

QUESTION: Does Feeding an Oral Antioxidant Supplement Increase Plasma Vitamin C & E Concentrations in Adult and Aged Horses?

Background

- Vitamins C and E are important antioxidants in lung fluid and lung tissue¹. Inflammation, caused by allergy (e.g. equine asthma) or infection (e.g. virus or bacteria) causes reduction in antioxidants which allows inflammation to persist^{2,3}.
- Supplementation with oral antioxidants has previously been shown to reduce airway inflammation and associated clinical signs in horses^{4,5}.

Aim of Study

To determine the ability of an oral antioxidant supplement (RespirAid, Science Supplements) to raise plasma vitamin C and E concentrations in horses. As older horses may experience higher levels of oxidative stress and have a higher requirement for antioxidant vitamins, both adult and aged groups of horses were studied.

Study Design

- *Placebo-controlled* = some horses received the active supplement and some received a supplement with no active ingredients (placebo). Use of a placebo helps reduce bias (seeing a false positive result) and allows for the fact that an improvement might be observed from horses spontaneously improving.
- *Randomised* = which horses were given placebo was pre-determined by a random system rather than a person deciding at the time of seeing a horse. This removes bias in the results caused by selecting only certain horses to have a particular treatment.
- *Blind* = researchers did not know which horses received the active supplement and or placebo supplement. Blinding removes bias caused by people wanting to see a positive effect with the active supplement.

Study Outline

Twenty aged (minimum of 20 years old) horses and 20 adult (5-12 years old) horses were studied. Ten aged and 10 adult horses were fed RespirAid at the recommended rate for 6 weeks. The remaining 10 aged and 10 adult horses were fed a placebo for 6 weeks. Blood samples for analysis of plasma Vitamin C and E concentration were collected every 2 weeks.

Results

- Plasma Vitamin C (Figure 1a) and E (Figure 1b) concentrations were significantly increased after 2 weeks in both the aged and adult groups of horses fed the antioxidant supplement RespirAid, but were unchanged in the placebo fed group.
- In the horses given the antioxidant supplement, there was no significant difference in plasma Vitamin C & E concentrations between aged and adult horses after supplementation, indicating that aged horses are comparable with adult horses in their ability to absorb antioxidants from the diet.

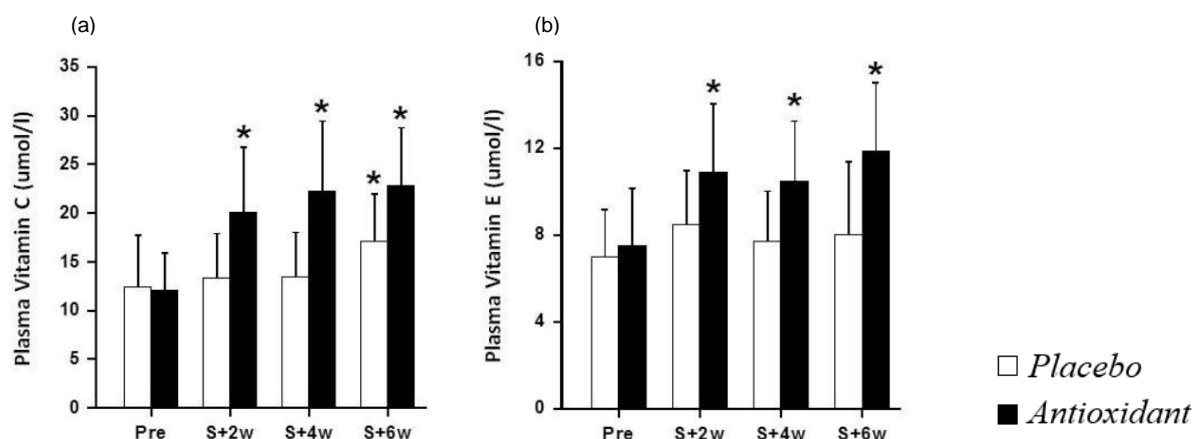


Figure 1: Mean (+ standard deviation) plasma Vitamin C (a) and Vitamin E (b) concentrations in adult and aged horses before (Pre) and after supplementation (S) for 6 weeks (w) with either an antioxidant rich supplement (RespirAid) or placebo. Each group consists of 10 young horses and 10 aged horses. * = Significantly different compared to Pre ($P < 0.0001$).

Take Home Message

- An oral antioxidant and key trace mineral supplement (RespirAid) is able to increase and maintain plasma Vitamin C and Vitamin E concentrations when fed to both adult and aged horses.

References

1. Deaton, C.M. et al. (2003) Pulmonary bioavailability of ascorbic acid in an ascorbate-synthesising species, the horse. *Free Radic Res* 37, 461-467
2. Deaton, C.M. et al. (2004) Pulmonary epithelial lining fluid and plasma ascorbic acid concentrations in horses affected by recurrent airway obstruction. *Am J Vet Res* 65, 80-87.
3. Deaton, C.M. et al. (2005) Effect of acute airway inflammation on the pulmonary antioxidant status. *Exp Lung Res* 31, 653-670.
4. Deaton, C.M. et al. (2002) Antioxidant supplementation and pulmonary function at rest and exercise. *Equine Vet J Suppl*, 58-65.
5. Deaton, C.M. et al. (2004) Antioxidant supplementation in horses affected by recurrent airway obstruction. *J Nutr* 134, 2065S-2067S.