

Comparison of Responses to Exercise When Consuming Carbohydrate and Carbohydrate/Protein Beverages

Valentine, Rudy J.; St. Laurent, Thomas G.; Saunders, Michael J. FACSM; Todd, M. Kent FACSM; Flohr, Judith A.
James Madison University, Harrisonburg, VA.

Recent studies suggest that carbohydrate/protein (CHO+P) beverages improve cycling endurance compared to carbohydrate-only (CHO) solutions. A criticism of these studies has been that they delivered less than 1g/min of carbohydrate, and thus it is unclear if performance benefits could have been elicited with additional carbohydrate intake.

PURPOSE: The purpose of this study was to compare exercise responses among subjects consuming >1g/min of carbohydrate in a CHO+P beverage (7.3%+1.8%) versus isocarbohydrate (CHO1) and isocaloric (CHO2) carbohydrate beverages.

METHODS: Ten male cyclists ($VO_{2peak} = 54.0 \pm 7.7 \text{ mL} \cdot \text{kg}^{-1} \cdot \text{min}^{-1}$) completed prolonged bouts of cycle ergometry at 75% VO_{2peak} while consuming 250 mL of beverage every 15 min. During the three trials (5-10 d apart), beverages were administered in a randomly counter-balanced double-blind design. Metabolic measures were assessed following 30 min of exercise.

RESULTS: Oxygen uptake did not differ among CHO+P, CHO1 and CHO2 trials, respectively (41.0 ± 8.1 , 42.0 ± 7.7 , $42.3 \pm 6.8 \text{ mL} \cdot \text{kg}^{-1} \cdot \text{min}^{-1}$). Blood lactate was significantly lower ($p < .05$) in the CHO+P trial ($2.9 \pm 1.1 \text{ mmol L}^{-1}$) versus CHO1 (3.6 ± 1.2) and CHO2 (3.6 ± 1.4). Heart rate was also lower in the CHO+P trial ($153.3 \pm 9.3 \text{ bpm}$) compared to CHO1 (159.0 ± 8.5) and CHO2 (158.1 ± 12.4). RPE in the CHO+P trial (12.9 ± 1.1) was significantly lower than CHO1 (13.7 ± 1.1), but did not significantly differ from CHO2 (13.2 ± 2.0). Plasma glucose concentrations did not differ between trials (67.7 ± 20.1 , 72.5 ± 22.3 , $74.2 \pm 11.7 \text{ mg} \cdot \text{dL}^{-1}$).

CONCLUSIONS: A CHO+P beverage consumed during exercise reduced lactate accumulation and perceived exertion compared to CHO beverages, despite no differences in blood glucose levels. These findings suggest that there are metabolic and performance advantages of CHO+P beverages over both isocarbohydrate and isocaloric CHO beverages.

Medicine & Science in Sports & Exercise, May 2006 - Volume 38 - Issue 5 - p S341