# The Skinny on Feeding Fat to Horses

*Lori K. Warren, PhD, PAS*
*Department of Animal Sciences,*
*Institute of Food and Agricultural Sciences,*
*University of Florida*

If you've visited a feed store lately or skimmed the advertisements in any horse-related publication, you've undoubtedly seen a great deal of promotion for "fat-added" and "high-fat" horse feeds. Marketing claims extolling the virtues of added dietary fat include "safer energy," "improved performance," "calm energy," and "improved coat and hoof condition."

Adding fat to the diet of horses is not a new practice. For a hundred years or more, horsemen have added a jigger of corn oil or a cup of boiled linseed to the grain ration to bring out the luster in the hair coat. So, why the current popularity in feeding fat? Research has demonstrated that fat can serve as a valuable feed source, particularly as an alternative to high grain diets or when additional calories are needed. Some types of fat may also have additional health benefits.

This article will discuss the benefits of adding fat to the diet, sources of fat for horses, and practical fat-feeding guidelines that can be used if you decide fat supplementation is right for your horse.

**The Benefits of Going "High" Fat**

Fat is a potent source of calories and is easily digested by the horse making it extremely useful in the diets of horses with high energy demands. Where we once relied solely on oats and corn to provide additional energy, we can now replace a portion of that grain with fat. In doing so, we may reduce the risk of digestive disorders associated with feeding large amounts of starch-rich grains. As a result, fat-added diets allow us a safer alternative to traditional grain mixes for putting weight on a thin horse or meeting the higher caloric needs of a high level performance horse or heavy milking broodmare. Furthermore, in situations where grain feeding is contraindicated, such as horses that have some forms of tying up or a past history of laminitis, fat can be used to help meet the caloric requirements when forage alone cannot do the job.

In addition to its use as an energy source, research has shown that fat-added diets may offer other benefits. Feeding a high fat diet to a performance horse may confer metabolic advantages that could improve stamina and prevent them from overheating while working in the hotter summer months. Research, supported by numerous anecdotal claims from horse owners, has also reported that high fat diets make horses calmer and more level-headed compared to traditional grain mixes that have no fat added. Fat also provides the horse with a source of essential fatty acids and aids in the absorption of the fat-soluble vitamins A, D, and E.

**Sources of Dietary Fat for Horses**

Although small amounts of fat naturally occur in the hay, pasture and grain a horse consumes, these traditional feed sources contain only 2-5% fat. Studies have shown that horses are able to digest and utilize up to 20% of the diet (by weight) as oil. However, most "high-fat" diets for horses are typically lower than 10% fat – compare this to the average human who struggles to keep the fat content below 30%! Supplemental fats are also well utilized by the horse, with virtually 100% of fatty acids from oils and other high-fat feed ingredients being absorbed in the small intestine.

There are three options for adding fat to your horse's diet:

**1) Top-dressing vegetable oil on the existing diet**
Horses willingly consume both vegetable oils and animal fats; however, research has shown that horses prefer vegetable oils. Acceptable vegetable oils include those commonly used for household cooking, such as corn oil, canola oil, sunflower oil and soy oil.

Top-dressing vegetable oil on your horse's current ration is the simplest approach and is reasonable when adding small quantities to the diet (ie, 1 cup or less for an average 1100-Lb horse). However, nutritional imbalances can occur when grain mixes are substituted by larger amounts of vegetable oil. Adding fat can reduce the amount of grain needed in the diet, but because pure vegetable oils contain no protein, minerals or vitamins, intake of these nutrients will be reduced as well. This can be of particular concern in young growing horses and pregnant and lactating mares due to their higher nutrient requirements. If you choose to top-dress vegetable oil at higher levels (greater than 1 cup per day), you need to ensure the diet still meets the protein, vitamin and mineral needs of the animal.

**2) Adding a fat-rich ingredient to the existing diet**
Some feed ingredients, such as rice bran, flaxseed, and heat-treated whole soybeans contain 20-40% fat. While this level of fat is much higher than that found in traditional feeds such as oats, corn and hay (2-5% fat), it is still less than that found in vegetable oils (100% fat). As a result, if you choose to add one of these fat-rich ingredients to your horse's diet, you will have to feed a greater quantity to get the same benefits as you would from vegetable oil. Refer to Table 1 (on page 21) for caloric exchange rates between oil and other feeds.

Another concern with rice bran is its inherently high phosphorus content, which is inverted in proportion to the calcium content. If a significant amount of rice bran (2 or more pounds) is added to the horse's ration, the diet will have to be balanced with supplemental calcium to avoid metabolic bone disorders. Some companies have corrected for this imbalance by adding calcium to their rice bran supplements (be sure to read the label).

**3) Feeding a commercial fat-added grain mix or fortified fat supplement**
Most feed companies have developed a line of fat-added grain mixes, typically containing 6-12% crude

fat. The fat content of these feeds has been amplified by the addition of oil (usually soy or corn oils), rice bran, flaxseed, and/or heat-treated whole soybeans. The advantage of a fat-added grain mix over top-dressing oil is that the commercial product is fortified with protein, minerals and vitamins, thus ensuring that the requirements for other essential nutrients are met (ie, all nutrients are in proportion to the extra calories provided by the fat added to the mix).

**TABLE 1:** Caloric exchange rates between vegetable oil and other feeds

| Feed | Total fat content | Calories per pound | Caloric equivalent to 1 cup of oil |
|---|---|---|---|
| Oil | 100 % | 4000 | 0.5Lbs |
| Rice bran | 22 % | 1750 | 1.0Lbs |
| Whole flaxseed | 40 % | 1540 | 1.3Lbs |
| Oats | 5 % | 1350 | 1.5Lbs |
| Commercial feed with no added fat | 4 % | 1450 | 1.4Lbs |

Several feed companies have also created fat supplements by blending ingredients that are naturally high in fat (ie, vegetable oils, flax, rice bran, extruded soybeans). These fat supplements are typically 25 to 40% fat and are designed to be added to the existing ration. Similar to a fat-added feed, fat supplements that have been fortified with protein, vitamins and minerals offer an advantage over top-dressing oil when larger quantities of dietary fat are desired. If the fat supplement has not been fortified, using it would be similar to top-dressing oil.

**Omega-3 and Omega-6 Fatty Acids**

More recent research, including several studies conducted at the University of Florida, has explored whether the type of fat added to the diet can provide any additional health benefits. Specifically, there is interest in the effects of omega-3 and omega-6 fatty acids on inflammation and the immune system.

Omega-3 and omega-6 represent two different families of fatty acids. Linoleic acid (LA), belonging to the omega-6 family, and alpha-linolenic acid (ALA), which is the parent of the omega-3 family are both essential fatty acids. The horse does not have the ability to synthesize these fatty acids in the body and, therefore, relies on the diet to provide them.

The total amount of fat, as well as the proportion of omega-3 and omega-6 fatty acids making up the fat in feeds commonly fed to horses is presented in Table 2 (page 22). Although low in total fat content, hay and pasture forage are excellent sources of the omega-3 fatty acid ALA. Cereal grains such as oats or cornare also naturally low in fat, but contain more of the omega-6 fatty acid LA. Vegetable oils and rice bran are high in total fat content with a large percentage of this fat in the form of omega-6 fatty acids.Of all the

**TABLE 2:** Average fatty acid composition of common feeds (omega-6 and omega-3 values presented as a % of total fat)

| Feed | Total Fat | Omega-6 | Omega-3 |
|---|---|---|---|
| Forages | 3 % | 19 % | 45 % |
| Grains | 3 % | 30 % | 3 % |
| Corn oil | 100 % | 57 % | 2 % |
| Soybean oil | 100 % | 54 % | 8 % |
| Canola oil | 100 % | 21 % | 11 % |
| Rice bran | 22 % | 34 % | 2 % |
| Flaxseed | 40 % | 16 % | 57 % |
| Fish oil | 100 % | 4 % | 24 % |

oils routinely used in horse feeds, only canola oil and soy oil have a respectable omega-3 content, though still much lower than the amount of omega-6 provided. Supplemental omega-3 fatty acids are often added to the diet with flaxseed or flaxseed/linseed oil, fish oils (eg, menhaden, cod liver, salmon, krill), and oils from special types of algae. Fish oils and algal oils are unique in that the omega-3 fatty acids they provide are the longer-chain conversion products of ALA, and are thus the fatty acids with the most biological activity. It is worth noting that the total amount of omega-3 supplied by forages often surpasses the amount of omega-3 fatty acids that are provided by the level of flax or fish oil typically supplemented.

Omega-3 and omega-6 fatty acids have somewhat opposing roles. Once in the body, these essential fatty acids are transformed into potent, hormone-likechemicals that regulate many vital body processes, including blood clotting, inflammation and the immune system. In general, omega-6 fatty acids tend to stimulate blood clotting and inflammation, whereas omega-3 fatty acids tend to suppress these responses. However, it is the balance of the fatty acids present that will dictate the overall response.

Blood clotting, inflammation and immune system responses are essential processes needed to fix damaged tissue and fight illness and infection. However, if these processes get carried away, they actually become harmful. Therefore, while omega-6 fatty acids, which promote these responses, need to be included in the diet, the ration must also contain enough omega-3 fatty acids to keep these processes in check.

The researchlooking at omega-3 supplementation in horses is limited compared to the work done in other species. A small number of studies have shown positive results, whereas most studies have found no effects at all. Despite the evidence that omega-3 fatty acid supplementation can alter some markers of inflammation and immune function in horses, there is still no evidence that omega-3 fatty acids can reverse inflammatory conditions such as osteoarthritis or prevent infections from pathogens encountered in the horse's environment. As a result, more research is needed to make appropriate recommendations on omega-3 supplementation in the horse.

**Fat-feeding Guidelines**

**How much fat should you add to your horse's diet?**

Before deciding how much fat to add to your horse's diet, you should first ask yourself, "does my horse need fat?" If your horse is in poor body condition and needs to gain weight, or if your horse requires large amounts of grain (0.5% of body weight or more) to maintain body condition, your horse may be an excellent candidate for fat supplementation. If, however, your horse is already in good condition and doesn't require much grain, the addition of fat to the diet may predispose them to obesity. Fat packs the most calories per pound (see Table 1) compared to any other feed. Therefore, fat is best used to provide calories, when needed, either as an addition to an existing diet, or as a replacement for some of the grain in an otherwise high-grain diet. If you choose to supplement fat for benefits other than calories, realize that you may have to make other adjustments to the diet (ie, reductions in grain and hay) to accommodate the extra calories and prevent obesity. Refer to Table 1 for the caloric equivalents between oil and other feedstuffs.

Ultimately, the amount of fat you choose to add to your horse's diet will depend on your fat-feeding goals. If your objective is to add a bit of sheen to your horse's coat, approximately 0.5 cup of oil per day may do the job. Similar amounts of fat may also make up the difference in minor essential fatty acid and fat-soluble vitamin deficiencies. Although this small amount of fat provides a relatively small number of calories, monitor your horse's body condition and make adjustments in the diet to avoid unnecessary weight gain.

If you are attempting to add calories to the diet, a minimum of 2 cups of oil or the use of a fortified fat-added feed or supplement may be necessary to make a significant contribution. As stated above, horses can tolerate up to 20% of the diet (by weight) as fat. Nonetheless, it is recommended to limit the total fat intake to 10% of the total diet or less.

To determine if the total fat content of your horse's diet does not exceed the recommended limit, you must account for the fat provided by all ingredients in the ration. Fat-added grain mixes, fat supplements, and oils may contain a significant amount of fat, but the forage component of your horse's diet only contains ~3% fat. Therefore, the lower fat content of the hay will dilute the higher fat content of the fat-added feeds. For example, say you were feeding an 1100-Lb horse 24Lbs of feed per day. If 25% of the ration (6Lbs) was a fat-added feed containing 10% crude fat and the other 75% of the diet (18Lbs) was made up of Coastal bermudagrasshay containing 3% fat, the total fat content of the diet would be 4.75% (25 x .10 + 75 x .03 = 4.75).In this example, the diet is well below the limit of 10% fat in the total diet, even with the use of a relatively high fat feed.

If your method of fat supplementation is top-dressing vegetable oil, a practical guideline is to feed no more than 3.5 ounces of oil per 220 pounds of body weight per day (or 100 milliliters of oil per 100 kg body weight per day). For the average 1100-Lb horse, this would be about 2 cups. (Note that one standard measuring cup holds about 8 fluid ounces = 220 mL = 0.5 Lbs oil).

**Allow gradual adaptation to fat in the diet**

To avoid digestive upset, fat (regardless of source) should be gradually introduced in the diet over a 2 to 3 week period. In addition, the daily amount is best divided into 2 or 3 feedings. If you are top-dressing vegetable oil, start with _ cup and increase _ cup every 5 days until the desired level is achieved. If you are switching to a high-fat commercial feed product, you should start by replacing 25% of the old feed with the new fat-added feed and gradually increase in the amount of the new feed while decreasing the old over a 2 to 3 week period.

Finicky eaters might be a little slow to adapt to feeding fat, but by-and-large most horses readily accept fat in their diets. Some horses might have softer manure during the early phases of oil feeding, but this problem is usually self-limiting. If this problem persists, back down on the amount of oil or high-fat feed until manure returns to normal, then reintroduce larger amounts of the fat source at a slower rate.

**Store your oils and feeds in a cool, dry area**

Oils and high-fat feeds and supplements can become rancid during storage. Conditions that promote the development of rancidity include high temperature and humidity and prolonged storage. Rancid fats are less palatable (so the horse may refuse to eat it) and may interfere with absorption of some vitamins, as well as destroy essential fatty acids. Therefore, it is important to store oils and high-fat feeds in a cool, dry area. You must also use your fat source within a reasonable amount of time (within 2 weeks for proper storage of high-fat feeds and within 2 months of properly stored vegetable oil). Buying in bulk may confer an economic advantage, but if the feed or oil goes bad before you can feed it, you are not saving any money.

**Fat supplementation and the older horse**

The addition of oil or a high-fat feed can work wonders for the older horse that is having trouble maintaining body condition. However, oil and fat-added feeds should not be fed to horses with liver dysfunction.

**Conclusion**

Because fat is something most Americans are trying to cut out of their own diet, it may seem surprising that it has become a useful feed for horses. But research has confirmed that adding fat to the equine diet has more benefits and uses than simply adding shine to the haircoat. The high calorie content makes fat particularly helpful for putting weight on horses in poor body condition. In addition, fat can be used to replace a portion of the calories normally provided by high-grain diets, thereby reducing the horse's risk for digestive disturbances. While not all horses need extra fat in their diets, the increasing availability of commercial fat-added products, as well as the old standby, vegetable oil, makes the addition of fat more convenient and viable for horses that do stand to benefit from supplementation. ■