

Effects of Creatine, Amino Acid, and Protein Supplementation on Performance

What Was the Question?

Various supplement companies often tout creatine as the ultimate performance-enhancing supplement, as it allegedly allows athletes to train at higher intensities and recover more quickly from fatigue. In addition, it has been hypothesized that protein and amino acid supplements facilitate muscular adaptation after exercise because protein and amino acids are necessary for repairing damaged tissue and for synthesizing myofibrillar proteins that contribute to muscle-fiber hypertrophy. It is also believed that there is a post-workout window in which individuals are able to absorb nutrients such as proteins and amino acids more efficiently. Is it possible that the combination of creatine, amino acids, and protein could synergistically provide greater training effects than any of them could individually? Does ingesting a drink containing these three substances offer any advantages over a carbohydrate drink when testing for improvements in body composition, strength, muscular endurance, and anaerobic power production?

What Was Done?

Over a 10-week period, Beck et al. (2007) analyzed 51 men without experience in resistance training. The men ranged in age from 18.9 years old, to 24.7 years old, and each performed both pre and post tests for body composition, anaerobic performance (peak power [PP] and mean power [MP] using Wingate Anaerobic Tests), strength (1 repetition maximum [1-RM]), and muscular endurance (maximum number of repetitions performed with 80% of a subject's 1-RM). The participants were then randomly divided into a test group and a placebo group. Both groups were assigned the same

resistance-training regimen, which consisted of dynamic, constant, external-resistance, bilateral leg extensions, and a bench press performed three times a week for 10 weeks. Training sessions consisted of two warm-up sets for each exercise, followed by three sets of 10 repetitions at approximately 75 percent of a subject's 1-RM. Training loads were adjusted over the course of the experiment to maintain these values. Furthermore, all participants received their requisite drink within 10 minutes after their workout, in order to take full advantage of the post-workout window. The test group's drink contained a combination of protein, amino acids, and creatine, while the placebo group's drink contained trace amounts of these elements as well as 29 grams of carbohydrates. Both drinks had a similar total caloric content. In week 11 the participants were once again tested for body composition, anaerobic performance, strength, and muscular endurance.

What Was Found?

Beck et al. found that, contrary to their hypothesis, there were no differences in body weight, body composition, 1-RM, or muscular endurance between the test and placebo groups after 10 weeks of training (i.e., both groups improved). However, there was a significant increase in PP and MP in the test group, which was not present in the placebo group. The researchers suggested that their findings were consistent with other studies that found correlations between creatine ingestion and resistance training. Nonetheless, the present investigation did not isolate the independent effects of creatine from protein and amino acids.

What Does the Study Mean?

These findings confirm that the ingestion of a supplement containing creatine, amino acids, and protein during a resistance-training regimen increased anaerobic capacity compared to a carbohydrate placebo. The authors suggest that this finding is important for athletes involved in such activities as sprinting, wrestling, and high-intensity short-duration cycling and swimming. They also suggest that further research is necessary to determine the robustness and generalizability of these findings. Different training durations and intensities, and subjects with various levels of pre-experiment training, were suggested as variables that need more study.

Reference

Beck, T. J., Coburn, J. W., Cramer, J. T., Housh, T. J., Johnson, G. O., & Malek, M. H. (2007). Effects of a drink containing creatine, amino acids, and protein combined with ten weeks of resistance training on body composition, strength, and anaerobic performance. *Journal of Strength and Conditioning Research*, 21(1), 100-104.

—Abstracted by Adam Lang, an undergraduate student in the Department of Nutrition and Exercise Sciences at Oregon State University, Corvallis, OR 97331.

Submissions Welcome!

Readers may send Research Works abstracts to Donald Siegel, Department of Exercise & Sports Studies, Smith College, Northampton, MA 01063; email: dsiegel@smith.edu