Omega-3 Fatty Acid Supplementation
Find out what’s special about omega-3 fatty acids

Nutritional supplements and “functional foods” are popular in both human and veterinary medicine. Equine nutritional supplement sales continue to climb, with an estimated $650 million spent each year on products such as joint and hoof supplements, multivitamins, and products containing omega-3 fatty acids.

This continued popularity of nutritional supplements is attributable, at least in part, to the growing body of evidence supporting the beneficial health effects of a variety of supplements, including omega-3 fatty acids.

WHAT ARE FATTY ACIDS?
Fatty acids are long chains of carbon and hydrogen linked together by chemical bonds that resemble the tail of a flying kite. The number of carbon and hydrogen atoms and the number and arrangement of bonds between adjacent carbon atoms help distinguish one type of fatty acid from another.

Saturated fats, such as those found in animal fats (e.g., beef, lard, butter, cream, cheese), have no double bonds between the carbon atoms. Unsaturated fats, such as those found in seeds, nuts, grains, and vegetables, have at least one double bond. Polyunsaturated fatty acids have more than one double bond between carbon atoms.

WHAT ARE OMEGA FATTY ACIDS?
Omega fatty acids are a special type of polyunsaturated fatty acid. Omega fatty acids are not produced by the body and therefore must be obtained through the diet.

There are two main forms of omega fatty acids: omega-3 and omega-6. Omega-3 fatty acids have the first double bond at the third carbon atom, whereas omega-6 fatty acids have the first bond at the sixth carbon atom. Although this detail seems relatively small, it makes a big difference in how these two omegas are metabolized.

Fatty acids are metabolized to produce inflammatory mediators called prostaglandins. The prostaglandins produced during omega-6 fatty acid metabolism are proinflammatory, which can be detrimental to health. In contrast, the omega-3 fatty acids are metabolized to mediators that inhibit the production of proinflammatory mediators and modulate the “inflammatory cascade.”

The most important omega-3 fatty acids are alpha-linolenic acid, eicosapentaenoic acid (EPA), and docosahexaenoic acid (DHA). EPA and DHA are obtained primarily from cold water fish (e.g., salmon, herring, mackerel) and fish-oil supplements, and alpha-linolenic acid is found in high quantities in flaxseed. Linoleic acid and arachidonic acid are classic examples of omega-6 fatty acids.

Researchers believe diets high in omega-6 fatty acids might contribute to many health issues.

Altering a diet’s ratio of omega-3 and omega-6 fatty acids by increasing the amount of omega-3 through supplementation can change the type of inflammatory mediators produced and potentially confer beneficial health effects to the horse.

THE SCIENCE BEHIND OMEGA-3 FATTY ACIDS
Equine nutrition has not yet reached the level of mass supplementation currently seen in human products (i.e., omega fatty acids added to create “functional foods,” such as breads, cereals, eggs, etc.). However, fatty-acid supplements for horses are available, widely used, and popular for:

- Coat and skin health;
- Hoof quality;
- Immune system support; and
- Weight gain in unthrifty horses.

In addition to those “general benefits,” evidence now exists supporting the benefits of omega-3 fatty acid supplementation for a variety of inflammatory conditions, such as osteoarthritis and recurrent airway obstruction (RAO, heaves). In fact, a recently published review article found that omega-3 fatty acid supplementation does appear to have a beneficial impact on animals with osteoarthritis.

OTHER USES FOR OMEGAS

Reproduction: Research results show that omega-3 fatty acids have the potential to improve sperm quality.

Research in broodmares showed they pass fatty acid levels in their milk and plasma reflective of the omega-3 and omega-6 levels they consumed. This caused an earlier inflammatory response in foals, suggesting that omega-3 could confer an early advantage in responding to infection.

Performance: Horses appear to benefit from fatty acid supplementation. Specifically, researchers have assessed omega-3 fatty acid supplementation in terms of its ability to improve exercise-induced hypertension and pulmonary hemorrhage. Preliminary studies have also found that horses supplemented with omega-3 fatty acids have lower heart rates and that fish oil alters exercise metabolism in condi-
tioned horses. Fish oil also appears to make the outer membrane of red blood cells more “fluid,” facilitating oxygen delivery.

Finally, unpublished research from Texas A&M showed that horses supplemented with soy oil versus corn oil experienced a reduced inflammatory response following exercise.

FEEDING OMEGA-3 FATTY ACIDS

Forages, which make up the bulk of a horse’s diet, typically contain only small amounts (2-3%) of crude fat. However, forages naturally have higher amounts of omega-3 fatty acids than do pro-inflammatory omega-6 fatty acids. In contrast, crude fat in cereal grains contains approximately 50% omega-6 fatty acids and only small amounts of omega-3s. Thus, horses supplemented with concentrates are consuming more omega-6 fatty acids that are metabolized to inflammatory mediators. Vegetable oils such as corn, safflower, or sunflower oils are high in omega-6 fatty acids. As mentioned, horses need both types of omega fatty acids, but a diet with a higher omega-3 to omega-6 ratio is more desirable.

The exact levels of omega-3 fatty acids and the ideal ratio of omega-3 to omega-6 in equine diets or supplements remains unknown. We do know, however, that horses absorb fatty acids following supplementation. In one study researchers found that horses fed 40 g/day of EPA and DHA had elevated EPA and DHA levels three days after initiation of supplementation. Those levels remained elevated until 42 days post-supplementation. Another study confirmed that increased omega-3 fatty acid consumption leads to increased levels in blood plasma (the fluid part of blood) as well as red blood cells.

SUPPLEMENT REGULATION

Like any dietary supplement, safety and quality varies from product to product. As recently reported on ConsumerLab.com, problems were identified for >30% of tested omega-3 fatty acid supplements. Visit TheHorse.com for more information on choosing a safe, quality supplement.

Key References

For more frequently asked questions, go to WelactinEquine.com