Omega-3 Fatty Acid Supplementation Provides Significant Benefits

Horses need to consume both omega-3 and omega-6 fatty acids, but the traditional equine diet tends to provide a skewed ratio of these compounds, minimizing the supply of omega-3s and oversupplying omega-6s. Optimal levels of omega-3 fatty acids have been shown to reduce inflammatory responses, support immune function, and enhance fertility. Continuing research is revealing more information about the benefits of supplementing horses with omega-3 fatty acid to achieve a more nutritionally sound balance.

Effect on body cells. In a study at the University of Florida, horses were fed either flax oil or fish oil, both good sources of omega-3 fatty acid. After 10 weeks, horses in both groups had plasma and red blood cell levels of omega-3 fatty acids that were higher than in an unsupplemented control group of horses. Those receiving fish oil had higher levels than horses in the flax oil group.

Stallions supplemented with marine-source omega-3 fatty acids for 90 days showed a 46% increase in daily spermatozoa output, although sperm motion characteristics such as motility and viability were not different from unsupplemented stallions.

Researchers at the University of Florida designed a study to determine the effect of dietary omega-3 fatty acid supplementation on susceptibility of cell membranes to oxidative damage as well as vitamin E status. Eighteen Quarter Horse yearlings were put into three groups and fed a control diet (grain-based concentrate and Bahia grass pasture) or the same diet supplemented with flax oil or fish oil, both sources of omega-3 fatty acids. Vitamin E content of the diets was similar, and exceeded NRC vitamin E requirements for growing horses. Red blood cell membranes were significantly altered by omega-3 fatty acid supplementation. Analysis of blood samples showed vitamin E status was not different among horses prior to the trial, but after 70 days of supplementation, serum vitamin E concentration was almost twice as high in horses receiving fish oil as in those receiving flax oil or the control diet. Results of the trial also indicated that provision of omega-3 fatty acids at a level sufficient to be detected in cell membrane composition does not increase lipid peroxidation in growing horses when dietary vitamin E requirements are met.

Effect on joint inflammation. Humans supplemented with omega-3 fatty acids have shown a reduction in inflammation from arthritis. Researchers at Michigan State University theorized that, if the same effect was found in supplemented horses, minimized discomfort might manifest as increased stride length among horses suffering from joint stiffness. To test this theory, they measured stride length at the walk and trot for 18 Arabian horses (12 mature animals and 6 two-year-olds). Horses were paired and all horses were fed sweet feed and Timothy hay. One horse in each group was supplemented with fish oil for 75 days while the other was given corn oil to supply an equal number of calories. The horses were exercised five days a week under saddle, on a longe line, or on a free-flow exerciser. At the conclusion of the trial, plasma levels of omega-3 fatty acids were higher in the fish-oil-supplemented horses than in the corn-oil-supplemented horses. There was no change in stride length at the walk, but horses supplemented with fish oil tended to have an increased length of stride at the trot. Omega-3 fatty acids are

known to inhibit production of cyclooxygenase-2 and aggrecanase, substances that cause inflammation and cartilage degradation. The increase in trotting stride length in supplemented horses suggests a decrease in inflammation, stiffness, and joint pain associated with movement.

The beneficial effect of omega-3 fatty acid supplementation for horses with arthritis was confirmed by a study performed at Texas A&M University. The experiment measured the effect of feeding supplemental omega-3 fatty acids on indicators of joint inflammation in plasma and synovial fluid in horses that had been previously diagnosed with osteoarthritis. Sixteen mature horses with arthritic knee, fetlock, hock, or stifle joints were divided into two groups, one of which was a control. In the other group, horses were supplemented with two pelleted omega-3 sources for 90 days. Samples of blood and synovial fluid were collected periodically during the trial period. Supplemented horses showed lower levels of joint inflammation indicators (white blood cells in synovial fluid and fibrinogen and prostaglandin E2 in plasma) than the control group. The researchers said, "The inclusion of omega-3s has the potential to benefit geriatric horses with osteoarthritis, as well as performance horses subjected to high-impact and high-stress training, thus potentially improving quality of life and athletic performance."

Effect on young growing horses. Though research on other mammals showed that elevation of omega-3 fatty acids led to a decrease in inflammatory processes, only minimal research on this subject had involved equines. A study at Texas A&M University looked at the effect of supplementing dietary omega-6 and omega-3 fatty acids from various sources on levels of the inflammatory markers fibrinogen and prostaglandin E2 . Nine Quarter Horse yearlings were assigned to one of three dietary groups. Diets were fed for a 28-day period, and each diet provided the same number of calories to meet NRC requirements for yearlings in periods of rapid growth. The three treatments consisted of a formulated concentrate top-dressed with corn oil, soybean oil, or a mixture of corn oil and fish oil. The diets provided omega-6:omega-3 ratios of 21:1, 14.2:1, and 13.9:1, respectively. The horses were exercised using a protocol designed to cause mild inflammation.

Fasting blood samples were taken at the beginning of the trial as well as periodically throughout the trial period and were analyzed for fibrinogen and prostaglandin E2 . Fibrinogen levels showed the greatest decrease, indicating a drop in inflammation, in horses on the soybean oil diet. Fibrinogen levels showed the least decrease in horses on the diet supplemented with a mixture of corn oil and fish oil.

Prostaglandin E2 concentrations did not differ between diets, but concentrations of this inflammatory marker decreased in all horses by the end of the third treatment period, possibly as a result of the horses adapting to the exercise protocol.

The results for prostaglandin E2 concentrations are inconsistent with some other similar studies, possibly because this study was conducted in live horses while others were conducted in a laboratory setting. Findings for fibrinogen levels are consistent with other studies that showed less inflammation when horses were fed soybean oil compared with corn oil. Previous studies have found a significant decrease in inflammatory response when horses were fed fish oil. The researchers suggest that the mixture of corn oil and fish oil used in this study may have resulted in competitive inhibition between omega-6 and omega-3 derivatives, preventing the expected decrease in inflammatory markers.

KERx Special Needs Nutrition, a division of Kentucky Equine Research, offers EO-3, a rich source of omega-3 fatty acids in a palatable liquid form. For information on this equine dietary supplement, go to kerx.com or call 888-873-1988.