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THE EFFECT OF PRE-EXERCISE B-VITAMIN SUPPLEMENTATION ON METABOLIC RESPONSE TO EXERCISE IN THOROUGHBRED HORSES

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Performance horses are often administered large quantities of B-vitamins before exercise in an attempt to improve performance. B-vitamins play an important role in the conversion of pyruvate into acetyl Co-A for use in aerobic energy generation. A reduction in the conversion of pyruvate to acetyl Co-A will result in lactate production which may contribute to fatigue during exercise. To evaluate whether B-vitamin supplementation before exercise can affect performance, a 2 X 2 Latin square experiment was conducted. During the first of two periods, four trained 3 year old Thoroughbreds (3 geldings and 1 filly) were divided into 2 groups and fed either a sweet feed and hay diet (CONTROL) or the control diet plus extra B-vitamins the evening before and morning of a standardized exercise test (SET) on a high speed treadmill. The B-vitamins were provided in an oral form from a commercial product (Lactanase, Vita-Flex Nutrition Co., Inc.) which contained 500 mg thiamine, 35 mg riboflavin, 35 mg niacinamide, and 450 mg of d-pantothenic acid per dose. This was added to the evening feed the night before the SET and in the morning feed which was fed 3 hours before the SET. The sweet feed used in this experiment was also fortified with B-vitamins so that both groups received daily B-vitamin supplementation throughout the experimental period (table 1). The SET consisted of a 2 minute warm-up

Table 1. VITAMIN CONCENTRATIONS.

<i>Vitamin</i>	<i>One packet(mg)</i>	<i>Vitamins provided by sweet feed</i>	<i>NRC¹ recommendation</i>
Thiamin	500	31 mg/day	46.5 mg/day
Riboflavin	35	31.9 mg/day	18.6 mg/day
Niacinamide	35	142.4 mg/day	NR ²
d-Pantothenic acid	450	65.1 mg/day	NR ²
Vitamin A	-	33936.4 IU/day	22500 IU/day
Vitamin D	-	4331.3 IU/day	2785 IU/day
Vitamin E	-	188.2 IU/day	743 IU/day

¹ NRC 1989 for working horse; moderate intensity; 500 kg

² No recommendation given

Table 2. V_{LA4} AND V_{200} DURING SET

	<i>CONTROL</i>	<i>B-vitamin supplementation</i>	<i>Standard error</i>	<i>Level of significance</i>
V_{LA4} (m/s)	10.80	10.47	0.17	NS
V_{200} (m/s)	9.63	9.55	0.03	NS

walk followed by an 800 m trot (~4 m/s), then 800 m gallops of 8 m/s, 9 m/s, 10 m/s and 11 m/s. These gallops were followed by an 800 meter warm-down trot and 2 minute walk. At the end of each speed, heart rate was measured and a blood sample was taken from an indwelling jugular catheter. Blood was also taken at 15 and 30 minutes after exercise. After period 1, the diets were switched and the protocol repeated. The lactate-velocity relationship was determined by regressing the logarithm of lactate against speed and was expressed as V_{LA4} . The heart rate-velocity relationship was determined by linear regression and was expressed as V_{200} . There was no statistical difference ($p>0.10$) for either V_{LA4} or V_{200} between control and B-vitamin treatment (table 2). There was also no difference in plasma glucose either during or after the SET.

Additional B-vitamin supplementation before exercise did not appear to affect metabolic response in horses already receiving daily B-vitamin supplementation. It remains to be determined whether this type of B-vitamin supplementation will affect exercise response in horses receiving no supplemental vitamins.