



Feeding Fats and Oils to Working Horses

Fats and oils are important components of ADM's Forage First® rations. They are added to horse rations to decrease dust, lubricate mixing equipment, serve as binders for pelleting, prevent sifting of ingredients in the mix, carry fat-soluble vitamins, and contribute to hair coat shine. However, the most important function of fat in a horse's diet is to increase energy density of the ration which help lessen the risks of colic, founder, gastric ulcers, and exertional myopathies (tying-up) induced by high-starch rations.

Why Increase the Energy Density of the Ration?

The purposes of increasing the energy density of the ration are to supply energy to support athletic performance potential, milk production, reproductive efficiency, growth rate, and/or to help maintain or increase body weight during hot, humid weather or extreme activity.

Increased digestible energy (DE) of the concentrate enables forage intake to increase which allows for increased water, electrolytes, and energy-producing nutrients to be present in the gastrointestinal tract. These are beneficial for long-term physical performance. High-forage diets also decrease the risk of boredom and stable vices.

How Much Fat Can Horses Utilize?

Horses can utilize up to 20% added fat in the total ration without adverse effects.^{1,2} In a number of studies, fat digestibility has run between 76% to 94% with up to 20% added fat in the ration. However, fat digestibility was less from animal than vegetable sources.³ Fat sources differ primarily in degree of saturation (number of double bonds between the carbon atoms). Animal fats tend to be less pure and may not be as palatable. Corn and soybean oil were the most palatable oils for horses in several studies.^{4,5}

Fats should contain less than 1.5% moisture, less than 0.5% insoluble impurities, and less than 0.1% unsaponifiables for animal fats and less than 2% for hydrolyzed fats. Most importantly, fats should be free of oxidative rancidity as indicated by a peroxide value of less than 20 mEq/kg.⁶ Fats and oils generally cost two to five times more per unit of weight compared to cereal grains, but provide about three times more available energy. Therefore, on a DE basis, they are usually comparable in cost.

Is Adding Fat to Horse Rations Beneficial?

General results of studies on the effects of added fat on



Mike Florida – Two-time NRHA Futurity winner, USET Gold Medalist, and NRHA Hall of Fame member.

the utilization of other nutrients include:³

- Increased total energy digestibility of the diet
- Increased (or had little effect on) digestibility of dry matter, crude protein, and acid or neutral detergent fiber
- Had no effect on calcium or phosphorus absorption
- Had no effect on numerous blood parameters including hematocrit, hemoglobin, total protein, calcium, phosphorus, magnesium, sodium, and lactate concentrations, pH, pCO₂, enzyme activities, triglyceride, or total fatty acids

Results of specific studies reporting the beneficial effects of added fat include:

- Increased the horse's plasma cholesterol concentration, particularly HDL, the high-density lipoprotein fraction^{3,7}
- Increased VLDL triglyceride fraction from three to seven hours after feeding⁸
- Increased the amount of energy available for growth, lactation, and physical activity even without an increase in dietary energy intake^{9,10,11}
- Decreased total body heat production by 14% and increased net energy available for production from 16% to 36% of DE intake.¹¹ This resulted in a 60% increase in net energy for production, when DE intake was unchanged.
- Decreased DE requirements for the same amount of activity^{12,13}
- Muscle glycogen increased with the use of up to 10-12% added fat, but began to decrease with 15-20% added fat in the total diet^{1,13,14,15}



What is the Preferred Fat Source?

Stabilized rice bran is stabilized with an extrusion process using heat. The bran, which is the outside coating, is milled off of white rice used for human consumption. It contains essential amino acids, fatty acids, vitamins, and minerals. Since raw rice bran is 20% fat, it becomes rancid very easily and quickly. And so, for years, much of it was thrown away as waste product. Occasionally, some of the fat would be taken out of the bran or chemical preservatives would be added to improve its shelf-life. When either of these things are done, the vitamins, including the high natural-source vitamin E content, most of the B vitamins, and most of the fat are lost. With the development of an extrusion-stabilization process, a considerable supply of valuable nutrients is now available for horses. HEALTHY GLO® is a stabilized rice bran and flaxseed product that does not contain additives or preservatives.

In studies with exercising horses, stabilized rice bran resulted in increased apparent digestibility of dry matter, crude protein, gross energy, neutral detergent fiber, acid detergent fiber, and ether extract,¹⁶ and lower plasma lactate accumulation and heart rates during exercise.¹⁷ Normal horses and horses with polysaccharide storage myopathy have had reduced episodes of recurrent exertional rhabdomyolysis (tying-up) and exhibited increased exercise tolerance when fed stabilized rice bran.^{18, 19}

Choosing a fat source for horses involves knowledge of the available products, a comparison of attributes, benefits, shelf-life, cost, and a personal decision. With the addition of HEALTHY GLO to the list of available fat sources, it is now possible to feed a product with a one year shelf-life that provides fat along with high concentrations of antioxidants, gamma oryzanol, vitamins, minerals, and balanced amino acids.

HEALTHY GLO Nuggets, HEALTHY GLO Meal, and MOORGLO® are Premium Hi-Fat Supplements, which are part of Forage First feeding programs. MOORGLO is a highly palatable, pelleted, Limited Starch Supplement containing stabilized rice bran, vegetable oil, Omega Flax™, CitriStim®, Prospan® yeast, and additional natural-source vitamin E. Omega Flax is an excellent source of essential Omega 3 fatty acids. HEALTHY GLO products also provide stabilized rice bran, Omega Flax, CitriStim, and added natural-source vitamin E. GROSTRONG® Minerals for Horses containing 28 vitamins, minerals (includes salt), and electrolytes should be fed along with these Premium Hi-Fat Supplements.

Premium Blends are also a part of Forage First feeding programs. Premium Blends are a unique group of equine feeds and supplements that are formulated using HEALTHY GLO and other premium ingredients for specific groups of horses, such as SENIORGLO® for adult horses, broodmares, and senior horses; POWERGLO® for barrel, race, and elite performance horses; JUNIORGLO® for foals, growing horses, and broodmares; and PRIMEGLO® for trail and light performance horses.

Guarantee and Ration Analysis

Premium Hi-Fat Supplements are ideal products to boost the energy provided to working horses or any horse in need of additional calories, such as horses that need to add body condition. Call ADM Animal Nutrition's Equine HELPLINE at 1-800-680-8254 for custom feeding recommendations for working horses.

Literature Cited

- ¹Hambleton PL, Slade LM, Hamar DW, et al: Dietary fat and exercise conditioning effect on metabolic parameters in the horse. *J Anim Sci* 52:1330 (1990).
- ²National Research Council: *Nutrient Requirements of Horses*, 5th ed. National Academy Press, Washington, DC (1989).
- ³Potter GD, Hughes SL, Julen TR, et al: A review of research on digestion and utilization of fat by the equine. *Proc European Conf on Nutr for the Horse*, pp 119-123 (1992).
- ⁴Bowman VA, Fontenot JP, Meacham TN, et al: Acceptability and digestibility of animal, vegetable and blended fats for equines. *Proc Equine Nutr & Physiol Soc Symp*, 74 (1979).
- ⁵Holland JL, Meacham TN, Kronfeld DS, et al: Acceptance of lecithin containing diets by horses. *Proc Equine Nutr & Physiol Soc Symp*, pp 64-65 (1993).
- ⁶Cuaron JA: Ingredients for liquid feeds: Molasses for pigs. As reported by K DeHaan. *Feed Mgt* 43(8): 10 (1992).
- ⁷Kurcz EV, Schurg WA, Marchello JA, et al: Dietary fat supplementation changes in lipoprotein composition in horses. *Proc Equine Nutr & Physiol Soc Symp*, pp 253-256 (1991).
- ⁸Kurcz EV, Schurg WA, Marchello JA, et al: Post-prandial changes in plasma lipoprotein components in horses fed either a control or fat added diet. *Proc Equine Nutr & Physiol Soc Symp*, pp 37-38 (1993).
- ⁹Kane E, Baker JP, Bull LS: Utilization of corn oil-supplemented diet by the pony. *J Anim Sci* 48:1379 (1979).
- ¹⁰McCann JS, Meacham TN, Fontenot JP: Energy utilization and blood traits of ponies fed fat supplemented diets. *J Anim Sci* 65:109 (1987).
- ¹¹Scott BD, Potter GD, Greene, LW, et al: Efficacy of a fat supplemented diet to reduce thermal stress in exercising Thoroughbred horses. *Proc Equine Nutr & Physiol Soc Symp*, pp 66-71 (1993).
- ¹²Potter GD, Webb SP, Evans JW, et al: Digestible energy requirements for work and maintenance of horses fed conventional and fat-supplemented diets. *J Eq Vet Sci* 10(3):214 (1990).
- ¹³Meyers MC, Potter GD, Evans JW, et al: Physiological and metabolic response of exercising horses to added dietary fat. *J Eq Vet Sci* 9(4):218-223 (1989).
- ¹⁴Oldham SL, Potter GD, Evans JW, et al: Storage and mobilization of muscle glycogen in exercising horses fed a fat-supplemented diet. *J Eq Vet Sci* 10(5):1 (1990).
- ¹⁵Pagan JD, Essen-Gaistavsson B, Lindholm A, et al: The effect of dietary energy source on blood metabolites in Standardbred horses during exercise. *Proc Equine Nutr & Physiol Soc Symp*, pp 425-430 (1987).
- ¹⁶Miller, PA and J Thompson: The effect of heat stabilized satin finish rice bran on nutrient digestibility and the physiological response to exercise in horses. *J Anim Sci* 74, Suppl 1 p 177 (1996).
- ¹⁷Kennedy MAP, JD Pagan, KE Hoekstra, E Langfoss, K Heiderscheidt: An evaluation of corn oil, rice bran, and refined dry fat as energy sources for exercised Thoroughbreds. *Proc E N P S*, Raleigh, NC, p 130, (1999).
- ¹⁸Valberg SJ, GH Cardinet III, GP Carlson, S DiMauro: Polysaccharide storage myopathy associated with exertional rhabdomyolysis in the horse. *Neuromusc Disord* 2:351 (1992).
- ¹⁹Valberg SJ: Exertional rhabdomyolysis and polysaccharide storage myopathy in Quarter Horses. *Proc Am Assoc Eq Pract*, p 228 (1995).

D1134B-0118