

Breeding Woes - Add Oomph with Omegas -

In recent years horse owners and veterinarians have embraced the notion of using fat in the diets of horses and ponies. Fat is relatively scarce in forages and grain and is therefore a seemingly unnatural feedstuff for horses, but its nutritional advantages are irrefutable.

Now that the advantages of feeding fat are accepted almost universally by horse people, scientists are delving deeper into how certain types of fat may be beneficial, particularly in breeding stock. Researchers have focused their attention on two distinct families of fatty acids: the omega-3 family and the omega-6 family. The omega-3 family comes 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 are instrumental in the life cycle, yet they cannot be manufactured in the body and must be obtained from dietary sources.

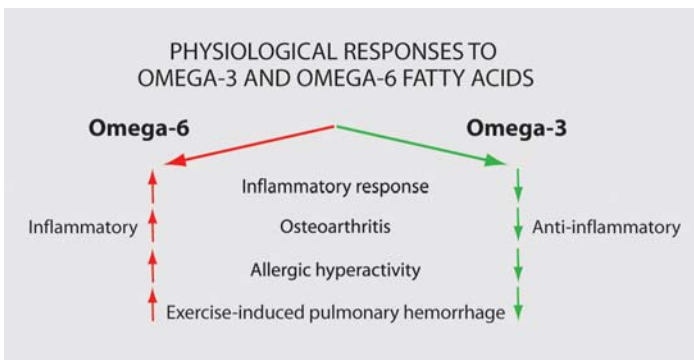


Figure 1: Physiological responses to Omega-3 and Omega-6 Fatty Acids

Significant members of the omega-3 family are eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA) which are often referred to as long-chain omega-3 fatty acids. Interestingly, the

horse’s body can convert ALA to EPA and DHA when sufficient quantities of ALA are consumed as long as the enzyme necessary for this conversion is in plentiful supply.

The shortage of EPA and DHA in equine diets is understandable, as these two fatty acids are found almost exclusively in fish. Fish oil can be harvested from many different types of fish but the best sources are often predatory fish which can accumulate mercury. An alternative cold water vegetarian species, rich in long chain omega 3 fatty acids has been used in the formulation of EO3 to avoid the risks of mercury accumulation.

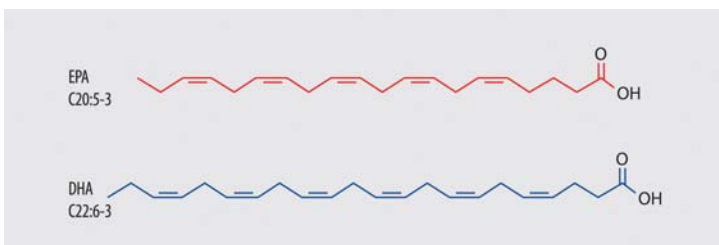


Figure 2: Long-chain omega-3 fatty acids DHA and EPA

ALA on the other hand is found predominantly in leafy plants and flaxseed (linseed) oil. The primary source of omega-6 fatty acids in the

diet is LA derived from the oils of seeds and grains and so omega 6 fatty acids are usually found in more plentiful supply in equine diets than omega 3 fatty acids. Corn, sunflower and canola oil contain abundant quantities of LA.

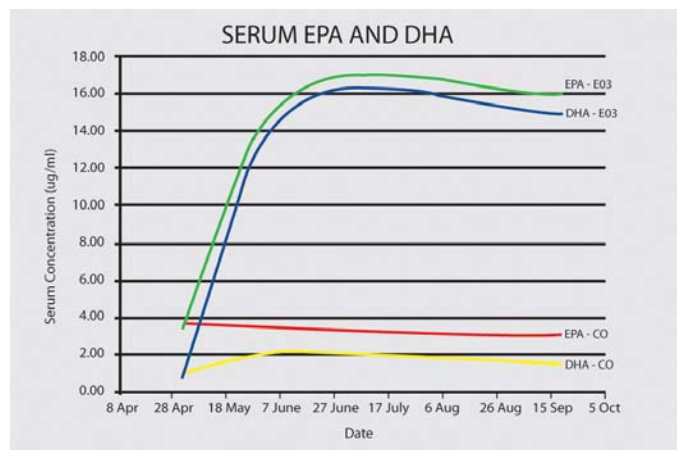
The domestication of the horse has in many cases led to the reversal of natural feeding patterns. Taken from a simple diet of predominantly forage, to that of starch rich feeds, restricted grazing and often lower than optimal forage intake, in most cases causes a drastic imbalance in the omega 3:6 ratio of the diet. It is essential that we try to rebalance the omega 3:6 ratio in the diets of horses and in particular that of growing and breeding horses to assist with optimal fertility and development.

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 a class of hormones called prostaglandins which are involved in the control of inflammation. The prostaglandins that evolve from consumption of omega-3 and omega-6 fatty acids have different effects on inflammatory processes in the body and it is preferable for these fatty acids to be balanced in order to prevent excessive inflammation. It may even be possible to manipulate this balance with a view to reducing inflammation in some cases.

The optimum ratio of omega 3:6 fatty acids remains unclear but is thought to be around 1 part omega 3 to 1-4 parts omega 6. In addition, omega-3 and omega-6 fatty acids are involved in the maintenance of cell membrane stability, in optimizing development and in the function of central nervous system tissue, oxygen transfer and immune function.

Recent research conducted in the USA has demonstrated benefits in supplementing the diets of sub-fertile stallions with omega-3 fatty acids from a fish oil source. A number of studies have concluded that artificial insemination stallions with poor sperm survival and motility after chilling or freezing can benefit from having long chain omega-3 fatty acids EPA and DHA added to their diets¹. EPA and DHA are essential components of the sperm cell membrane, and considering that most modern equine diets lack these forms of long-chain omega-3 fatty acids it is not uncommon for sperm quality to be compromised.

Figure 3: Serum EPA and DHA levels when horses are supplemented with Omega-3 oil from a marine source.



Further positive results in sperm quality when long-chain omega-3 fatty acids are added to the diet, include; increased progressive motility, increased

¹ Brinsko, S.P., Verner, D.D., Love, T.L., Blanchard, B.C., Day, B.C., and Wilson, M.E. 2005. *Effect of feeding a DHA-enriched nutraceutical on the quality of fresh, cooled and frozen stallion semen.* Theriogenology. vol. 63:5, pp. 1519-1527.

percentage of morphologically normal sperm membranes and even increased sperm output. Most importantly studies have shown that high DHA intakes are associated with greater fertility through good semen quality and quantity, with anywhere up to a 40% increase in output in stallions considered to have a normal level of fertility².

The addition of long-chain omega-3 fatty acids to the diets of pregnant and lactating mares has shown considerable benefit to both the mare and foal. Supplementation of pregnant mares with DHA and EPA confers benefits to the developing foetus, and certainly provides benefits to the foal as soon as it is on the ground. Researchers have discovered that the placenta may be responsible for transferring DHA and EPA to the foetal nervous system, therefore supplementing the mare during pregnancy may assist with foal development in-utero. Furthermore it has been found that mares who consume diets high in omega-3 fatty acids produce richer colostrum which assists in the passive transfer of colostral anti-bodies and may well 'jump start' the health of the foal.

Long gone are the days of hay and oats. The examination of novel feed stuffs and intense scientific research of ingredients, such as omega-3 fatty acids, opens the door to new possibilities. Not only do our horses benefit from a healthier and more comfortable existence, but for those in the business of breeding the advantage of increased fertility in stock has an obvious positive effect on the bottom line for the stud owner.

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² Harris, M.A., Anderson, C.R., Webel, S.K., Godbee, R., Sanders, S.R., Schurg, W.A., Baumgard, L.H., and Arns, M.J. 2005. *Effects of feeding an omega-3 rich supplement on the fatty acid composition and motion characteristics of stallion spermatozoa*. Proc. 19th Equine Science Society: 239.