

A low dose of Glc in mice, equivalent to a translational dose in humans of 1400 mg x day⁻¹, acts as an enhancing performance substance in exercise. The beneficial effects of Glc are lost at higher doses of the amino sugar. The synergistic effect of Glc with exercise training on mitochondrial biogenesis and the increase in oxidative metabolism, through modifications in the redox balance, deserves further studies.

EFFECTS OF BEETROOT JUICE INTAKE ON PERFORMANCE, HORMONAL AND MECHANICAL RESPONSES IN WELL-TRAINED CROSSFIT PRACTITIONERS

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INTRODUCTION:

Performance in CrossFit (CF) workouts are mainly linked to improvements in anaerobic power and aerobic capacity (1). Acute beetroot juice (BJ) intake has demonstrated to improve aerobic and anaerobic performance (2, 3). However, no studies have evaluated the effects of BJ intake on CF performance by linking hormonal and mechanical responses. This study aimed to determine the causal physiological association between CF workouts performance and hormonal and mechanical responses after acute BJ intake.

METHODS:

Nine well-trained male (mean $\pm$ SD: age = 28.4 $\pm$ 4.1 years, body mass = 80.9 $\pm$ 4.9 kg, height = 175.8 $\pm$ 6.9 cm) practitioners undertook a CF workout after drinking 140 mL of BJ (~ 12.8 mmol NO₃⁻) or placebo. The two experimental conditions were administered using a randomized, double-blind, crossover design. The CF workout consisted of repeating the same exercise routine twice: Wall ball shots plus full back squat with 3-min rest (1st routine) or without rest (2nd routine) between the two exercises. A 3-min rest was established between the two exercise routines. Before and after the CF workout mechanical fatigue was assessed. Blood collection to determine nitrate-nitrite and hormone plasma concentrations (cortisol and testosterone) were performed under resting conditions (pretest) and after completing mechanical fatigue assessment (post-test). A two-way analysis of variance with repeated measures was applied to compare the effects of the two experimental conditions. A statistical level of $p < 0.05$ was accepted. All data are expressed as mean $\pm$ SD

RESULTS:

Nitrate-nitrite plasma concentrations were higher after BJ intake (377.7 $\pm$ 84.4 μ M) than placebo conditions (25.9 $\pm$ 6.0 μ M) ($p < 0.001$). An interaction effect was observed in the number of repetitions performed ($p = 0.01$). The Bonferroni test determined a higher number of repetitions after BJ (80.1 $\pm$ 3.5) than placebo intake (76.9 $\pm$ 4.7) when a 3-min rest between WB and FBS (1st routine) was established ($p = 0.01$). An interaction effect was detected in cortisol response ($p < 0.05$). Cortisol showed a higher increase after BJ compared to placebo intake (70% vs. 35%, respectively). No interaction effect was observed in the testosterone and testosterone/cortisol ratio ($p > 0.05$). An interaction effect was verified in muscular fatigue ($p < 0.05$) with a higher muscular fatigue being observed with BJ than placebo ($p < 0.05$).

CONCLUSION:

BJ intake improved anaerobic performance only after the recovery time between exercises. This increase in performance in the first routine probably generated greater hypoxia in the muscle mass involved, possibly conditioning post-exercise performance. This was observed with a fall in muscle fatigue measured at the end of

- REFERENCES
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WHEY PROTEIN SUPPLEMENTATION DOES NOT ACCELERATE RECOVERY FOLLOWING A SINGLE BOUT OF ECCENTRIC EXERCISE

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INTRODUCTION:

Eccentric exercise induces muscle damage, resulting in a transient decline in muscle function and performance. It is unclear whether protein supplementation can accelerate recovery following a bout of intense eccentric exercise. In the present study we investigated the impact of protein supplementation on recovery of muscle function and muscle soreness following unaccustomed eccentric exercise.

METHODS:

Forty recreationally active males (24 $\pm$ 4 y, BMI 23 $\pm$ 2 kg/m²) participated in a double blind, randomized, parallel placebo-controlled trial, comprising a 9-day supplementation period with twice daily supplementation of whey protein (PRO; 60 g/day) or an iso-energetic carbohydrate (CON). Measurements of muscle function, and soreness were conducted before, and 0, 3, 24, 48, and 72 h after performing 100 drop jumps on day 5 of the supplementation period. Muscle function was assessed by maximal voluntary isometric (60° knee angle) and isokinetic contractions (90 and 180°·s⁻¹ angular velocity) of the upper leg muscles and by countermovement jumps. Blood markers of muscle damage and inflammation included creatine kinase (CK) and C-reactive protein (CRP). Muscle soreness was assessed by Visual Analogue Scale (VAS). Mixed-model ANOVA was applied to assess whether recovery following eccentric exercise differed between groups. Data are presented as mean $\pm$ SD.

RESULTS:

No differences were observed between groups at baseline for any of the outcome variables. During the supplementation period, total protein intake increased from 1.1 $\pm$ 0.3 to 1.7 $\pm$ 0.2 g/kg/body mass in PRO and decreased from 1.2 $\pm$ 0 to 1.0 $\pm$ 0.2 g/kg/body mass in CON (time x treatment interaction, $P < 0.0001$). After an initial decline in maximal voluntary isokinetic contraction at 180°·s⁻¹ from 129.1 $\pm$ 31.9 to 109.6 $\pm$ 30.6 (-14.9 $\pm$ 9.7%) and 134.3 $\pm$ 27.4 to 118.0 $\pm$ 28.2 N·m (-12.1 $\pm$ 11.6%) in PRO and CON, respectively, recovery of maximal voluntary isokinetic contraction at 180°·s⁻¹ was slower in PRO as opposed to CON (time x treatment interaction, $P = 0.011$). In line, the recovery of maximal voluntary isokinetic contraction at 90°·s⁻¹ was also slower in PRO as opposed to CON (time x treatment interaction, $P = 0.044$). In contrast, the recovery of maximal voluntary isometric contraction did not significantly differ between groups (time x treatment, $P = 0.555$). Countermovement jump performance showed a transient decline following eccentric exercise, but changes did not differ between groups (time x treatment, $P = 0.518$). CK and CRP showed a temporary increase (time effect, $P < 0.0001$) over the 72h period, with no differences