



NUTRITION NOTES

Innovation + Research from Kent Nutrition Group

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SOYBEAN MEAL AND PROTEIN IN THE HORSE DIET

Protein is a primary component of every tissue and organ in the animal body. It is found in muscle tissue, bones, cartilage, blood, hair, and hooves. Protein is also a component of hormones and enzymes as well as immunoglobulins or antibodies as part of the immune system. Protein is involved in nutrient transport and regulating many body systems and functions. Many of these proteins, however, are constantly being broken down and then re-synthesized. Thus a continuous supply of protein is needed in the diet throughout life for growth and repair of body tissues.

Supplying protein in the diet means supplying amino acids, the building blocks of protein. Supplying **quality** protein in the diet means supplying the correct amount and ratios of **essential amino acids** – those amino acids that are required in the diet because the body cannot synthesize them. The amino acid Lysine (followed by Threonine and Methionine) is considered the first-limiting amino acid because if it is lacking in the equine diet it restricts protein synthesis, particularly in growing foals and lactating mares. Thus, protein sources with higher levels of lysine and other essential amino acids are considered higher quality.

The lysine, methionine, and threonine amino acid content of the most common protein sources used in equine diets is shown in Table 1. Due to its high lysine and other essential amino acid content, Soybean Meal is considered a high-quality protein source.

Table 1: Amino Acid Content of Common Protein Sources¹

Protein Source	Lysine, %	Threonine, %	Methionine, %
Soybean Meal	2.96	1.86	0.66
Canola Meal	2.07	1.55	0.71
Cottonseed Meal	1.50	1.36	0.51
Linseed Meal	1.19	1.13	0.77
Corn Distillers Grain	0.90	0.99	0.57
Alfalfa Meal	0.74	0.70	0.25

Protein **quality** is also determined by its **digestibility**, specifically in the small intestine (prececal) of the horse where intact amino acids can be readily absorbed. The prececal digestibility of protein varies with protein source and protein concentration in the diet. In addition, numerous factors including other ingredients in the diet, protein amount consumed in a single meal and transit time through the tract will affect the prececal digestibility of amino acids in the equine digestive tract.

In a study conducted at Texas A&M University on soybean meal digestibility, true total tract digestion of soybean meal protein was found to be 95.3%.² More importantly, approximately 72% of the protein was digested in the small intestine when consumed at average nitrogen intakes below 125 mg/kg body weight/feeding.² From previous studies, this is almost twice the true prececal digestibility of forage proteins.² This indicates that the essential amino acids found in soybean meal were available for absorption and utilization in the small intestine of the horse. An additional finding from this study was the importance of not overwhelming the equine foregut by feeding excessive levels of nutrients in a single meal as evidenced by a reduced prececal digestibility at higher nitrogen intakes.



NUTRITION NOTES (continued)

Protein **quality** of a given feed source can also be affected by **processing**. Soybean meal is generally available in two forms – 44% protein meal and 48% protein dehulled meal. Dehulled soybean meal is produced by removing the hulls and extracting the oil from soybeans and then the leftover meal is cooked at specific temperatures for a specific amount of time to provide optimal nutritional value. Hulls can be added back to produce the 44% protein meal. The higher protein dehulled soybean meal is lower in fiber and better utilized by younger horses. Under-cooking and overcooking of soybean meal can affect nutrient quality and should be monitored. Raw soybeans should not be fed to horses as they contain a compound that will interfere with protein digestion.

At Kent Nutrition Group, all equine products are formulated using quality proven ingredients that are balanced to provide the best nutrition. A combination of protein sources including only dehulled soybean meal and the individual amino acids lysine, methionine, and threonine are used to meet essential amino acid requirements of all horse classes. Routine assays are performed on both ingredients and finished feeds to ensure high nutrient quality.

References

¹ NRC, 2012. *Nutrient Requirements of Swine, 11th rev. ed.* Washington, DC: National Academy Press.

² Farley EB, Potter GD, Gibbs PG, Schumacher J, Murray-Gerzik M: *Digestion of Soybean Meal Protein in the Equine Small and Large Intestine at Various Levels of Intake.* *J. Equine Vet Sci.* 1995; 15:391-397.