

# Omega-3 Fatty Acids

*Not all fats or fatty acids are created equal; some are more beneficial than others for horses*

## Overview

Dietary supplementation with fatty acids has become increasingly popular in human and veterinary medicine. Since not all fats (or fatty acids) are created equal—and positive health benefits are not associated with each kind of fat—it is important to understand the differences between saturated and unsaturated fatty acids, the latter of which includes the omega fatty acids.

Fatty acids are long chains of carbon and hydrogen linked together by chemical bonds. The number of carbon and hydrogen atoms and presence and type of double bonds between adjacent carbon atoms distinguishes one fatty acid from another.

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

## What are Omega Fatty Acids?

Omega fatty acids are a special group of polyunsaturated fatty acids, some of which are essential, meaning they must be obtained through the diet and cannot be synthesized by the body.

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

Linoleic acid (LA) and arachidonic acid (AA) are examples of omega-6 fatty acids. The omega-6 fatty acids are different from omega-3 fatty acids based on their chemical structure and how they are metabolized.

Both omega-3 and omega-6 fatty acids



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are metabolized via the “arachidonic acid pathway” to produce inflammatory mediators called prostaglandins. This includes thromboxanes, leukotrienes, and prostacyclins. The prostaglandins produced during omega-6 fatty acid metabolism are pro-inflammatory, while omega-3 fatty acids are metabolized to less inflammatory substances.

By altering the ratio of omega-3 and omega-6 fatty acids in the diet (e.g., by increasing the amount of omega-3 through supplementation), the type of inflammatory mediators produced can be altered and could potentially confer beneficial health effects to the horse.

## Benefits of Omega-3 Fatty Acids

Omega-3 fatty acids are widely added to human food products, including eggs, bread, juice, yogurt, and infant formula. Equine nutrition has not yet reached this level of mass supplementation, but fatty acid supplements are widely available.

Omega-3 fatty acid supplements can be

purchased alone or in combination with a variety of other supplements in powder, liquid, pellet, and treat formulations.

Fat supplements for horses are primarily marketed for the coat, skin, hooves, immune system, and weight-building. Scientific research supporting the administration of omega-3 fatty acids has been increasing in recent years.

Omega-3 fatty acid supplementation is reportedly beneficial for a variety of inflammatory conditions, such as osteoarthritis, in reproductive medicine (e.g., to improve semen quality and output, increase a mare's milk content of omega fatty acids to pass onto foals, and to impact luteal function in mares), and in exercising horses. In the latter case, omega-3 fatty acid supplementation has been assessed in terms of its ability to improve exercise-induced hypertension and pulmonary hemorrhage (EIPH).

Preliminary studies have found that supplemented horses have lower heart rates and that fish oil alters exercise metabolism in conditioned horses.

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### Feeding Omega-3 Fatty Acids

Forages, which make up the bulk of a horse's diet, typically contain only a small amount (2-3%) of crude fat; however, forages are naturally higher in omega-3 fatty acids than pro-inflammatory omega-6 fatty acids.

In contrast, cereal grains contain approximately 50% omega-6 fatty acids and only small amounts of omega-3. Thus, horses that are supplemented with concentrates are consuming more omega-6 fatty acids.

Performance horses or geriatric horses offered a fat substitute are often given vegetable oil (such as corn, safflower, or sunflower) top dressed on their feed. These oils are high in omega-6 rather than omega-3 fatty acids. While the horse needs both types of fats, a diet with a higher omega-3 to omega-6 ratio is more desirable.

Since this area of research is in its infancy, the exact levels of omega-3 fatty acids and the ideal ratio of omega-3 to omega-6 in the diet or supplement remain unknown.

It should also be mentioned that research has been done on the effects of omega-3 fatty acids on reproduction. Research has shown that omega-3 fatty

acids have the potential to affect not only sperm quality, but sperm quantity. Research in broodmares showed that mares passed along 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.

Published studies have demonstrated that horses do absorb fatty acids following supplementation. For example, one study found horses fed 40 g/day of eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA) had elevated EPA and DHA levels by the third day after initiation of supplementation and that levels remained elevated until 42 days post-supplementation. Further, the profile of circulating fatty acids was altered compared to non-supplemented control horses.

Another study confirmed that increased consumption of omega-3 fatty acids led to increased levels in blood plasma and red blood cells.

A Texas A&M study showed that horses supplemented with soy oil versus corn oil

experienced a reduced inflammatory response to a bout of exercise.

### Supplement Regulation

Like any dietary supplement, products containing omega fatty acids are not manufactured and regulated like pharmaceutical drugs.

Work with a quality company so you're assured the product is safe and contains what's stated on the label. ◀

### For More Information

- The Latest on the Omegas, [www.TheHorse.com/7186](http://www.TheHorse.com/7186).
- Study Shows Horses Able to Absorb Fatty Acid Supplements, [www.TheHorse.com/11202](http://www.TheHorse.com/11202).
- Feeding to Lessen Inflammation, [www.TheHorse.com/12996](http://www.TheHorse.com/12996).
- Feeding Omega 3 to Horses for Reproduction, [www.das.psu.edu/research-extension/equine/penn-state-horse-newsletter/articles/hn-201001-04](http://www.das.psu.edu/research-extension/equine/penn-state-horse-newsletter/articles/hn-201001-04).

*Authored by Stacey Oke, DVM, MS; reviewed by Fairfield Bain, DVM, Dipl. ACVIM, ACVP, ACVECC.*

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