The Effect of Sucrose vs Non-Nutritive Sweeteners on Blood Glucose Levels During Exercise

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PURPOSE: The purpose of this study was to examine the glucose load (GL) between sucrose (SU) sucralose (SP), and stevia (ST) on blood glucose (BG) values, during exercise. METHODS: Twenty participants (n = 14 males, n = 6 females; M = 23 ± 4 years) were measured on 4 occasions. Participants were fasted (≥ 8 hours) and blindly provided with one of four beverages containing 30g SU, 30g SP, 15g ST, or no additive (NS) in a 474 ml solution. BG values were collected fasted, post-beverage, at each of the YMCA Bike Test protocol’s 4 stages, and 15- and 30-minutes post-exercise. Energy expenditure (RER), rate of perceived exertion (RPE), and heart rate (HR) were measured. Glucose response was determined by area under the curve (AUC). Paired samples t-tests determined differences among AUC and time to peak load, mean RER peak, and total participant RPE, where significance was set at p < 0.05. A 4x4 (drink x time) repeated measures ANOVA determined differences among RER. All data was presented as mean ± SD (standard deviation).

RESULTS: SU AUC was significantly greater than NS, SP, and ST (912 ± 109 mg/dL vs. NS: 712 ± 86 mg/dL, p < 0.01; SP: 735 ± 93 mg/dL, p < 0.01; ST: 717 ± 79 mg/dL, p < 0.01). SP AUC was significantly greater than NS (735 ± 93mg/dL vs. 712 ± 86 mg/dL, p = 0.016). SU peaked significantly later during Stage 4 of exercise, compared to NS (Stage 2, p < 0.01), SP (Stage 3, P = 0.009), and ST (Stage 2, p < 0.01). At blood glucose peak, ST RER was lower than SU and SP (ST: 0.99 ± 0.05 v vs. SU: 1.12 ± 0.08, SP: 1.05 ± 0.06, p < 0.01). RPE scores were highest in Stage 4 of all conditions. In each condition, HR max was in Stage 4 and decreased after termination of exercise in recovery.

CONCLUSION: ST may be a better, natural alternative to weight loss as it does not increase glucose levels and the body must utilize fat for energy.

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