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Effects of an Acute Dose of Betalain Rich Concentrate on Determinants of Running Performance

Steven Vitti ¹, Leah Bisgrove ², Samuel Grey ² and Sarah Levine ², Craig Mattern ², Michael Bruneau, Jr., FACSM ¹, Justin Faller ². ¹ Drexel University, Philadelphia, PA, ² SUNY Brockport, Brockport, NY

Beetroot juice (BRJ) has been shown to enhance exercise performance due to its high nitrate content, but the role of other compounds such as betalains, remains unclear. Betalain dosing has shown improvement in running performance following a seven-day loading scheme; however, the effects of betalains on predictors of running performance remain unknown.

PURPOSE: To examine the acute effects of a betalain-rich concentrate (BRC) on running economy and maximal oxygen consumption (VO_{2max}). **METHODS:** Seventeen college-age males (19 ± 1.75 yrs) consumed 100 mg of BRC containing 25% betalains and 100 mg of dextrose (placebo, [PLA]) in a randomized, counterbalanced, double-blinded, placebo-controlled trial. Participants were instructed to consume BRJ or PLA 2 hr prior to completing a running economy protocol, in which participants ran at submaximal speeds corresponding to 60% and 80% of their VO_{2max} for 5 min, before proceeding with a VO_{2max} test. Heart rate (HR), skeletal muscle oxygen consumption (SMO₂), and rating of perceived exertion (RPE) were recorded during the last 30 seconds of each velocity and at the end of each stage of the VO_{2max} test.

Repeated measures analyses of variance were performed with post-hoc pairwise comparison and simple effects tests to assess differences between BRC and PLA. Alphas were set *a priori* to $p < .05$. **RESULTS:** Peak HR (BRC: 188 ± 5.65 vs. PLA: 191 ± 5.43 bpm) and RPE (BRC: 8.59 ± 1.62 vs. PLA: 9.59 ± 1.70) were significantly lower after BRC supplementation compared to PLA ($p = .010$ & $p = .019$, respectively) at 60% VO_{2max}). A trend toward significance was observed for HR at 80% VO_{2max} ($p = .051$). No statistically significant differences in SMO₂ or VO_2 were observed between treatments, nor were there observed differences between treatments for VO_{2max} ($p > .05$). **CONCLUSION:** BRC reduced HR_{max} and RPE during submaximal running exercise but did not improve running economy or VO_{2max} compared to PLA.

SIGNIFICANCE/NOVELTY: We examined the effects of an acute dose of BRC on running performance. Our findings suggest that BRC may be useful in reducing perceived exertion during exercise and may confer cardiovascular benefits such as enhanced vasodilation, supporting our HR findings at submaximal and maximal intensities. Larger, more controlled studies exploring mechanisms underlying our observations are warranted and encouraged.