

EFFECT OF WATER DISPERSIBLE NATURAL VITAMIN E ON SERUM AND MUSCLE α -TOCOPHEROL IN VITAMIN E DEFICIENT QUARTER HORSES

H. Bedford^A, M.K. Boyce^A, S.J. Valberg^A, J.D. Pagan^B, T.N. Trumble^A and P.J. Huntington^B

^A University of Minnesota Equine Center, 1365 Gortner Ave, St Paul MN 55108 USA

^B Kentucky Equine Research, 3910 Delaney Ferry Rd, Versailles, KY 40383 USA & 7/35 Dunlop Rd, MULGRAVE 3170

Vitamin E functions as a biological antioxidant, preventing the oxidation of unsaturated lipids within cellular and subcellular membranes by neutralising production of free radicals and serves to maintain normal neuromuscular function. Several specific equine diseases develop in the face of vitamin E deficiency including nutritional myodegeneration, neuroaxonal dystrophy and equine degenerative myeloencephalopathy in young animals. Adult horses deficient in vitamin E may develop a vitamin E deficient myopathy or equine motor neuron disease. Treatment with vitamin E is usually instituted in an attempt to reverse clinical signs. In addition vitamin E is often supplemented in horses with various forms of tying up and nervous disease. However, selecting the type and amount of vitamin E to supplement can be challenging because the bioavailability and potency varies widely among commercial supplements. Water dispersible natural vitamin E sources have previously been shown to have much greater bioavailability than synthetic forms based on dose response studies (Fig 1) and water dispersible vitamin E levels have been shown to increase CSF vitamin E levels to a greater extent than synthetic sources. No studies have evaluated the effect of water dispersible vitamin E supplementation on serum and muscle α -tocopherol in vitamin E deficient horses.

A supplementation study was conducted in 5 vitamin E deficient Quarter Horses aged 4-10 yrs. Horses were selected based on serum vitamin E < 2 μ g/ml with no clinical or histopathologic evidence of neuromuscular disease. For four weeks prior to the study and during the 6 week period, horses were fed approximately 1.5% of body weight in grass hay and 2 kg of sweet feed. They were exercised 20 min per day at a walk, trot and canter 5 days per week on a treadmill. Supplementation of 5,000 IU of nano dispersed natural α -tocopherol (KERx Nano•E^a) was provided in the morning feed 5 days a week. Prior to and on the last day of the period, serum and muscle samples were obtained for α -tocopherol measurement. The gluteus medius muscle was sampled at a standard site. At least 250 mg of muscle was immediately frozen in liquid nitrogen and submitted for α -tocopherol analysis by HPLC. Serum concentrations of vitamin E increased significantly by two fold ($p=0.0037$) and muscle concentrations increased by over 3 fold ($p=0.05$) (Figure 2). The results of this study show that high doses of water dispersible natural vitamin E can increase α -tocopherol levels in muscle of deficient horses.

Fig 1. Change in serum vitamin E level in normal horses after supplementation with 5000 IU of synthetic (●) or nano dispersed natural vitamin E (▲)

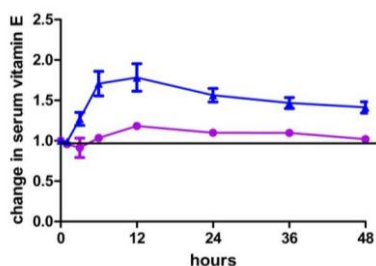


Fig 2. Serum and muscle vitamin E levels in vitamin E deficit horses before and after 6 weeks of supplementation with 5000 IU nano dispersed natural vitamin E (— normal levels).

