

Vitamin E concentrations in equine serum after oral supplementation of horses with d-alpha tocopherol (natural vitamin E)

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Introduction

Vitamin E is most recognized as an antioxidant that works closely with its partners selenium and vitamin C to protect the cells in the body from free radicals generated by exercise, illness, and other sources of oxidative stress. In addition, certain medical conditions are associated with vitamin E deficiency such as equine motor neuron disease, vitamin E deficient myopathy, neuroaxonal dystrophy/equine degenerative myeloencephalopathy, nutritional myodegeneration, and others.

Found in high amounts in fresh pasture, levels of vitamin E begin to deteriorate the moment forage is cut for hay. Therefore, horses that do not have access to grass should receive 1-2 IU/kg BW of oral vitamin E supplementation as recommended by the National Research Council Nutrient Requirements of Horses, 2007. Although synthetic vitamin E (dl-alpha tocopherol) is absorbed by the horse, natural vitamin E (d-alpha tocopherol) has been shown to be more biologically active. The purpose of this study was to confirm that Vitamin E Pellets by SmartPak, which contains natural vitamin E, increase serum levels of vitamin E as compared to control when given orally to horses.

Materials and Methods

Client-owned horses and ponies of various ages and breeds were used in this study. All received a physical examination, brief gait assessment, and bloodwork consisting of a complete blood cell count (CBC) and serum chemistry. In addition, each was body condition scored and had its weight and height measured with a commercial tape. The horses were randomly assigned into treatment group NE or control group CO and received either 15 grams of Vitamin E Pellets by SmartPak once daily for 28 days (2,500 IU d-alpha tocopheryl succinate, n = 5, Group NE), or no supplement (n = 4, Group CO). Blood samples were collected from each horse at the same time after supplementation and prepared for submission to the Animal Health Diagnostic Center at Cornell University College of Veterinary Medicine for serum alpha tocopherol concentration via high performance liquid chromatography (HPLC) on days 0 (baseline), 4, 7, 11, and 14.

Special emphasis was placed on blood sample handling and supplies, as studies have shown that variables introduced by a veterinarian during procurement, transporting, and storing samples may decrease HPLC-measured serum alpha-tocopherol values. These variables include temperature, light, exposure to the rubber stopper of the blood collection tube, hemolysis, duration of freezing time, and repeated freeze/thaw cycles. In addition, recent evidence has suggested that barrier gels, gel clot activator tubes, and silicone or glass particle additives may also decrease alpha-tocopherol values.

Results

After 14 days of oral supplementation, serum vitamin E levels were significantly higher in the group receiving Vitamin E Pellets by SmartPak as compared to the control group. Average serum vitamin E rose from the baseline of 232 ug/dl to 366 ug/dl (134 ug/dl, a 57.7% increase) while the control group average changed from 232 ug/dl to 278 ug/dl (46 ug/dl, a 19.8% difference).

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