

## **Use of L-Carnitine in growing foals, broodmares, stallions and performance horses**

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L-Carnitine is a naturally occurring amino acid, found in high levels in skeletal and cardiac muscles of all mammals, but in very low levels in cereal grains and plants.

L-Carnitine is classed as a “conditionally essential” nutrient in humans, and is routinely used in supplementation of patients on drip nutrition, as well as those with liver, heart, kidney and muscle disease. Importantly, L-carnitine is also routinely used in the nutrition of newly born babies. L-Carnitine is very well researched in human and animal performance, and is known as an “ergogenic aid” – a natural product which enhances performance.

### *L-carnitine use in mares and foals*

Adequate L-carnitine levels are critically important for the survival of newborn foals. After birth there is increased dependence on fat stores for energy to maintain body temperature, as well as for other vital metabolic processes (Borum, 1985). Several studies on pigs, fish, foals, quail and broiler chickens demonstrate a growth improvement by feeding extra dietary L-carnitine (Szilagy, 1998). Adequate L-carnitine in the first days of life is critical for foals, particularly those born in bad weather, or with other illness or injury. L-Carnitine supplementation of mares prior to foaling results in increased milk and plasma carnitine concentrations during the first three months of lactation (Benamou and Harris, 1993). Hence, precautionary supplementation of brood mares during the last few weeks of pregnancy and during early lactation may be beneficial, as this raises milk L-Carnitine levels for the newborn foal.

Blood levels of L-Carnitine in foals and young horses are usually only 30-40% of that in adults. This reflects a poor ability to manufacture L-carnitine in all young mammals, at the very time when adequate levels are critically required.

### *L-carnitine use in stallions*

Oral administration of L-carnitine to stallions with questionable seminal characteristics (low sperm progressive motility and reduced spermatozoa/ml) may improve spermatozoa kinetics and morphological characteristics (Stradaiolo et al., 2004) and the uptake of free L-carnitine is useful to the survival of spermatozoa (Jeulin and Lewin, 1996). Carnitine may also contribute towards improving the maintenance of spermatozoa viability during storage (Stradaiolo et al., 2000).

Supplementation of stallions during the breeding season where there is added performance stress could be of significant use to many breeders.

## *L-carnitine and athletic performance*

Studies have shown that exogenous carnitine has an additive effect on muscular responses to training which should be favourable to improve athletic performance (Rivero et al., 2002). L-Carnitine is essential in the process of transporting fats into cells for energy (ATP) production. Through this essential process, L-carnitine helps reduce the storage of body fat, and the amount of fat in the blood. By doing this, it acts as a buffer by delaying the accumulation of lactic acid in muscle cells and then blood when animals are working at maximum exertion. By delaying lactic acid production with subsequent muscle fatigue, endurance and stamina are extended in performance animals and humans.

### **References**

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