

2006: Hess T M; Kronfeld D S; Carter R A; Treiber K H; Byrd B M; Staniar W B; Smith L T; Gay L A; Harris P A

## **Does usefulness of potassium supplementation depend on speed?**

Equine Veterinary Journal. Supplement 2006;(36):74-9.

**REASONS FOR PERFORMING STUDY:** Electrolyte mixtures given to counter sweat loss usually contain abundant potassium. However, increases in plasma [K<sup>+</sup>] occur with exercise and supplementation may further increase plasma levels, potentially increasing the risk of neuromuscular hyperexcitability and development of adverse clinical sequelae. This proposition requires study.

**OBJECTIVES:** To compare effects of a K-rich electrolyte supplement (EM+K) to a K-free one (EM-K) on plasma [K<sup>+</sup>], [Ca<sup>++</sup>] and acid-base status during an endurance incremental exercise test on the treadmill.

**METHODS:** The test consisted of 3 bouts (simulating loops in an endurance race) of 12 km performed at 6, then 7, then 8 m/sec with 25 min rest stops (S1, S2) between loops on 13 endurance trained Arabian horses (7 EM-K, 6 EM+K). Electrolytes were supplied orally 60 mins before exercise (Pre) and at each stop. Blood samples were taken before exercise and during exercise, each S and 120 mins of recovery (R). Blood was analysed for pH, PCO<sub>2</sub>, packed cell volume (PCV), plasma [Na<sup>+</sup>], [K<sup>+</sup>], [Cl<sup>-</sup>], [Ca<sup>++</sup>], glucose, and lactate [La<sup>-</sup>]; plasma [H<sup>+</sup>] and osmolality (osm) were calculated. The dietary cation anion difference (DCAD) was calculated to be -27 meq/dose EM-K and 109 meq in EM+K, respectively. **RESULTS:** Plasma [H<sup>+</sup>] decreased during the 6 and 7 m/sec loops, increased during the 8 m/sec loop, and returned to Pre at S1, S2 and R. Plasma [K<sup>+</sup>] was higher at 8 m/sec and plasma [Ca<sup>++</sup>] was overall lower in the EM+K group compared to EM-K. Other findings included higher overall PCV, overall glucose, and [La<sup>-</sup>] during the 8 m/sec loop (P<0.040) in EM+K compared to EM-K horses.

**CONCLUSIONS:** EM+K supplementation leads to higher plasma [K<sup>+</sup>] increasing the risk of neuromuscular hyperexcitability during exercise. Acute effects of a lower DCAD in EM-K may have led to higher plasma [Ca<sup>++</sup>]. Potassium-rich electrolytes may have triggered the release of epinephrine, contributing to higher PCV, glucose release and increased lactate production.

**POTENTIAL RELEVANCE:** Lower plasma [K<sup>+</sup>] and higher plasma [Ca<sup>++</sup>] with EM-K supplementation may help reduce the risk of conditions associated with neuromuscular hyperexcitability occurring especially during higher speeds in endurance races.

**SOURCE:** Equine veterinary journal. Supplement 2006;(36):74-9. as source.