



Mid Atlantic Regional Chapter of the American College of Sports Medicine

Annual Scientific Meeting, November 2nd - 3rd, 2018
Conference Proceedings
International Journal of Exercise Science, Issue 9, Volume 7



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.

Supported by the Student Research and Creative Expression Program, William Paterson University.