

The effect of beetroot juice dosage on high intensity intermittent cycling performance

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Abstract

Background: Resynthesis of creatine phosphate (PCr) and intramuscular pH, which influences glycolytic rate, are dependent on skeletal muscle blood flow (Sahlin et al., 1979: Scandinavian Journal of Clinical and Laboratory Investigation 39(6):551-8; Sutton et al., 1981: Clinical Science 61(3):331-8). Skeletal muscle blood flow during exercise has been shown to be enhanced following supplementation with nitrate-rich beetroot juice (BJ) through a nitrate-nitrite-nitric oxide-mediated mechanism (Ferguson et al., 2013: Journal of Physiology 591(Pt 2):547-57).

Purpose: The purpose of this study was to determine if acute supplementation with BJ enhanced subsequent high intensity intermittent cycling performance and to investigate if performance gains could be influenced by varying BJ dosage.

Methods: In a randomised control trial with a repeated-measures crossover design, 2 hours after consumption of low dose (250ml), high dose (500ml) of a commercially available BJ or nothing, 8 active young males (24 ± 8.5 yrs) completed three 30s Wingate anaerobic tests (WAnT) on a Monark 894E interspersed with 3 minutes active cycling recovery at low intensity. The three trials were separated by a 7-day washout period for each participant. Peak power (PP), mean power (MP) and fatigue index (FI) were recorded for each WAnT and were compared using a two-way repeated measures ANOVA.

Results: MP declined successively in the second and third WAnT in each trial ($p < 0.05$), however no changes were observed in PP or FI in any trial. No significant differences in MP, PP or FI at any time point were observed across the three treatment arms.

Discussion: The maintenance of PP across successive WAnT indicates resynthesis of PCr during recovery periods, but the decline of MP possibly suggests a progressive decline in total PCr availability and/or a decline in intramuscular pH at each stage. Lack of a supplementation effect on measures of anaerobic power suggests BJ neither expedites PCr resynthesis nor restores intramuscular pH through either a skeletal muscle blood flow or other mechanism.

Conclusion: Acute supplementation with BJ has no beneficial effect, even with high dosage, on high intensity intermittent cycling performance.

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