There are a number of studies examining varieties of hay and different approaches in how it is offered, cut, and stored

More Than a Gut Feeling

IT'S IMPORTANT TO TAILOR HAY TO **SPECIFIC HORSES' NEEDS**

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AS HORSE CARE can get expensive, horsemen keep an eye out for areas where they can save some money, but when it comes to the right hay, cutting corners is ill-advised.

The value of hay to a horse's health is simply too important. Feeding the best hay possible is advised; however, the best hay for any given horse is a less straightforward matter.

The palatability and nutritive value of hay depend on multiple factors such as plant species, level of plant maturity at harvest, weed content, growing conditions, curing and harvesting conditions, soil conditions and fertility, moisture content, and the length and method of storage, according to the Association of Equine Practitioners' paper "Hay Quality and Horse Nutrition: Evaluating Your Horse's Nutritional Needs."

"Horses are herbivores by design and foragers by nature," the AAEP paper explains. "They have evolved to utilize grasses and other forage plants as their primary source of nutrition. Horses are more able to convert poor-quality forage than ruminants such as cows, goats, and sheep. Horses are most content when they can nibble almost constantly. As an added benefit, horses that are allowed to graze continuously will typically have fewer dental problems. Although it's not always possible to let our domesticated friends graze to their hearts' content, one way to satisfy their urge to chew and provide essential nutrients is to feed high-quality hay."

No matter what type of program a horse is on, it is important to manage the available roughage properly. That was one of the major points in a December 2020 paper published by the *Journal of Equine Veterinary Science* "Characterization of Forage Utilization and Pasture Management Practices on Florida Horse Operations." The study examined the data from 80 complete responses to an online survey.

"Most respondents reported using a combination of hay and pasture (57.5%) as their primary source of forage, followed by pasture only (32.5%) and hay only (10%)," explained researchers. "Pasture maintenance was performed by 82% of respondents, and 6% did not implement any type of pasture management. Primary forage fed to the horses was related to the type of pasture management implemented and turnout practices.

"The multiple correspondence analysis showed that relying on hay as the primary source of forage was associated with a shorter duration of pasture access and lack of pasture management. Most operations did not have their hay (89%) or pasture (94%) analyzed for nutrient composition. Despite pasture availability, lack of adequate pasture management appeared to contribute to a greater dependence on hay feeding."

Understanding what makes some

The value of quality hay to a horse's health is too vital to cut corners

varieties of hay better than others is an ongoing process. Researchers have conducted multiple studies on the subject, ranging from topics such as how hay is offered to horses to when it is cut and stored. There are multiple ways to approach these variables. How hay, which is notoriously associated with dust, is presented to horses is one avenue with several options. Soaking it before serving it is a relatively common practice, but it is an approach that researchers have concerns about, as noted in the study "Effect of Hay Soaking Duration on Metabolizable Energy, Total and Pre-cecal Digestible Crude Protein and Amino Acids, Non-Starch Carbohydrates, Macronutrients and Trace Elements," which was published in the *Journal of Equine Veterinary Science* in June.

"Soaking hay before feeding has been documented to reduce airborne respirable particles and water-soluble carbohydrate content, which may have positive benefits for horses suffering from equine asthma or equine metabolic syndrome," explained researchers. "Prolonged soaking also leaches minerals, but to date no measurement of the loss of small intestine digestible crude protein has been documented."

Airway inflammation linked to dust from hay can be a concern for race horses

The study examined the effects of different soaking durations on the nutrient contents of hay while also looking to determine the pre-cecal digestible crude protein and amino acid fraction contents, as well as pre-cecal digestibility. Researchers took four different batches of meadow hay and soaked them in water for 15 minutes, 30 minutes, an hour, 12 hours, or not at all. All soaked hay was then drained for 20 minutes.

"A 15-minute soaking duration significantly reduced the levels of nearly all investigated nutrients," researchers concluded. "However, the crude fiber, acid detergent fiber, and acid detergent lignin content increased. Metabolizable energy contents decreased by 5%-15%; pre-cecal digestible crude protein and pre-cecal digestible amino acids were down 35%; and pre-cecal digestibility declined by up to 49%. In contrast, the pre-cecal digestibility was 56% before soaking. Longer soaking durations did not enhance the wash-out effect."

The study advises that owners should be aware that soaking hay, regardless of reason, might negatively alter the nutritional value. The wide range of wash-out effects might pose risks in calculating the correct dry matter portion to prevent weight loss and maintain metabolizable energy, pre-cecal digestible crude proteins and amino acids, especially for horses with equine asthma or equine metabolic syndrome.

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>
> —AMERICAN ASSOCIATION OF EQUINE PRACTITIONERS' WHITE PAPER ON FEED

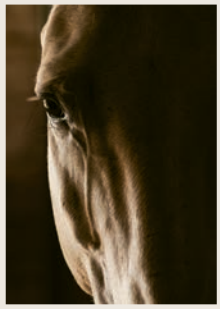
In November 2020, *PLOS One,* a peer-reviewed scientific journal, published "The haybiome: Characterizing the viable bacterial community profile of four different hays for horses following different pre-feeding regimens," which examined other alternatives to soaking hay.

"Respirable dust in conserved forages can pose problems with equid respiratory health; thus, soaking and high-temperature steaming are employed to reduce the levels in hay," explained researchers. "The aim of this study was to characterize the viable bacterial community profile of four hays from two different locations in UK following pre-feeding wetting regimens."

For the study, two meadow hays and two Italian ryegrass hays were sourced from two different commercial forage companies. The hay varieties were kept dry for the control, received high-temperature steaming, or were soaked in tap water for 12 hours. "High-temperature steaming (HTS), when compared to soaking or leaving hay dry, significantly reduced bacteria in hays," researchers concluded. "HTS also kept the diversity of species similar to that of dry hay whereas soaking reduced diversity though an increase of Gram-negative proteobacteria in the bacterial community profile, which may have a negative impact on gastrointestinal health. This study adds to the growing body of evidence that long soaking hay increases the abundance of Gram-negative bacteria which, when ingested, may have a negative effect on health.

"Furthermore, findings from read counts for microbiota following HTS are suggestive that the mechanism of HTS

HAY QUALITY AND HORSE NUTRITION: EVALUATING YOUR HORSE'S NUTRITIONAL NEEDS



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Many people spend a lot of time and effort to evaluate the best feeds and supplements for their horse, but they may be overlooking another important nutritional need, which is hay quality. The quality of hay greatly affects how it meets the nutritional needs of your horse. Hay is typically harvested two to four times per year, depending on the forage type, weather conditions, and geographic location. Hay quality can vary greatly between cuttings, geographic location, and plant species, but the greatest difference is due to the stage of maturity, or the amount of time from planting date to harvest date.

Hay harvested at an early maturity stage will contain a greater calorie content as well as a higher level of protein. You will notice that it requires a lower amount of high-quality hay to keep weight or maintain a good body condition (BCS) for your horse, and you will be able to provide less horse feed to maintain your horse's weight. You might also notice an improved topline evaluation score (TES) or muscle development when feeding a high-quality hay. A poor-quality hay will provide lower calorie and protein content. The hay quality might be so poor that your horse can't consume enough on a daily basis to maintain good body condition, and you might need to provide large amounts of horse feed to maintain or gain weight.

Our equine nutrition experts can visit your farm, collect samples of your hay, and provide a complimentary nutrient analysis. They are trained to evaluate your horse using BCS and TES and can provide feeding recommendations based on nutrient analysis of your hay to manage your horse to achieve desired BCS and TES. To schedule an appointment with an equine nutrition expert in your area, go to proelitehorsefeed.com.

—Marty Adams, PhD, PAS – Technical Services Equine Nutritionist for Cargill

on microbiota involves denaturing proteins, thus reducing the ingestion of viable microbiota. HTS reduced bacteria associated with respiratory and dental disease while increasing the abundance of bacteria associated with carbohydrate metabolism, which is indicative of reduced disease risk in equids."

The pros and cons of feeding hay (which is cut when grass is mature and then left to dry) or haylage (which is usually cut and baled sooner) is another area of continued study. Hay relies on the removal of moisture while haylage is wrapped in polythene to help prevent mold growth. This means hay is more susceptible to dust while haylage is at greater risk of molding.

This April the *Equine Veterinary Journal* published "Hay vs haylage: Forage type influences the equine urinary metabonome and fecal microbiota."

"Gut microbial communities are increasingly being linked to diseases in animals and humans," explained researchers. "Obesity and its associated diseases are a concern for horse owners and veterinarians, and there is a growing interest in the link among diet, the intestinal microbiota, and metabolic disease."

For the study, researchers assessed the influence of long-term hay or haylage feeding on the microbiota and metabolomes of 20 Welsh mountain ponies. The ponies had urine, feces, and blood collected monthly over the span of 13 months so that they could be analyzed.

"Fecal bacterial community profiles were observed to be different for the two groups, with discriminant analysis identifying 102 bacterial groups (or operational taxonomic units) that differed in relative abundance in accordance with forage type," researchers found. "Urinary metabolic profiles of the hay- and haylage-fed ponies were significantly different during 12 of the 13 months of the study. Notably, the urinary excretion of hippurate was greater in the hay-fed ponies for the duration of the study while ethyl-glucoside excretion was higher in the haylage-fed ponies.

Horses allowed to graze continuously will typically have fewer dental issues, but this ideal is not always possible

"UNDERSTANDING THE POTENTIAL IMPLICATION OF FEEDING A PARTICULAR TYPE OF FORAGE WILL ENABLE HORSE OWNERS TO MAKE MORE INFORMED CHOICES WITH REGARD TO FEED, ESPECIALLY IF THEIR HORSE OR PONY IS PRONE TO WEIGHT GAIN."

—A PUBLISHED STUDY IN *EQUINE VETERINARY JOURNAL*

"The data generated from this study suggest that the choice of forage may have implications for the intestinal microbiota and metabolism of ponies and, therefore, potentially their health status. Understanding the potential implication of feeding a particular type of forage will enable horse owners to make more informed choices with regard to feed, especially if their horse or pony is prone to weight gain."

The effects of feeding hay or haylage to horses in athletic pursuits was examined in the study "Dust exposure and pulmonary inflammation in Standardbred racehorses fed dry hay or haylage: A pilot study," which the *Veterinary Journal* published in May.

"Respirable dust exposure is linked to airway inflammation in racehorses," explained researchers. "Feeding haylage may reduce dust exposure by 60-70%. The objective of this study was to compare dust exposure, airway cytology, and inflammatory cytokine concentrations between horses fed haylage or hay over six weeks while in training."

For the six-week study, seven Standardbreds were fed either alfalfa hay or grass-alfalfa mix haylage while training on a treadmill. Exposure to dust as well as endotoxin and beta-glucan concentrations in respirable dust was measured. Additionally, bronchoalveolar lavage fluid (BALF) cytology was determined at the beginning as a baseline and after two, four, and six weeks, while cytokine concentrations were measured in BALF at the beginning and end of the study.

"The effect of forage on exposure, airway cytology, and cytokines were evaluated using generalized linear mixed models," said researchers. "Respirable dust and beta-glucan exposures were lower in horses fed haylage than hay. In horses eating haylage, BALF neutrophil proportion decreased between baseline, week two, and week six. By week six, horses fed haylage had lower BALF neutrophilia than horses fed hay. Interleukin-4 concentration in BALF was higher at week six in horses fed hay compared to baseline. In conclusion, feeding haylage instead of hay to horses in training can reduce exposure to respirable irritants and mitigate airway neutrophilia."

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Hay

Dust is just one of many factors when it comes to feeding, and there is a lot to consider when deciding what is best to feed a specific horse. This August, *Animals* (Basel) published "Effects of Differences in Fiber Composition and Maturity of Forage-Based Diets on the Microbial Ecosystem and Its Activity in Equine Caecum and Colon Digesta and Faeces."

"Fibrous feeds are essential for horses," explained the study. "When developing feeding regimens promoting health and performance, we need to understand the digestion of plant cell walls and the functioning of the hindgut microbial ecosystem. Our objective was to investigate the effect of grass fiber maturity and legume forage on the hindgut microbiota and its activity."

For the 28-day study, six caecum- and colon-fistulated geldings were fed three different diets: concentrate and late-harvested grass haylage (Diet C); early and late harvested grass haylage (G); and lucerne and late-harvested grass haylage.

"No differences were measured in total bacteria concentrations, fungi, and protozoa numbers nor in cellulolytic bacteria concentrations among the diets," researchers concluded. "Short-chain fatty acid concentrations did not differ among diets, but a lower (acetate + butyrate)/propionate ratio when the horses were fed Diet C, compared to G and L, was observed, suggesting lower fibrolytic and higher amylolytic activity.

"The pH increased when the horses were fed Diet L and decreased when fed C and G from caecum to feces. The buffering capacity of hindgut digesta was five to 15-fold higher than that of the feeds, suggesting a decreased effect of feed buffering capacity as digesta travelled through the digestive tract. In conclusion, an early harvested forage opens up the possibility for forage-only diets, providing high energy without the negative effects of concentrate."

While the options when it comes to hay might seem overwhelming on paper, a lot of the answers reside in the practical availability of hay in one's area and the nutritional needs of each individual horse.

"Remember, horses at different ages and stages of growth, development and activity have different dietary requirements," advises the AAEP. "Consult your veterinarian or a qualified equine nutritionist when formulating your horse's ration. He or she can help you put together a balanced diet that utilizes hay, grain, and supplements in a safe, nutritious, and cost-effective way." BH