theHORSE.com
YOUR GUIDE TO EQUINE HEALTH CARE

FACTSheet

Hay Soaking

Soaking horses' hay before feeding can help minimize (and perhaps prevent) the development of important, life-threatening medical conditions

When hay is offered along with water and a trace mineralized salt block, most horses can flourish on it as their sole food source.[1] Hay does, however, have its downsides: it can be dusty, moldy, and in some cases, high in carbohydrates or minerals, which can be deleterious to some horses' health.

Increasing recognition of diet's impact on disease has spurred several research groups into action, and studies now support hay soaking as a method for managing a number of equine conditions. It must be done with care, however, because other essential nutrients—such as protein and minerals—can be accidentally leached from the hay.

WHAT'S IN YOUR HAY?

There are two main types of hay: legume and grass. Both types contain water, fiber, protein, carbohydrates, and minerals. Legume hay (alfalfa and clover), generally speaking, contains more protein and energy (calories) than grass hay (e.g., timothy, orchard, oat, fescue, Bermuda) and is often high in calcium, which if fed in high amounts can be detrimental for young growing horses.[2]

Two main types of carbohydrates exist in hay. One is called structural carbohydrates, such as those from cell walls. These are resistant to horses' digestive enzymes and must be fermented by bacteria in the intestine. The second type of carbohydrate in hay is nonstructural carbohydrates (NCSs), such as simple sugars, including glucose, sucrose, and fructose and a compound called fructan, which is a chain of fructose molecules linked together that's found mostly in cool-season grasses.[3] It is the NCS component of hay that is deleterious to some horses; however, this fraction is water-soluble and can be removed during soaking.

Recent study results support hay soaking for managing a number of equine conditions, including respiratory and metabolic diseases.

MEDICAL CONDITIONS THAT BENEFIT FROM SOAKING HAY

The most well-studied conditions that apparently benefit from hay soaking include respiratory conditions, various metabolic disorders, and obesity.

Heaves/inflammatory airway disease/chronic obstructive pulmonary disease/recurrent airway obstruction (RAO)

RAO is a debilitating respiratory condition that affects approximately 15% of mature horses. In one study researchers found that soaking hay for 30 minutes decreased respirable dust particle numbers by 88%.[4]

More recently, researchers used a particle counter to measure the "respirable dust concentration" in the horse's breathing zone, which included small dust particles that could be inhaled into the small (lower) airway and cause inflammation. That study found:

- Dust concentration was significantly higher in the breathing zone of horses fed dry hay compared to horses fed hay immersed in water (and fed immediately after immersion) or fed hay soaked for 16 hours; and
- There did not appear to be any benefit of prolonged soaking. In fact, those researchers indicated that soaking hay for 30 minutes or even simple immersion prior to offering the hay in a hay net sufficiently reduced respirable dust.[5]

Insulin resistance (IR)/equine metabolic syndrome (EMS), laminitis

IR horses are at an increased risk of laminitis. Horses are sensitive to even small changes in their intake of carbohydrates, especially fructan.[6] One way to minimize laminitis development, particularly in horses with IR/EMS, is to soak the hay to reduce the NSC content to <12%.[7]

- In one study researchers found that soaking 2 kg flakes of hay in 65 L tubs containing 24 L of tap water (~8°C, or 46°F) for between 20 minutes and 16 hours decreased NCSs by an average of 27%. Specifically, fructan reduced 24%, fructose reduced 41%, sucrose reduced 45%, and glucose reduced 56%. Crude protein was not significantly reduced after soaking.[7]
- Researchers from another study found that water temperature had little effect on NSC removal, soaking grass hay for 15–30 minutes was typically sufficient, and extended soaking (12 hours) resulted in significant loss of other dry matter components (which is undesirable).[6]

Obesity

Equine obesity is becoming an epidemic, primarily as a result of overfeeding and inadequate physical activity. Obesity can culminate in insulin resistance, EMS, and laminitis. Researchers found that restricting a horse's diet to 1.5% of his body weight (rather than the standard 2-2.5%) for six weeks results in a 6.8% decrease in body mass, as well as improvements in body condition score and belly circumference. In that study, the researchers suspended the hay in a hay net in 40 L of cold water for 8–16 hours prior to feeding. The hay was allowed to drain for 30 minutes prior to offering it to the horses, and the soaking resulted in a 38% decrease in NCSs.[8]

Hyperkalemic periodic paralysis (HYPP)

Not only does soaking hay remove NCSs, but it can also decrease mineral levels. This practice could benefit horses with HYPP, a genetic condition that results in high levels of potassium, leading to muscle twitching or even paralysis.

A diet low in potassium (<1.1% K) is thought to lessen the frequency and severity of paralysis. Soaking alfalfa and orchardgrass for 12 hours was needed to reduce K concentrations sufficiently to benefit horses

Fast Fact

Hay soaking should only be used if "acceptable" hay (that contains less than the NSC and K thresholds) is not available and hay is soaked for only 15-30 minutes.[6,9]

with HYPP; however, this practice could alter the calcium (Ca) to phosphorus (P) ration, especially in alfalfa hay, potentially requiring P supplementation.

Polysaccharide storage myopathy (PSSM)

PSSM is a muscular disorder exacerbated by feeding high-NSC diets. Veterinarians and nutritionists currently recommend feeding horses with PSSM a diet with ≤10% NSCs.[9]

HOW TO SOAK HAY AND OTHER CONSIDERATIONS

You can soak hay in something as simple as a bucket or wheel barrow, either on its own or pre-placed in a hay net. Alternatively, owners can consider purchasing commercially available hay soaking units.

For an average 500 kg (1,100 pound) horse, an owner must soak 12 kg of hay (if fed at 2.5% body weight) per day, resulting in 144 L of "liquor," which contains an estimated 1 kg of NSCs and other elements including phosphorus. This liquor is an environmental pollutant and, "It is clear that hay-soak liquor should be disposed of responsibly (in grassy areas without frequent, repeated disposal) and on no account should it be drained into watercourses or static ponds."[7]

Further, not all hays are created equal. Hay quality and the amount of NSCs vary depending on the type of hay, the hay-making process, crop maturity, time of day, and weather conditions during harvesting.[7]

PROFESSIONAL RECOMMENDATIONS

- Limit/eliminate horses' pasture intake to minimize NCS ingestion;
- Feed hay low in NSCs;
- Do not shake out hay flakes prior to soaking;
- When hay low in NSCs is not available, soak the hay after considering the initial forage NSC content, the type of forage (alfalfa vs. grass), economics of dry matter loss, and disease status of the horse;
- Water temperature, in general, has little impact on NSC removal;
- A 1:12 ratio (of water:hay volume) is recommended to completely submerge the hay in 65 L tubs;
- Feed hay immediately after soaking to eliminate molding of the wet hay; and
- Prolonged soaking (i.e., <12 hours) can cause "unnecessary" protein and mineral losses, resulting in imbalances (e.g., high Ca:P ratio); however, soaking hay for 15-60 minutes is unlikely to result in nutrient deficiencies for an average 500 kg horse in light work.

Key References

1. Oke S. Understanding feeds for the busy owner. TheHorse.com. Available at http://www.thehorse.com/articles/21198/understanding-feeds-for-the-busy-owner.
2. Anon. Hay quality & nutrition: evaluating your horse's nutritional needs. Available at http://www.aaep.org/health_articles_view.php?id=109.
3. Pagan JD. Carbohydrates in equine nutrition. Kentucky Equine Research. Available at http://www.ker.com/library/advances/103.pdf.
4. Moore-Colyer MJ. Effects of soaking hay fodder for horses on dust and mineral content. J Anim Sci 1996;63:337–42.
5. Clements JM, Pirie RS. Respirable dust concentrations in equine stables. Part 2: The benefits of soaking hay and optimizing the environment in a neighbouring stable. Res Vet Sci 2007;83:263–268.
6. Martinson K, Jung H, Hathaway M, et al. The effect of soaking on carbohydrate removal and dry matter loss in orchardgrass and alfalfa hays. J Eq Vet Sci 2012;32:332–8.
7. Longland AC, Barfoot C, Harris PA. Effects of soaking on the water-soluble carbohydrate and crude protein content of hay. Vet Rec 2011;168:618.
8. McGown CM, Dugdale AH, Pinchbeck GL, et al. Dietary restriction in combination with a Nutraceutical supplement for the management of equine metabolic syndrome in horses. Vet J In press.
9. Martinson CM, Hathaway M, Jung J, et al., The effect of soaking on protein and mineral loss in orchardgrass and alfalfa hay. J Eq Vet Sci 2012;32:776–82.
10. Janicki KM. Effects of soaking on protein, mineral loss in hay. TheHorse.com. Available at http://www.thehorse.com/articles/31220/effects-of-soaking-on-protein-mineral-loss-in-hay

Authored by Stacey Oke, DVM, MSc; reviewed by Krishona Martinson, PhD