The effect of beetroot juice supplementation dose on neuromuscular performance during resistance exercise

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Dietary nitrate supplementation, administered as beetroot juice (BR), enhances powerful and fast contractions; however, whether BR impacts resistance exercise performance and if dosing influences the efficacy of nitrate are underdeveloped. The purpose of this study is to assess whether BR supplementation influences neuromuscular performance (muscle power and speed), in healthy, recreationally active males. In a double-blind, randomized crossover design, 15 males will be randomly allocated to consume 4 x 70 ml of BR over four conditions: (1) 4 x 70 ml of nitrate-depleted BR for placebo (PL); (2) 1 x 70 ml of nitrate-rich BR and 3 x 70 ml of PL for a low nitrate dose (BR-LOW); (3) 2 x 70 ml of nitrate-rich BR and 2 x 70 ml of PL for a moderate nitrate dose (BR-MOD); and (4) 4 x 70 ml of nitrate-rich BR for an elevated nitrate dose (BR-HIGH). Participants will report to the laboratory 5 times over 5-wk. Participants will complete a 1 repetition max (1RM) and a familiarization to the exercise protocol. On experimental visits, participants will complete a warm up and then a protocol to assess explosive performance using a linear transducer and force plate during vertical countermovement jumps, and then back squat and bench press, in a randomized order. A resting blood sample will be drawn for the determination of plasma nitrate and nitrite concentrations. These data could provide insight for dietary nitrate as an ergogenic aid and inform both supplementation guidelines and recommendations for enhancing resistance training performance in men. **(250 words)**

Keywords: beetroot, ergogenic aid, dietary nitrate, nitric oxide, resistance training

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Back squat: peak power in watts (W) (Day 1: condition A: 1716.44 ± 501.17 vs. condition B: 1718.33 ± 515.35, P>0.05), (Day 4: condition A: 1764.18 ± 455.26 vs. condition B: 1798.56 ± 543.23, P>0.05), mean power in watts (W) (Day 1: condition A: 678.08 ± 159.45 vs. condition B: 692.78 ± 145.36, P>0.05), (Day 4: condition A: 698.80 ± 142.99 vs. condition B: 674.19 ± 187.77, P>0.05), peak velocity in meters per second (m/s) (Day 1: condition A: 1.46 ± 0.15 vs. condition B: 1.58 ± 0.37, P>0.05), (Day 4: condition A: 1.49 ± 0.14 vs. condition B: 1.46 ± 0.21, P>0.05) mean velocity in meters per second (m/s) (Day 1: condition A: 0.75 ± 0.06 m/s vs. condition B: 0.76 ± 0.06, P>0.05), (Day 4: condition A: 0.76 ± 0.05 vs. condition B: 0.75 ± 0.07, P>0.05).

Bench Press: peak power in watts (W) (Day 1: COND A: 638.78 ± 109.10 vs. condition B: 670.67 ± 151.06, P>0.05), (Day 4: condition A: 690.79 ± 142.74 vs. condition B: 712.22 ± 190.64, P>0.05), mean power in watts (W) (Day 1: condition A: 398.42 ± 74.96 vs. condition B: 410.56 ± 87.35, P>0.05), (Day 4: condition A: 418.44 ± 89.50 vs. condition B: 427.00 ± 96.81, P>0.05), peak velocity in meters per second (m/s) (Day 1: condition A: 0.87 ± 0.14 vs. condition B: 0.89 ± 0.12, P>0.05), (Day 4: condition A: 0.91 ± 0.15 vs. condition B: 0.92 ± 0.13, P>0.05), mean velocity in meters per second (m/s) (Day 1: condition A: 0.59 ± 0.06 vs. condition B: 0.60 ± 0.06, P>0.05), (Day 4: condition A: 0.62 ± 0.06 vs. condition B: 0.62 ± 0.05, P>0.05).

There were no sig dif in peak power (SQUAT: cond a: mean +/- sd vs. COND B: same thing; BENCH: cond a vs cond b *P*>0.05)... for all variables