

A Closer Look at Fats: Omega-3 and Omega-6 Fatty Acids

For years, horsemen have generously heaped fat into the feed bins of horses. **Corn oil, rice bran, and flaxseed are common fat supplements.** Unlike its consumption among humans, fat is beneficial to certain horses: it cuts down the size of grain meals for horses that require high-energy diets; it shines the coats of sales horses and show ring mounts; and it soothes the minds of excitable horses while delivering necessary calories. Aside from obesity, long-term consumption of fat in horses has resulted in **no ill effects.**

Equine nutritionists are now researching which fats are most advantageous for horses. To do that, nutritionists are taking a closer look at individual fatty acids.

An Introduction to Omega-3 and Omega-6 Fatty Acids

All fats are comprised of fatty acids that are linked together in long chains by chemical bonds. The number of bonds that join fatty acids to one another determines if a fat is saturated or unsaturated. **Saturated fats** are solid at room temperature and are derived from animal tissues or dairy products. Two examples of saturated fats are lard and butter. In contrast, unsaturated fats are liquid at room temperature. Common **unsaturated fats** include vegetable oils. Unsaturated fats can be further separated into monounsaturated and polyunsaturated fats, which are obtained from fatty fish and plants.

Polyunsaturated fats are rich in two distinct families of fatty acids: **the omega-3 family and the omega-6 family.** The omega-3 family stems from alpha-linolenic acid (ALA), and the omega-6 family originates from linoleic acid (LA). ALA and LA are considered “essential fatty acids” because they cannot be manufactured in the body and must be obtained from dietary sources.

Significant members of the **omega-3 family are eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA).** Interestingly, the horse’s body can convert ALA to EPA and DHA when insufficient quantities of ALA are consumed. The lack of EPA and DHA in equine diets is understandable, as these two fatty acids are found almost exclusively in fish. The fish, namely cold-water species, are at the top of a food chain based largely on algae that manufacture EPA and DHA. ALA, on the other hand, is found predominantly in leafy plants, more traditional components of equine diets than fish by-products (fishmeal or fish oil). Linseed oil is also a rich source of omega-3 fatty acids.

The primary source of **omega-6 fatty acids in the diet is LA derived from the oils of seeds and grains.** Corn, sunflower, and safflower oil contain abundant quantities of LA.

The Omega-3 to Omega-6 Ratio: A Balancing Act

Omega-3 and omega-6 fatty acids must be balanced within the body in order for both to be effective. **Each fatty acid is necessary** for the production and distribution of hormone-like substances

called prostaglandins. The prostaglandins that evolve from consumption of omega-3 and omega-6 fatty acids have different effects on inflammation processes in the body.

Scientists have not pinpointed the optimal ratio of omega-3 fatty acids to omega-6 fatty acids for horses of various ages and uses, though they believe a **ratio of 2 to 4:1 may be optimal**. Even without an exact ratio, general knowledge of omega-3 and omega-6 fatty acids and typical equine management practices uncover some potentially undesirable trends.

The natural diet of horses—primarily fresh and dried forages—contains more omega-3 fatty acids than diets consisting of a mixture of forage and cereal grains. Domesticated horses are often fed concentrated sources of energy in the form of grain meals. Grains possess more omega-6 fatty acids than forage, creating a balance of omega-3 to omega-6 fatty acids that may be inappropriate, especially when diets are high in grain. Such diets may also not include the myriad benefits of one abundant in omega-3 fatty acids.

The Benefits of Omega-3 Fatty Acids

Supplemental omega-3 fatty acids are thought to help with numerous inflammatory conditions specific to horses including laminitis and skin sensitivity to insects such as *Culicoides* (also known as pruritis).

Omega-3 fatty acids have proven beneficial to several body systems in humans and other mammals. **Reproductive advantages** of omega-3 fatty acids are abundant. Several studies in dairy cows demonstrated improved conception rates when fishmeal was included in the diet. Researchers felt EPA and DHA may have been responsible for the boost in fertility.

When omega-3 fatty acids were given to pregnant women, they were more likely to carry their babies to term, and the babies had higher birth weights. These findings suggest that mares with a history of abortion may benefit from nutritional support with omega-3 fatty acids.

Supplementation of pregnant mares with DHA and EPA confers **benefits to the developing fetus**. More than a decade ago researchers discovered that the placenta may be responsible for providing DHA and EPA to the **fetal nervous system**. These fatty acids can be passed from the dam to the foal through milk, so supplementation of the mare can provide for the foal as well.

Broodmares on diets high in omega-3 and omega-6 fatty acids may produce **richer colostrum**, which could jumpstart the health of their foals. These foals may be less likely to develop **gastric ulcers** as omega-3 supplementation has helped alleviate ulcers in other species.

Male reproduction has been enhanced with omega-3 rich additives. When fed to boars, tuna oil, a polyunsaturated fat high in both EPA and DHA, had positive effects on **sperm viability and motility**.

Of particular interest to horsemen may be the joint and inflammatory benefits linked to omega-3 fatty acids. Though **joint inflammation reactivity to omega-3 fatty acids has yet to be studied specifically in horses**, a beneficial effect is likely based on studies in humans and other animals.

The addition of omega-3 and omega-6 fatty acids to the diet of horses may have several advantages. As researchers continue to home in on the benefits of these fatty acids, feed companies will begin to incorporate them into formulas and the health and well-being of horses will only improve.