



FORAGE FOR HORSES THE KEY TO HEALTH

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Forage, such as hay and pasture is critical for the health and well-being of all horses. Understanding the design, function and reliance of the horse's digestive system on forage is the first step in appreciating the critical value of forage. Knowledge of what's in forage, the types and physical forms of forage and importance of forage quality should be common for all horse owners. Finally, understanding how much forage a horse requires per day is essential in properly feeding any horse. So let's get started learning about forages for horses.

The Digestive System

The unique structure and function of the horse's digestive system is ideally suited for the utilization of forage. As such, horses are classified as herbivores or plant eaters. They are also referred to as "hindgut fermenters" since the back portion of the digestive tract is a large fermentation vat. The horse's hindgut is a large balloon-like area consisting of the cecum and colon. It is the largest area of the digestive system making up over 65% of the digestive capacity. Billions of bacteria and protozoa live in this portion of the digestive tract. These microorganisms work together to break down (ferment) plant fiber from forage. It is the presence of these microorganisms in the hindgut that allows horses to utilize forage. Without these microorganisms the horse would not be able to digest forage. The intestinal mi-

croorganisms produce energy-yielding compounds called volatile fatty acids, as well as amino acids and B-vitamins that can be absorbed by the horse.

With over 65% of the horses digestive system geared towards digestion of forage, it is easy to see why forage is critical to the health of all horses.

Types and Physical Forms of Forage

Forage comes in many different types and physical forms. In general, forages can be divided into two types: legumes and grasses.

Legumes are plants such as alfalfa and clover. They are capable of fixing their own nitrogen and therefore they have higher protein content. Legumes also contain less fiber and more of that fiber is un-digestible fiber compared to grasses.

Grasses that are fed to horses include many different species. The individual species of grass are further divided into those which grow well in colder climates - cool season grasses (e.g. ryegrass, orchard, timothy, and prairie) and those that grow well in hotter climates - warm season grasses (e.g. bermuda, kikuyu and pangola). Again, grasses typically contain less protein and more fiber compared to legume forages.

The physical form of forages fed to horses is also quite variable. The simplest form of forage is pasture. Pasture can contain both grass and legume

plants. Pasture plants can be selected to grow in all types of climates. Unfortunately when conditions become harsh such as during extreme heat or cold, pasture plants will quit growing and become dormant. At these times of the season, the horse must rely on physical forms of forage that have been stored.

Hay is the most common form of stored forage. To make hay, plants are grown to a certain height or maturity, cut, dried to low moisture content and packaged into a bale. If the moisture content is greater than 15% the hay will mold while in storage. Feeding moldy forage is never recommended with horses since it can result in digestive upset (colic) or even death. Forage that has been stored initially as hay can then be further processed into other physical forms. These forms include pellets, cubes, or chaff. These physical forms of forage have the same digestibility as the hay they were made from. The processing into pellets, cubes or chaff simply add convenience in handling or feeding. Processing hay into cubes or pellets also allows hay to be readily transported from areas with favourable hay growing conditions to areas of the country with poor hay growing conditions. Pelleted or cubed forages are also the correct choice for aged horses or horses with poor teeth. Pellet and cubes can be soaked in water to form a mash or gruel that is well tolerated by these special needs horses.

Forage Quality

The main factors that influence the quality of forage are: specie of plant, stage of maturity of the plant and the physical location where the plant was grown. As mentioned previously, legume plants (alfalfa and clover) tend to be higher in protein, energy and calcium compared to grass plants. Hence, legume forages are best suited for horses with elevated nutrient requirements such as broodmares and growing horses. On the other hand, grass forages because of the lower energy content may be better suited to horses that gain weight easily or for show horses.

The maturity of the plant is also a determinant of forage quality. The more mature a plant becomes or the taller a plant grows, the lower the quality. As plants mature, digestibility decreases due to an increased amount of fiber to keep the plant upright. Due to the high fiber content of mature plants, they proportionally contain less energy, protein, vitamins and mineral compared to shorten, less mature plants. Hay that is cut when the plants are too tall and mature will be less digestible. The cutting of hay is often delayed in many geographic areas of the country due to rain or poor weather. These weather delays decrease the quality of hay.

The final determinant of forage quality is the physical location where the

plant was grown. Different geographic regions contain soils with different nutrient densities. The nutrient content of the soil is reflected in the nutrient content of the plant. For example, plants grown in nutrient deficient soil will also be nutrient deficient and of lower quality. As mentioned previously, certain areas of the country have difficulty in growing quality forage because of poor climate conditions. Forage grown in the Western United States is some of the highest quality in the world because of optimum growing and harvesting conditions.

Forage quality can be determined to a limited extent by visual inspection of the forage. Visual inspection can include looking at:

- the leaf to stem ratio,
- the length of the seed head,
- color of the plant,
- presence of dust or mold.

Higher quality forages will have more leaves than stems, a short seed head, be green in color, and smell fresh with no dust or mold. A more accurate evaluation of forage quality can be acquired via a laboratory analysis. First, a representative sample of forage is sent to the laboratory for chemical analysis. The results will then provide accurate determination of energy, protein, vitamin and mineral content. Laboratory analysis can also be used to determine the presence of harmful mold.

How Much Forage Should Be Fed?

Forage is the safest dietary ingredient that can be fed to horses. Horses require an absolute minimum of 1% of their body weight in dry forage per day, for a 1000 lb horse this equates to just 10 lbs of forage per day. Racehorses are the only horses that would get down to this minimum amount of forage. A safer guideline is to provide horses with a minimum of 1.5% of their body weight in dry forage per day, which equates to 15 lbs of dry forage per day for a 1000 lb horse. So how much forage will a horse eat? Conservative estimates are for horses to consume a maximum of 3.5% of their body weight in dry forage per day. This is a whopping 35 lbs of dry forage per day for a 1000 lb horse.

Summary

Forage is the most important dietary ingredient for horses. The digestive system of the horse is designed to digest forage. There are many types and physical forms of forage. All forages fed to horses should be of good quality. Forage should be offered free-choice to horses unless your horse is obese or somehow sensitive to something in forage. Feeding large volumes of forage will maximize digestive health and minimize the amount of grain that will need to be provided to the horse.



What's in Forage?

Forage contains all of the essential nutrients required by horses: water, energy, protein, vitamins and minerals. Unfortunately, many horse owners only talk about, or judge forage based on protein content. While protein is certainly important, other nutrients are often as important. Forage should be judged by the levels of all nutrients not any one single nutrient. The following are some of the nutrients that forage contains along with a brief explanation.

- Water — Pasture contains large amounts of water whereas preserved forages such as hay, hay cubes or pellets and chaff have been dried to prevent mold growth while in storage.
- Protein — The protein content is highest in legumes such as alfalfa and clover and lower in grasses such as timothy or orchard grass.
- Fat — Forage contains a small amount of fat which is high in omega 3 fatty-acids.
- Fiber — Not all of the fiber in forages is digestible with an overall estimate of digestibility ranging from 40 to 50%. As hay becomes more mature (taller), the fiber content increases and the digestibility decreases.
- Minerals — A number of important minerals such as calcium, phosphorus, potassium, copper, zinc, selenium and others are present. The mineral content of forage is dependent on soil conditions where the plants were grown.
- Vitamins — The vitamin content of green forages is higher compared to sun-bleached or weather-damaged forage.