

NUTRITIONAL VALUE OF ALFALFA HAY FOR HORSES: MYTHS VS. REALITY

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Abstract Myths regarding alfalfa as a horse feed purport that it is too high in protein and calcium and causes enteroliths and reproductive problems. Alfalfa is an excellent protein source for growing horses, does not cause kidney damage and may or may not increase heat production in performance horses. The calcium:phosphorus level of diets containing alfalfa hay must be balanced to compensate for the high calcium level in alfalfa. The high magnesium level of alfalfa has not been shown conclusively to contribute to the formation of enteroliths. Data does not substantiate claims that alfalfa causes reproductive problems although certain molds found in hay may be partly responsible.

Keywords alfalfa, horses

INTRODUCTION

Sometimes myths contain a grain of truth and sometimes they do not. The horse industry seems to have more than its share of myths and folklore, perhaps because horse people tend to value tradition over facts, or perhaps, in search of the perfect horse, horsemen will feed anything the trainer of the winning horse feeds, whether the horse needs it or not.

Alfalfa has not escaped the scourge of myths, most of which try to sabotage it as a horse feed. But over the last 20 or so years, and especially in the Western states, alfalfa has been recognized as the highest quality roughage available for most classes of horses. Still, old myths die hard and new ones are created daily as vague connections between feeds and physiologic changes are assumed to be cause and effect. The aim of this paper is to address some old myths and possibly some new myths that have not yet been shown to contain truth or not.

MYTH #1 ALFALFA IS TOO HIGH IN PROTEIN FOR HORSES.

The high protein level of alfalfa hay has been blamed for causing kidney damage, skeletal growth disorders and excessive heat production in performance horses. None of these allegations have been proven.

Feeding alfalfa hay will cause horses to drink more water and produce more urine that may contain more ammonia. In poorly ventilated barns, the ammonia smell may be more noticeable when alfalfa hay is fed. The urine is sometimes darker in horses fed

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alfalfa hay than grass hay. It has been speculated that alfalfa feeding should be avoided in horses that have acquired kidney damage, but the alfalfa itself has not been shown to cause damage to the kidneys.

Many factors are thought to contribute to skeletal growth disorders such as physitis, contracted tendons and possibly wobbler syndrome. Genetic predisposition, environment and nutritional factors have all been implicated as causative agents. Among the nutritional factors, excess protein and energy, imbalanced or inadequate calcium and/or phosphorus, and inadequate or excessive micromineral levels all play a role in growth rate and skeletal development.

High protein (and energy) diets promote rapid growth. It has been speculated that rapid growth may be unbalanced growth with one type of tissue growing faster than another. This line of thinking leads to postulations that body weight may become too great compared to skeletal strength leading to disruption of the cartilage layer in growth plates and physitis. Bones growing faster than tendons may result in "contracted" tendons. While this theory has not been proven, many nutritionists advocate decreasing the protein (and energy) content of diets with the aim of decreasing growth rate in colts that exhibit skeletal growth disorders.

From a physiologic standpoint, it makes sense that high protein diets would cause an increase in heat production because the heat of metabolism and nutrient utilization is greater for protein than for carbohydrate or fat. Some research has shown an increase in heart rate, respiratory rate and sweating in endurance horses fed high (15 - 17%) compared to low (10%) protein diets (Slade et al, 1975). Other research has shown no difference in performance between horses fed 12 or 24% protein (Hintz, 1983). There appears to be no benefit to feeding high protein diets to mature working horses. The added heat of metabolism of high protein diets may or may not affect athletic performance depending on the level of performance and environmental temperature and humidity.

Not addressed in this myth is the benefit of alfalfa protein for growing horses. Alfalfa protein is well digested by horses and is a good source of lysine which is thought to be the growth limiting amino acid in horse diets.

While there is much controversy over the definition of "optimum" growth rate in horses, no horseman would knowingly feed protein deficient diets to colts. In California, oat or other grass hays alone or with grain generally do not meet the protein requirements of horses under one year of age. Protein supplementation or alfalfa hay are usually needed to ensure adequate growth rate.

MYTH #2 ALFALFA IS TOO HIGH IN CALCIUM FOR HORSES

Like protein, the high calcium level and the high calcium:phosphorus ratio of alfalfa hay are frequently blamed for skeletal growth disorders. The calcium content of alfalfa hay can range from 1 to 1.5% (dry matter basis) and the calcium:phosphorus ratio is generally about 6:1. The calcium requirements of horses range from .3 (for mature horses in maintenance condition) to .6 to .8% (for fast growing weanlings). While mature horses seem to easily tolerate this high calcium:phosphorus ratio, it is more critical for growing horses to have a ratio closer to 2:1 for proper bone formation. Phosphorus supplementation, some of which is achieved by adding grain to the ration, is often needed to balance the calcium:phosphorus ratio of growing horses.

There is some concern about the availability of alfalfa calcium due to the variable presence of oxalate in alfalfa hay. Oxalate can tie up calcium making it unavailable for absorption. However, in a study conducted by Hintz et al (1984), the availability of calcium in alfalfa was estimated to be about 80%, even in hay known to contain up to .9% oxalate. From a practical standpoint, alfalfa hay supplies adequate or superadequate levels of calcium to horses in most physiologic states.

MYTH #3 ALFALFA CAUSES ENTEROLITHS.

Enteroliths are hard, solid objects found in the small or large intestine of horses. Sometimes called intestinal stones, enteroliths can be described as being similar to pearls, that is, a central small object surrounded by many concentric layers of material.

Not all horses have enteroliths and their presence is difficult to determine until a horse undergoes abdominal surgery, usually to remove an enterolith that has blocked a portion of the intestine. Enteroliths can be small or large and there may be one or several at any one time.

The link between alfalfa and enteroliths is the layer material, ammonia magnesium phosphate. Because enteroliths have been found with greatest frequency in the Western states in horses fed alfalfa hay, it is thought that the high magnesium content of alfalfa contributes to the formation of ammonia magnesium phosphate. Enteroliths have also been linked to drinking water with high magnesium levels and to diets that cause relatively high intestinal pH (such as diets composed solely of alfalfa).

It has not been proven that high dietary magnesium levels or intestinal pH contribute to the formation of enteroliths. Genetics may also play a role as enteroliths are more prevalent in Arabians and Quarter Horses than other breeds.

MYTH #4 ALFALFA CAUSES REPRODUCTIVE PROBLEMS IN MARES

Swerczek (1980) proposed that highly nutritious diets such as those containing alfalfa or clover caused reproductive problems and foal diseases. Diets high in energy, protein and vitamins were reported to be associated with shaker foal syndrome, pneumonia and abortions. However, little if any other research can be found to support these claims.

Alfalfa may be associated with reproductive problems in mares if the hay is contaminated with certain species of *Fusarium* molds. Some *Fusarium* species produce zearalenone and similar compounds which have estrogenic effects. Zearalenone has been shown to cause abnormalities in farm animals such as hypertrophy of the reproductive organs, decreased fertility and early abortion. The mold, not the alfalfa, is the cause of these problems.

SUMMARY

Despite allegations that alfalfa hay is overly nutritious and/or imbalanced in nutrient content for horses, alfalfa hay is an excellent source of protein, calcium and energy, especially for growing horses or horses with greater needs for these nutrients.

For optimum growth, diets containing alfalfa hay should be balanced to approach a 2:1 calcium:phosphorus ratio and should be fed in amounts that do not promote obesity.

Working horses do not have increased protein requirements and may need relatively low protein diets to reduce heat production.

Claims that alfalfa causes enteroliths and/or reproductive problems are as yet unsubstantiated.

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