

The Effect of Consumption of Four Drinks on Endurance Performance and Physiology

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Isotonic sports drinks containing carbohydrate and electrolyte are commonly used to assist endurance performance, but there is evidence from a number of previous studies that hypotonic sports drinks could be superior.

Purpose: To compare absorption and effects on performance of a new hypotonic sports drink containing carbohydrate and electrolytes with three other drinks: water, Sportsdrink A (carbohydrate and vitamins) and Sportsdrink B (isotonic; carbohydrate and electrolytes).

Methods: Sixteen well-trained cyclists were randomized in balanced crossover fashion to consume each of the four drinks in a double-blind manner on separate days at a rate of 250 ml every 15 min during a 2-h steady ride at constant power followed by a continuous incremental test to peak power. Tests were performed at room temperature (18-22°C) and were separated by 3-7 d. The physiological measures were: osmolar, electrolyte, glucose and lactate concentrations in blood samples taken before, during and after exercise; volume and osmolarity of urine collected before and after exercise; sweat volume inferred from change in body mass; and heart rate and tympanic temperature recorded throughout exercise.

Results: The highest power in the incremental test occurred during the trials conducted with the new hypotonic sports drink; peak power improved by 4.3%, 3.2% and 0.4% when compared to the water placebo, Sportsdrink A and Sportsdrink B. There were similar outcomes for differences in peak heart rate and peak lactate.

The hypotonic sports drink produced the lowest urine osmolarity and the greatest urine volume after the performance test, which represents good evidence that the hypotonic drink was excreted and therefore absorbed more rapidly than the other drinks. Effects on body temperature sweat rate and solute concentrations in blood were not noteworthy.

Conclusion: The new hypotonic sports drink aimed at optimizing fluid absorption, gave slightly better peak performance than the isotonic sports drink and substantially better peak performance than water and the other sports drink.

The new drink was absorbed more rapidly than all three other drinks. The beneficial effects on performance do not appear to be mediated via increased sweating or a reduction in exercise temperature.

Other publications providing evidence for faster hydration with hypotonic drinks:

Maughan RJ, Bethell LR, Leiper JB (1996). Effects of ingested fluids on exercise capacity and on cardiovascular and metabolic responses to prolonged exercise in man. *Experimental Physiology* 81: 847-859

Vist GE, Maughan RJ (1995). The effect of osmolality and carbohydrate co-ingestion on the rate of gastric emptying of liquids in man. *J Physiology* 486: 523-531

Mettler S, Rusch C, Colombiani, PC (2006). Osmolality and pH of sport and other drinks available in Switzerland. *Sportmedizin und Sporttraumatologie* 54: 92-95