Our aim was to examine the acute (5 hr) hemodynamic (HR and BP) and hematologic profiles for (1) Placebo (PL), (2) Creatine Monohydrate (CM, 5 g), (3) Creatine Nitrate (CN, 1.5 g CR; 0.5 N), and (4) Creatine Nitrate 2x (CN, 3 g CR; 0.5 N) formulated, administered in a randomized, double-blind manner with 7 days of washout between treatments. Participants (N=13; 22±2 y) were presented for testing after abstaining from exercise and fasting for 8 hrs. Initial unsupplemented measures (Time 0) were assessed, followed by supplement ingestion and serial sampling (0.5, 1, 2, 3, 4, 5 hrs). Variables included heart rate, blood pressure, liver (ALP, AST, ALT), kidney (creatinine, BUN), and muscle (LDH, TCKR) enzymes, glucose and blood lipids. Analysis included GLM and LSD post-hoc procedures. Significant within group perturbations were noted for LDL-C (CM, PL), HDL-C (CN, 1.5 N), triglycerides (CN, 3 g PL), glucose (CN, 3 g; CM, 1.5 N), creatinine (all), CK (CN, 3 g PL, BUN, ALT) over the 5 hr study period (all, P < 0.01). Corresponding between group differences (all, P < 0.05) were noted for LDL-C (CN vs. PL, 5 hr), HDL-C (CN 1.5 vs. CN 3 g, PL), triglycerides (CN 3 g vs. PL, 5 hr), glucose (CN 1.5 vs. CN 3 g, 2 hr), CK (CN 1.5 vs. PL, 3 hr), and ALT (CM vs. CN 3 g, 4 hr). No change was noted for any analyte when compared to baseline. Analysis included GLM and LSD post-hoc procedures using IBM SPSS for Windows version 22.0 software (Chicago, IL) and are presented as means ± SD% change from baseline for each treatment group.

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Rationale

Although use of dietary supplements among U.S. adults is common and continues to grow, some state that little research exists on the safety of dietary supplements. It was estimated that dietary supplement sales reached $11.5 billion in 2012, and forecasts suggest sales will reach $15.5 billion by 2017. Although the safety and efficacy of creatine monohydrate has been established and thoroughly studied, the safety of the combination of creatine monohydrate and nitrate has limited research. Dietary supplement consumption leading to consistent changes in heart rate, blood pressure, liver, kidney, muscle, and blood lipids could be interpreted unsafe. The purpose of this experiment is to examine the heart rate, blood pressure, and blood profile response to four treatments—(1) Placebo (PL), (2) Creatine Monohydrate (CM, 5 g), (3) Creatine Nitrate (CN, 1 g CR; 0.5 N), and (4) Creatine Nitrate 2x (CN, 2 g CR; 1.0 g N)—administered in a randomized, double-blind manner with 7 days of washout between treatments.

Methods and Procedures

- Subjects were recruited through flyers and email using the university’s Listserv.
- Body mass and height, resting blood pressure, and heart rate were obtained during the familiarization session.
- Fasting blood samples were obtained after an 8 hr fast (Time= 0).
- Blood samples were donated at baseline (0) and after (0.5-hr, 1-hr, 2-hr, 3-hr, 4-hr, and 5-hr) supplementation.
- 4-day food records were obtained at each visit and analyzed.

Statistical Analysis

- Analysis included GLM and LSD post-hoc procedures using IBM SPSS for Windows version 22.0 software (Chicago, IL) and are presented as means ± SD% change from baseline for each treatment group.

Significant within group perturbations were noted for LDL-C (CM, PL), HDL-C (CN, CNX2), triglycerides (CNX2, PL), glucose (CNX2), creatinine (all), CK (CNX2, PL), BUN (all), ALT (PL) over the 5 hr study period (all, P < 0.05).

Corresponding between group differences (all, P < 0.05) were noted for LDL-C (CN vs. PL, 5 hr), HDL-C (CN vs. CNX2, 4 hr), triglycerides (CNX2 vs. PL, 5 hr), glucose (CN vs. CNX2, 2 hr), CK (CN vs. PL, 2 hr), and ALT (CR vs. CNX2, 4 hr).

Conclusions

- Given a lack of consistent patterns for any analyte we have demonstrated that CR, CN, and CNX2 are well tolerated and do not adversely affect hemodynamic or hematologic function when acutely ingested.