

Seven days of high and low dose creatine nitrate supplementation II: Performance

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Abstract

Background Creatine and nitrates are popular dietary supplements. While both have been examined in singularity, little is known regarding their co-ingestion relative to performance, side effects and safety. The purpose of this study was to examine the safety and efficacy of a creatine nitrate dietary supplement

Methods In a double-blind, crossover, randomized and placebo-controlled manner; 28 apparently healthy and recreationally active men and women (18 men, 10 women, 21.6±3.7 yr, 20.4±10.6% fat, 24.7±2.9 kg/m²) ingested daily supplements for 7-d consisting of a dextrose flavored placebo (PLA); a low dose of creatine nitrate (Low, 3g) and a high dose of creatine nitrate (6g). Participants repeated the experiment with the alternate supplements randomly with a 7 day washout period between each. Performance outcomes were: Bench and Leg Press 1RM, reps to fatigue during the 3rd set of BP and LP 1RM at 70% 1RM repeated 30 mins post supplement on days 1 and 6 and 4 km cycling time trial performance on days 2 and 7. Data were analyzed by repeated measure 4 x 3 x 2 MANOVA with Time, Group, and Gender as factors using Greenhouse-Geisser as appropriate and are presented as mean±SD. Testing occurred both pre supplement (pre) followed by post supplement exercise (post).

Results No significant group x time interactions were observed among supplementation groups. Therefore, results for the pooled cohort, separated by gender, are presented. Overall, we observed significant time, gender, and time x gender interaction for bench press and leg press 1RM and bench press lifting reps to fatigue (all, p<0.001), as well as for time to complete the 4-km trial (p<0.01) and average time trial power (p<0.001). A time x gender interaction for only bench press 1RM was observed. Female vs. Male bench press 1RM are: Day1 (89.2±16.9 vs. 203.6±43.8), Day1 Post Supplement (84.2±18.4 vs. 185.9±46.7), Day6 (92.2±19.5 vs. 206.5±45.2), Day 6 Post Supplement (87.3±16.7 vs. 193.0±46.4 lbs). Female vs. Male leg press 1RM: Day1 (630.2±113.0 vs. 1047.7±210.9), Day1 Post Supplement (606.3±111.1 vs. 1002.9±215.4), Day6 (652.5±121.1 vs. 1062.9±215.4), Day 6 Post Supplement (611.3±106.4 vs. 1020.4±213.7 lbs). All comparisons are significantly higher for males vs. females. Women decreased less post supplement compared to men for bench press 1RM. Female vs. Male reps to fatigue for the BP are: Day1 (14.9±6.0, vs. 13.7±4.8), Day1 Post Supplement (15.6±4.4 vs. 13.2±4.7), Day6 (15.9±5.2 vs. 14.1±4.9), and Day6 Post Supplement (17.2±4.9 vs. 14.5±5.2). All comparisons are significantly higher for females vs. males. No differences were found for leg press reps to fatigue. Time trial performance was significantly slower for women vs. men, respectively, at all testing time points: Day2 (390.8±79.3, vs. 209.9±35.2), Day7 (390.0±97.9 vs. 203.9±3.6 sec), with men also demonstrating significantly higher average power: Day2 (158.6±26.8, vs. 292.9±54.5), Day7 (161.6±32.3 vs. 304.1±59.3 sec).

Conclusion Ingesting 3 and 6 g/d of creatine nitrate for 7-days had no significant effects on performance measures in comparison to ingesting a placebo. Males were found to be stronger than females, but with significantly lower bench press endurance. Males also performed better on the bicycle tests regarding time to complete the time trial and the average power output associated with the cycling task.

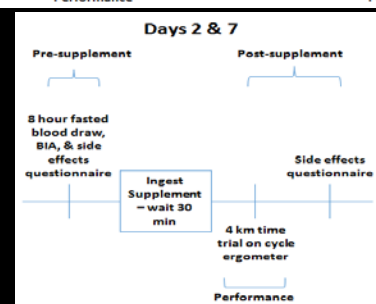
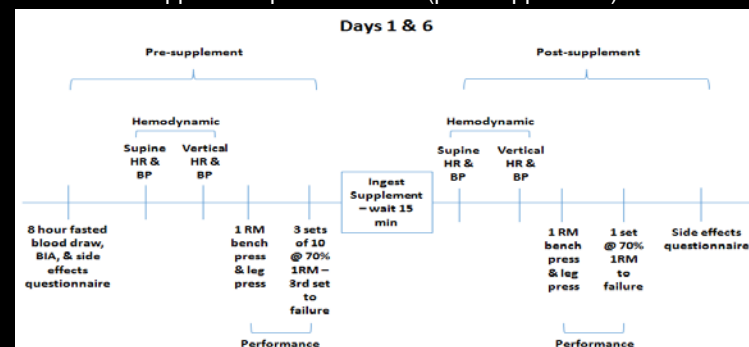
Background

Many individuals seek ergogenic aids to enhance their sports performance. Pre-workout supplements geared to increase workout

intensity are one such supplement. This study examines the potential exercise benefits of a supplement with creatine nitrate.

Methods

- 28 apparently healthy and recreationally active men and women (21.6±3.7 yr, 20.4±10.6% fat, 24.7±2.9 kg/m²)
- The blood donation occurred after 8+ hours of fasting on days 1,2,6 and 7 for each supplement
- Exercise testing occurred at the same time points as blood donation
- Participants were placed on a tilt table for 15 minutes prior to exercise to obtain resting HR & BP. Subsequent HR & BP were measured after 2 minutes vertical on the tilt table
- Participants then exercised to reach a bench and leg press 1RM, reps to fatigue during the 3rd set of BP and LP at 70% 1RM (pre supplement)
- Participants then ingested one of two different supplements, a low dose of creatine nitrate (Low, 3g: 2g Cr, 1g N) a high dose of creatine nitrate (6g: 4g Cr, 2g N), or a placebo containing 6g dextrose, daily for 7 days
- Participants were then placed back on the tilt table 15 minutes after ingestion, for an additional 15 minutes. HR&BP were measured in the exact same method as before.
- The aforementioned 1 RM bench press and leg press protocol were performed a second time followed by only reps to exhaustion to measure supplement/placebo effect (post supplement)



Statistical Analyses

Data were analyzed by MANOVA, using IBM SPSS for Windows version 22.0 software (Chicago, IL). Data are presented as changes from baseline as mean change; 95% confidence interval

Results

- Wilks' Lambda time (p<0.01) and time x gender (p<0.01) interaction were found for bp1rm, bpreps, lp1rm, lpreps.
 - Greenhouse-Geisser univariate analysis revealed significant changes over time (p<0.01) for bp1rm, bpreps, lp1rm.
 - Greenhouse-Geisser univariate analysis revealed significant changes over time x gender (p<0.01) for bp1rm.
 - Significant gender effects for bp1rm, bpreps, and lp1rm (p<0.01)
- Wilks' Lambda found a time effect for 4k time trial (p<0.01)
 - Greenhouse-Geisser univariate analysis revealed significant changes over time for average power (p<0.01).
 - Greenhouse-Geisser univariate analysis revealed significant differences for gender (p<0.01) for secs and average power.
 - No group differences found for group or group x gender.

Conclusions & Applications

- 7 days of acute ingestion of creatine nitrate high (6g/d) and low (3g/d) had similar effects to placebo with exercise results
- There were significant decrements after training, not significant between groups, most likely due to energy system fatigue
- No differences between groups was found to have a training benefit
- Slight training-effect was noticed
- Further research is needed to test exercise results with chronic usage

Acknowledgements & Disclosures

www.exercisendportnutritionlab.com

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Figures represent mean Δ with 95% confidence interval.

* Indicates differences between time points

Indicates linear and cubic interactions

