

Supplement Project – Part 2

Name:

Topic: Beta Alanine and Its Effects on Exercise and Performance

Article 1 Title: Effects of Acute Beta Alanine Supplementation On Anaerobic Performance in Trained Female Cyclists

Author: Jordan M. Glenn, Keyona Smith, Nicole E. Moyen, Ashley Binns, & Michelle Gray

Summary: Beta Alanine, an amino acid that functions as a precursor to the protein carnosine, tends to produce higher levels of carnosine in women than in males. Thus, this study tested the results of acute beta alanine supplementation, followed by rigorous exercise in women. This was a double-blind and placebo controlled experiment of twelve women, all volunteers. The study showed that actual physiological results were not found after supplementation, but that psychologically the women who took the beta alanine had a lower "rating of perceived exertion" than when the women did not take the beta alanine. The study also concluded that beta alanine supplementation increased exercise time before fatigue set in (compared to exercise without beta alanine).

All together, the main findings of this study were that women do not need as much beta alanine supplement as do men to get very similar levels of carnosine in their muscles. It also concluded that although beta alanine (in acuted doses) does not necessarily improve performance, it definitely lowers the perceived exertion rates of exercising women. These results are consistent with the claims made about beta alanine, specifically that claims that this supplement increases carnosine levels and that it lessens the impression of fatigue during exercise.

Article 2 Title: Evidence-Based Evaluation of Potential Benefits and Safety of Beta-Alanine Supplementation for Military Personnel

Author: Richard Ko, Tieraona Low Dog, Dennis KJ Gorecki, Louis R Cantilena, Rebecca B Costello, William J Evans, Mary L Hardy, Scott A Jordan, Ronald J Maughan, Janet W Rankin, Abbie E Smith-Ryan, Luis G Valerio Jr, Donnamaria Jones, Patricia Deuster, Gabriel I Giancaspro, and Nandakumara D Sarma

Summary: This article looks at the overall effectiveness and safety of beta alanine supplementation, specifically in military personnel. Because military individuals have daily physical demands and certain individuals have extremely difficult physical

commands, these researchers wanted to know if beta alanine supplementation would help military personnel reach their fitness goals easier and faster.

The results showed very mixed reactions to beta alanine supplementation. They looked at previous studies and found that the lack of long-term studies makes beta alanine benefits very unsure. Overall, the study does not show that beta alanine has worthwhile improvements to fitness. It also shows that many people who took the supplement had paresthesia side effects, making beta alanine a bad choice for a fitness supplement.

Article 3 Title: Effects of Beta-Alanine Supplementation and High-Intensity Interval Training on Endurance Performance and Body Composition in Men

Author: Abbie E Smith, Ashley A Walter, Jennifer L Graef, Kristina L Kendall, Jordan R Moon, Christopher M Lockwood, David H Fukuda, Travis W Beck, Joel T Cramer and Jeffrey R Stout.

Summary: This study tested forty-six college aged men who were regularly physically active, but had not taken any form of supplements in the recent past. The study was a double-blind study, with the research group receiving beta-alanine supplements for six weeks and the control group receiving a placebo. The goal was to see if beta-alanine supplements made a difference in the men's ability to perform high-intensity interval training and to see if it helped change body composition within six weeks. Both groups of men performed HIIT exercise at 90-110% of their VO2Max for the first three weeks, adding about 5% more during the last three weeks of training.

The results of the study showed that the group who took beta-alanine supplements had better results than the control group. For example, both groups increased their VO2Max, but the group taking beta-alanine increased theirs even more. Thus, it appears that beta-alanine supplementation may "enhance the benefits of high-intensity interval training." The results also claimed that one of the reasons for these benefits were that beta-alanine increased the muscle's ability to buffer acidity for a longer amount of time. Also, the group with the supplements had a substantial change in their lean body mass, whereas the control group didn't see much change. Overall, this study supports the use of beta-alanine with endurance training, specifically HIIT.

Article 4 Title: International Society of Sports Nutrition Position Stand: Beta-Alanine

Author: Eric T. Trexler, Abbie E. Smith-Ryan¹, Jeffrey R. Stout, Jay R. Hoffman, Colin D. Wilborn, Craig Sale, Richard B. Kreider, Ralf Jäger, Conrad P. Earnest, Laurent Bannock, Bill Campbell, Douglas Kalman, Tim N. Ziegenfuss and Jose Antonio

Summary: This group of authors examined a large collection of previous research studies and results with the supplement beta-alanine, and then documented the findings and published their official opinion on the use of beta-alanine as a supplement. This article includes discussions about beta-alanine effects on exercise, dosage, strategies and procedures for supplementation, and the safety of this supplement. Within the topic of exercise, they discussed aerobic, anaerobic, strength training, and fatigue.

The results this group of authors published are as follows: In aerobic exercise, beta-alanine results in improved performance, specifically for exercise less than twenty-five minutes. For anaerobic exercise it also improves performance, namely by enhancing the muscles buffering ability. However, for exercise less than one minute, beta-alanine did not seem to cause any improvements. For strength training, previous studies have varied results. Thus, after comparison of these studies, they concluded that the supplement does "increase training volume," but it doesn't necessarily increase strength as hypothesized in previous studies. Significantly boosted carnosine levels was one effect of supplementation that was absolutely agreed upon, meaning beta-alanine definitely functions as an acidity buffer. Lastly, they concluded that paraesthesia is a known side effect of beta-alanine, but that lowering the dosage per day could easily solve this problem.

Article 5 Title: Effect of Beta-Alanine Supplementation on Muscle Carnosine Concentrations and Exercise Performance

Author: Craig Sale, Bryan Saunders, and Roger C. Harris

Summary: This article begins its discussion by describing carnosine, a dipeptide that is formed by linking beta-alanine and histidine in muscle and brain tissue, and discussing its role in the body. Carnosine acts as a buffer in the body to maintain homeostasis, specifically by lowering the pH when abundant H⁺ ions are present. Beta-alanine, then, plays an important role in buffering as well, because it is the rate-limiting enzyme for the reaction that forms carnosine. Because acidity is typically related with high-intensity exercise, beta-alanine has been hypothesized to be a useful supplement for athletes participating in events such as sprint running, rowing, cycling, soccer, and other sports with short, high-intensity bursts of action.

The results clearly showed that beta-alanine supplementation does elevate the levels of carnosine in muscle tissue, making it a clear supplement that aids in pH buffering during exercise. They also concluded that with at least four weeks of supplementation, exercise capacity increases, specifically with high-intensity training. However, they also concluded that the useful levels of carnosine are still unknown and that the amounts of beta-alanine for optimal results is still questionable.

SUMMARY: Summarize all 5 research articles and discuss whether or not the research articles you found support the claims made about your supplement or group of supplements. If the science does not agree, why not? What are some possible reasons for the discrepancy?

All five of my articles covered slightly different aspects of beta-alanine supplementation and its role in exercise and sports performance. Altogether, the research studies I looked at concluded that beta-alanine decreases the impression of exertion during exercise, increases the benefits of high-intensity interval training, elevates the level of carnosine levels in muscle tissue, and seems to increase the capacity for exercise. On that last point, different articles had varying results, making increased exercise capacity a questionable effect of beta-alanine supplementation. Multiple articles also agreed that this supplement causes paraesthesia as a side-effect. Although some results are mixed, altogether the studies seem to suggest that beta-alanine is a useful supplement for people involved in high-intensity exercise. This result agrees with the claims I found on beta-alanine, especially claims regarding boosted carnosine levels, increased aerobic capacity, and enhanced pH buffering during exercise.

However, one of the claims made about beta-alanine was not supported. This was the claims that beta-alanine supplementation results in increased muscle mass and strength, which the studies I read found to be completely untrue. Although it helps with endurance exercise by reducing lactate buildup (and a low pH), beta-alanine has no effect on the size or strength of muscle, even when used as a supplement during strength training sessions. I think that knowing the role of carnosine and naturally found beta-alanine in the body makes it clear why it does not enhance strength - beta-alanine is simply involved with buffering, not much else. Because many people are looking to increase their strength by using supplements, I think this was a claim made before adequate research was done in an effort to sell a product. This discrepancy between claims and research results is not likely due to bad research, but rather due to a lack of research at the time that beta-alanine was first being used as a supplement.

Although a lot is now known about beta-alanine supplementation, almost all of my articles agree that more research is needed to fully understand the implications and safety of this supplement, especially in the long term. In the near future I expect to see more research studies published with more in-depth questions and results explaining beta-alanine and the best uses for athletes and other active individuals.

List of References

***APA Format**

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3. Smith, A.E., Walter, A.A., Graef, J.L., Kendall, K.L., Moon, J.R., Lockwood, C.M., ... & Stout, Jeffery R. Effects of beta-alanine supplementation and high-intensity interval training on endurance performance and body composition in men. Journal of the International Society of Sports Nutrition, 2009. 72 (3) p. 217-225.
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5. Sale, C., Saunders, B., & Harris, R.C. Effect of beta-alanine supplementation on muscle carnosine concentrations and exercise performance. Amino Acids, 2010. 39 (2) p. 321-333.