

Vitamin A and beta-carotene supplementation in horses on different forage systems

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Forages, such as pastures and hays, often require supplementation to be utilized efficiently, especially as the nutritional value of pastures declines during fall and winter. A common supplement is vitamin A which influences many functions, notably reproduction and growth in the horse. Its dietary precursor, beta-carotene progressively deteriorates in pastures after they stop growing during the fall and winter, as well as in hays and other conserved feeds, so additional sources of vitamin A are often required for grazing or stabled herbivores.

Forty-five Thoroughbred mares were divided into 3 groups and kept on different forage systems for 30 months. The first forage system was a dry lot where mares were fed grass hay and a concentrate made without vitamin A added (HC). The second and third systems were bluegrass/clover pastures supplemented with alfalfa/grass hay during the winter (PH) where one of the groups was also fed the vitamin A free concentrate (PHC). The mares were on these diets for at least 8 months, during which vitamin A status was depleted as assessed by serum retinol concentration and a

relative doe response (RDR) test (Greiwe-Crandell *et al*, 1993, 13th ENPS Proc, 1-2), before any vitamin A supplementation was started. In the repletion phase, each group of 15 mares was divided into 3 subgroups : 5 mares were supplemented with vitamin A palmitate at twice the NRC requirement (A) ; 5 mares were given beta-carotene at the equivalent of twice the NRC requirement of vitamin A (B) ; and the last 5 mares were given a placebo (C). Supplements were given 2 times per week orally and individually. Every 2 months vitamin A status was assessed by RDR test and serum retinol concentration. The foals born during the experimental period were subjected to a RDR test within the first 24 hours.

Over the 22 month period, means of serum retinol concentration were 18.5, 20.4 and 20.3 ug/dl (SE 0.33 ug/dl) in control, beta-carotene and vitamin A supplemented mares, respectively ($P<0.05$). Corresponding RDR values were 15.7, 15.0 and 10.7 % (SE 0.64 %) ($P<0.05$). We conclude that supplementation with vitamin A palmitate was more effective than beta-carotene in improving vitamin A status.