

MESSAGE FROM THE GRAYSON-JOCKEY CLUB RESEARCH FOUNDATION

# NUTRITIONAL MANAGEMENT OF THE EQUINE METABOLIC SYNDROME HORSE—A TOPIC THAT NEEDS MORE RESEARCH

BY DR. AMANDA ADAMS

Insulin dysregulation is characterized by increased insulin responses to oral sugars, hyperinsulinemia, or tissue insulin resistance. It is most often associated with equine metabolic syndrome, which predisposes horses to laminitis. Laminitis is a devastating inflammatory condition that causes severe pain and often leads to euthanasia.



Grayson-Jockey Club  
Research Foundation

Similarly to humans, vast amounts of nutrients are available to horse owners, which often leads to equine obesity and the development of insulin dysregulation. It remains to be determined how to nutritionally manage EMS horses in order to control the postprandial response in EMS-ID horses, thereby reducing the risk for laminitis. While it is recommended to maintain EMS-ID horses on a forage only diet and avoid feeding grain, no research has been conducted to determine the effects of forage nutrient content on insulin responses in EMS-ID horses. It remains to be determined what level of non-structural carbohydrates and protein in forage will cause an exaggerated metabolic response in EMS-ID horses compared to metabolically normal horses.

The long-term goal of our ongoing research is to define mechanisms that drive insulin dysregulation and the development of laminitis, and to identify strategies that might provide improved nutritional management practices to protect horses from devastating occurrences of laminitis.

Nutritional management is a crucial topic that has not been fully addressed in the EMS-ID horse. The Equine Endocrinology Group suggests managing EMS-ID horses with nutrition; however, there are currently no science-based recommendations for EMS-ID horses.

When discussing this topic, there are two considerations: 1) what to feed the EMS horse and 2) how much to feed the EMS horse. The EEG recommends to maintain the EMS horse on an all forage

diet, avoiding grain and to restrict the amount of forage to a certain percentage of body weight of the horse to help induce weight loss or to maintain body weight. What we don't know is "what" forage is safe to feed the EMS horse to reduce the insulin response to feeding.

Forage varies tremendously in terms of nutrient content of sugars, starches, and protein, all of which can influence the metabolic response in an EMS horse. For example, an alfalfa forage is likely going to be higher in protein content compared to an all-timothy forage. Currently it remains unknown what nutrient content of non-structural carbohydrates (NSC) or crude protein (CP), and nutrient content levels drive exaggerated insulin response in EMS-ID. One study found that forage (hay) less than <12% NSC would lower insulinemic and glycemic responses in polysaccharide storage myopathy (PSSM) horses. Although this study was conducted in a group of PSSM horses (n=7), this dietary recommendation has been spread across literature, including recent journal articles and a popular, well referenced book, *Equine Applied and Clinical Nutrition: Health, Welfare and Performance*, as guidelines to feeding EMS-ID horses.

Even the American College of Veterinary Internal Medicine recommends that EMS-ID horses should be fed <12% NSC hay content. The most recent consensus statement to be released by the European College of Equine Internal Medicine stated that horses should be fed <10% NSC,

which came from a paper that was not conducted in EMS-ID horses.

There have been a few studies to try and understand the effects of NSC on insulin responses, but no work has provided a complete understanding of what levels of CP or NSC that affects insulin response in EMS-ID horses.

One group of researchers performed a study in ID and healthy ponies that compared the insulin response to three types of hays varying in NSC content. When soaked hay (10.9 + 2.5 % NSC), dry hay (16 + 2.6 % NSC), and haylage (18.5 + 4.1% NSC) were compared, ID ponies' insulin response remained statistically higher than that of healthy ponies, even with the soaked hay that had 10.9% NSC. The soaked hay, however, did significantly decrease the insulinemic response in ID ponies compared to haylage. This work was conducted in ID ponies; therefore, it is still yet to be determined whether EMS-ID horses respond the same as ponies. Another recent study found that a high-protein meal given to EMS-ID horses produces a nine-fold greater response in insulin secretion compared to that of healthy horses.

In summary, the current recommendations by many groups of feeding <12% NSC in forages is best for EMS-ID horses. If low NSC forage is not available, then soak the hay in water for at least 30 minutes to achieve lower NSC. Moreover, based on the EEG recommendations, to induce weight loss in EMS horses feed 1.5% of body weight in forage for 30 days

then weigh the horse. If weight loss has been achieved, then feed at that current rate; if not, then feed at 1.2% body weight in forage but no lower. It is important to reassess body weight in the EMS horse undergoing weight loss. Since the EMS horse should be maintained on an all-forage diet, it is also important to provide

a vitamin/mineral/ration balancer that is safe for the EMS horse and does not induce an insulin response. [BH](#)

---

*Dr. Amanda Adams is an associate professor at the University of Kentucky Gluck Equine Research Center.*