lower in more mature plants as well as overall digestibility reduced as compared to less mature plants. Horse owners are becoming more educated and aware of fiber statistics and appear to want to know more about Acid detergent fiber (ADF) and Neutral detergent fiber (NDF) percentages. Both fiber measures help indicate forage quality; as they increase, quality decreases. High quality forages tend to have ADF values of 25-35% and NDF values of 35-55% (as-fed). Lower quality hay tends to have ADF % in the 35-45 range while NDF ranges between 55 and 70%. Horse owners want hay with the lowest ADF for a comparable NDF amount resulting in more desirable hay quality. Since about 2/3 of the protein in a plant is contained in the leaves, plants having high leaf to lower stem ratios are desirable and result in elevated percentage of protein. If hay is harvested too dry, leaves may shatter and the loss of leaves during the baling process produces a hay of lower nutritional quality. Texture and touch of hay should be soft and have flexibility rather than dry, course or brittle feel. Lastly, horse owners look for the color of hay. The correlation of green in color generally suggests higher quality and greater carotene content of the precursor of Vitamin A than hays bleached by the sun or brown in color. Studies at the University of Arizona showed that in 60 days of storage (April to June), the carotene content of alfalfa fell by nearly 60%. Owners want to look inside the bale and not just the exterior to aid in making a color determination and then smell the hay and look for any foreign materials. Hay should be aromatic and smell sweet and fresh, no moldy or dusty smell. Further, freedom of insects, weeds, plastic bags etc. are aspects of this physical inspection which most horse owners are practicing. Horse owners at our local retail stores are encouraged to "bring" hay back if it has any problems with it. The horse owner demands high quality today as they pay premium prices for product.

The following items may be important for hay producers, brokers, retailers and horse owners to understand:

- Alfalfa usage can frequently result in an economic benefit to horse owners. If alfalfa and grass hays are comparable in price a lactating mare would need to be fed about 30% less grain when feeding alfalfa. Monthly grain costs will be lowered even though hay prices are similar, as suggested by Lawrence, 2000.
- Alfalfa generally is more palatable and horses prefer it over grass hay and horses don't "waste" as much.
- Horse owners need to recognize the "true" cost of hay. Cost/bale may not provide as much information as Cost/nutrient.
- All parties need to be more transparent regarding the availability of hay.
- Keep horse owners in the "loop" as competition between dairy and exportation continues to heat up.
- Most horse owners today will pay what the market will bear as long as quality isn't compromise.

## References

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