Gastric Emptying and Intestinal Absorption of Electrolytes, and Exercise Performance in Electrolyte-Supplemented Horses

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1. Introduction
Horses lose considerably more electrolytes through sweating during prolonged exercise than can be readily replaced through feeds.

2. Materials and Methods
The present study tested an oral electrolyte supplement (ES) designed to replace sweat electrolyte losses. We measured gastric emptying of 3L of ES (using gamma imaging of 99mTc-sulfide colloid), the absorption of Na+ and K+ from the gastrointestinal tract using 24Na+ and 42K+, and the distribution of these ions in the body by measuring radioactivity within plasma and sweat during exercise. Three liters of ES emptied from the stomach as fast as water, with a half-time of 47 minutes, and appeared in plasma by 10 minutes after administration. Three liters of ES emptied from the stomach as fast as water, with a half-time of 47 minutes, and appeared in plasma by 10 minutes after administration. Three liters of ES emptied from the stomach as fast as water, with a half-time of 47 minutes, and appeared in plasma by 10 minutes after administration. Three liters of ES emptied from the stomach as fast as water, with a half-time of 47 minutes, and appeared in plasma by 10 minutes after administration.

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3. Results and Discussion
24Na+ appeared in sweat at 10 minutes of exercise and when horses received 3L of ES the duration to voluntary fatigue was increased in all horses by 33±10%. It is concluded that an oral ES designed to replace sweat ion losses was rapidly emptied from the gastrointestinal tract, was rapidly absorbed in the upper intestinal tract, and was rapidly distributed within the body. The ES clearly served as a reservoir to replace sweat ion losses during exercise, and administration of ES before exercise resulted in increased duration of submaximal exercise.