Carbohydrate feeding and exercise: effect of beverage carbohydrate content

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The purpose of this study was to determine the effect of ingesting fluids of varying carbohydrate content upon sensory response, physiologic function, and exercise performance during 1.25 h of intermittent cycling in a warm environment (T_{db} = 33.4°C). Twelve subjects (7 male, 5 female) completed four separate exercise sessions; each session consisted of three 20 min bouts of cycling at 65% VO_{2max}, with each bout followed by 5 min rest. A timed cycling task (1200 pedal revolutions) completed each exercise session. Immediately prior to the first 20 min cycling bout and during each rest period, subjects consumed 2.5 ml·kg BW^{-1} of water placebo (WP), or solutions of 6%, 8%, or 10% sucrose with electrolytes (20 mmol·l^{-1} Na^+, 3.2 mmol·l^{-1} K^+). Beverages were administered in double blind, counterbalanced order. Mean (±SE) times for the 1200 cycling task differed significantly: WP = 13.62 ± 0.33 min, *6% = 13.03 ± 0.24 min, 8% = 13.30 ± 0.25 min, 10% = 13.57 ± 0.22 min (* = different from WP and 10%, P < 0.05). Compared to WP, ingestion of the CHO beverages resulted in higher plasma glucose and insulin concentrations and higher RER values during the final 20 min of exercise (P < 0.05). Markers of physiologic function and sensory perception changed similarly throughout exercise; no differences were observed among subjects in response to beverage treatments for changes in plasma concentrations of lactate, sodium, potassium, for changes in plasma volume, plasmas osmolality, rectal temperature, heart rate, oxygen uptake, rating of perceived exertion, or for indices of gastrointestinal distress, perceived thirst, and overall beverage acceptance. Compared to ingestion of a water placebo, consumption of beverages containing 6% to 10% sucrose resulted in similar physiologic and sensory response, while ingestion of the 6% sucrose beverage resulted in significantly improved end-exercise performance following only 60 min of intermittent cycling exercise.