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EFFICACY OF AN HERBAL FEED SUPPLEMENT IN REDUCING EXERCISE-RELATED STRESS IN HORSES

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Introduction

Ergogenic aids are often used in horses to enhance performance without adequate scientific validation. These supplements, which might contain herbal components, are not required by law in the United States to provide evidence supporting manufacturers' claims. The present study investigated an herbal supplement containing *Withania somnifera* (ashwaghanda), *Ocimum sanctum* (holy basil), *Phyllanthus emblica* (Indian gooseberry), *Asparagus racemosus* (asparagus), *Glycyrrhiza glabra* (licorice), *Mangifera indica* (mango), *Tribulus terrestris* (puncture vine), and shilajit (mineral pitch).

Literature suggests that various herbs in the supplement have anti-stressor (Archana and Namasivayam, 1999) and "adaptogenic" properties (Bhattacharya et al., 2002), as well as the ability to affect the hypothalamic-pituitary-adrenal axis (Al-Qarawi et al., 2002). More specifically, the supplement investigated in the study contains herbs which have been found to decrease stress-induced plasma cortisol concentrations (Archana and Namasivayam, 1999), heart rate (Dhuley, 2000), and lactate concentrations (Dadkar et al., 1987).

Methods and Materials

Six horses (three Thoroughbreds, three Arabians) were used in a crossover design with animals serving as their own controls. Animals were fed the supplement or placebo for 15 days and a standardized exercise test (SET) was conducted followed by a 15-day clearance period. Feeds were then switched and protocols repeated. Samples were taken at rest, at speeds of 3.5, 4.0, 4.5, 5.0, and 5.5 m/s on a 10% incline, and 15, 30, 45, and 60 minutes and 24 hours post SET. Samples were analyzed for plasma cortisol, blood lactate, neutrophil:lymphocyte ratio, white blood cell count, packed cell volume (PCV), and hemoglobin. Heart rates (HR) were measured continuously during the SET.

Results

ANOVA indicated there was an interaction (p=0.026) of treatment and recovery time on cortisol concentrations during the recovery period. The cortisol concentrations were decreased in the supplement group an average of 11% in the 15, 30, and 45 minutes post-SET samples (p=0.001, p=0.010, and p=0.045, respectively).

There was an effect of supplement on PCV during the SET (p=0.007) and during the recovery period (p=0.009). PCV was decreased in supplemented horses at rest and 3.5 m/s samples (p=0.009 and p=0.001, respectively) during the SET and during the recovery period at 15, 30, and 45 minutes post-SET samples (p=0.009, p<0.001, and p<0.001, respectively).

ANOVA indicated there was an interaction of treatment and recovery time (p=0.038) on hemoglobin concentrations. Hemoglobin concentrations were decreased during the recovery period at 15 and 30 minutes post-SET samples (p=0.048 and p=0.018, respectively).

The supplement did not have an effect on blood lactate concentrations during the SET. Although the supplement did not decrease blood lactate concentrations during the recovery period, the data support that there was an interaction (p=0.063) between supplement and recovery time. Blood lactate concentrations were lowered during the recovery period at 30 minutes post-SET samples (p=0.011).

There was no effect of the supplement on white blood cell counts and neutrophil:lymphocyte ratio at rest, during exercise, or during the recovery period, or on average HR during exercise and HR recovery time.

Discussion

Cortisol is often used as an indicator of stress due to stimulation of the hypothalamic-pituitary-adrenal axis, which is a common physiological response to various stressors. The attenuation of cortisol during the recovery period in the supplemented animals is interpreted as a reduction of stress (Stull and Rodiek, 2002).

During exercise, the sympathetic nervous system stimulates splenic contractions, which increase circulating red blood cell (RBC) numbers, assessed here as either PCV or hemoglobin concentrations. The decreased RBC at rest, when running at lower speeds during the SET, and during the recovery period suggests that the supplement is affecting sympathetic tone. A decreased sympathetic tone could account for the decreased release of red cells at rest and increased sequestering of RBC during the recovery period, supporting the claims of reduced stress, at least at lower concentrations of sympathetic activity (Rose and Allen, 1985).

Although the lowered lactate concentrations produced by the supplement during the recovery period in the present study do not support the claims of increased metabolic performance, they are perhaps indicative of increased speed of recovery,

which may increase performance potential for a subsequent exercise bout (Wickler and Anderson, 2000).

Take-Home Message

Although the mechanism is unknown, the data from the present study support the hypothesis that the supplement reduced exercise-related stress (as assessed by plasma cortisol) in horses. Although the supplement had no effect on cardiovascular or metabolic performance during an exercise bout (as assessed by heart and blood lactate), it appeared to increase the speed of recovery following a moderate intensity exercise bout.

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