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REVIEW ARTICLE

EFFECT OF SINGLE DOSE OF BETA ALANINE ON PERFORMANCE OF SPRINTERS

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Effect of Single Dose of Beta Alanine on Performance of Sprinters

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Abstract – The purpose of the study was to determine the effect of single dose of beta alanine supplement on the performance of the university level sprinters the subjects comprised of 8 young male athletes (age 20-24) who has participated in inter-university athletic meet. After the pretest measurement, the next day athletes consumed beta alanine supplement (2.5gm) diluted with water one hour before the test. After proper warm-up the same procedure was followed. pre and post measurement of $\text{VO}_2 \text{ max}$ and VJH were documented. Statistical analysis was performed using SPSS 18.0 version software. Paired t-test was used for pre and post analysis to find the difference in vertical jump height (VJH) and $\text{VO}_2 \text{ max}$. Level of significance was set at 0.05. The result states that we can find that there is increase in the amount of oxygen consumed during posttest which ensure that the athlete do not fall into fatigue as fast as compared to pre examination.

Keywords – Beta-alanine, Sprinters, VJH and $\text{VO}_2 \text{ max}$.

INTRODUCTION

Beta alanine supplements has become a common practice among competitive athletes participating in a range of different sports. Although the mechanism by which chronic beta alanine supplements could have an ergogenic effect is widely debated, the popular view is that the beta alanine supplementation arguments intra muscular carnosine content, leading to an increase in muscle buffering capacity, a delay in the onset of muscular fatigue and a facilitated recovery during repeated bouts of high-intensity exercise. Beta alanine supplementation appears to be most effective for exercise tasks that rely heavily on ATP synthesis from aerobic glycolysis. However, research investigating its efficiency as ergogenic is remains equivocal, making it difficult to draw conclusion as to its effectiveness for training and competition (Bellinger, 2014).

A critical review of literature reveals that when significant ergogenic effect has been found, they have generally showed in untrained individuals performing bouts under laboratory conditions. The disparity in result from recent review clearly indicate the type of studies and exercise bouts previously employed have not allowed oral beta alanine supplementation to be optimally examined and utilized for its ergogenic properties (Artoli et al., 2009). Beta alanine supplementation is a relatively recent and growing area of research. It carries potential beneficial effects with high intensity exercise including anaerobic sprints

and resistance training. Limited research have been done till now to see the ergogenic effect of single dose of beta alanine (Sout, 2008). Moreover, studies most of the studies claiming ergogenic effect of beta alanine, have used supplements with multi ingredients thus, the effect of pure form has still not documented. Therefore, the study aims towards exploring the effect of single dose of beta alanine on performance in Sprinters.

METHODOLOGY

Eight male sprinters (age 20-24) were selected. Prior to the test they were examined to assure having any physiological problems (like liver function, cardio pulmonary, musculoskeletal, neurological complication or any system disorder) in the past 4 months. Subjects were given single dose (2.5 gm/100ml) one hour before the VO_2 and VJH tests. Statistical analysis was performed using SPSS 18.0 version software. Paired t-test was used for pre and post analysis to find the difference in vertical jump height (VJH) and $\text{VO}_2 \text{ max}$. Level of significance was set at 0.05.

Test for Anaerobic Power

Testing for anaerobic power was done using vertical jump height. Prior to the vertical jump height, the subjects were lead through 10 mins warm-up which consists of running, rotation exercises and stretches. The subjects chalked in the end of his finger tips and

stands side onto the wall, keeping both the feet on the ground, reaches up as high as possible with one hand and mark the wall with the tip of the fingers(M1). The subject from the static position jumps as high as possible and marked the wall with the chalk on fingers (M2).The assistant measured and record the distance between M1 and M2. The player repeats the test three times. The assistant recorded the best of three distances in centimeters and used this value to assess the player's performance (Changela, 2012).

Testing for Aerobic Power

Testing for aerobic power was done using Queens Step Test. Following the 5-10 minutes warm-up, subject undertook the step test, which was performed on stool of 16.25 inches(41.3cm)height for total duration of 3minutes. The metronome was used to monitor the stepping cadence, which was set at 90 beats per minute(complete 24 bilateral steps)for males. After completion of the test, the subjects remained standing while the carotid pulse was measured for 15seconds,5-20 seconds into recovery (chatterjee, 2004).

This 15 seconds pulse of converted into beats per minute and the following equation was used to predict the maximum oxygen uptake capacity:

$$POV \text{ max (ml/kg/min)} = 111.333 (0.426 \text{ pulse rate in beats/min})$$

Beta alanine powder was served to subjects before that it was fully dissolved in 100ml of water. Subject drank the beverage one hour before the testing work out. Subjects were instructed to report any possible side effects or discomfort to the researcher as well as their compliance with the performance of activity during the study.

RESULT

TABLE-I

Computation of paired t ratio of vertical jump height of sprinters

Vertical jump height	mean	Std. deviation	DF	Mean difference	Std. Error mean	t- ratio
Pre-post	3.00000	26.33846	7	28.56	9.31205	.322

*Significant at 0.05 level.

Table – I reveals that the mean=3 and standard deviation=26.34 respectively. Since, the obtained paired t ratio was lesser than tabulated value 2.14. It was found to be statistically for the degree of freedom 7 at 0.05 level of significant. The result clearly indicates that there is no significant improvement in vertical jump height of sprinters in one time consumption of beta alanine supplement.

TABLE-II

Computation of paired t test of Vo2 max of sprinters

Vo2 max	mean	Std. deviation	DF	Mean difference	Std. Error mean	t- ratio
Pre-post	-3.00000	25.33846	7	27.08	8.75205	.305

*Significant at 0.05 level.

Table – II reveals that the mean=3 and standard deviation=25.36 respectively. Since, the obtained paired t ratio was lesser than tabulated value 2.14. It was found to be statistically for the degree of freedom 7 at 0.05 level of significant. The result clearly indicates that there is no significant improvement in Vo2 max of sprinters in one time consumption of beta alanine supplement.

DISCUSSION AND CONCLUSION

Result of present study indicate that beta alanine was effective in improving the aerobic and anaerobic indices in sprinters but it was not significant enough to prove that single dose of beta alanine drastically enhance performance. Previous studies states that oral consumption of beta alanine supplement elevate carnosine level. carnosine ,a histidine-containing depeptide, is known to contribute to acid-base buffering in skeletal muscle It has also been shown that carnosine are more in sprinters than endurance athletes. And can be significantly elevate following spring training. Increasing muscle buffering capacity from a nutritional supplement, such as beta alanine, would likely provide a strength/power athlete the ability to withstand and maintain higher intensity workout resulting in improved performance.

The concept of physical working capacity, a measure of aerobic power, muscular endurance and efficiency is typically measured by oxygen consumption rate (vo2) during a maximal graded exercise test. Harris et al (2003) and hill et al (2005) suggest that oral beta alanine supplementation improve exercise performance=the proposed physiological role of carnosine in skeletal muscles are many and include pH buffering , function as an anti-oxidant,regulating muscle contractibility by exerting effect on Ca²⁺ sensitivity and excitation contraction and coupling inhibiting protein glycation and preventing formation of protein-protein cross links(9). Glycolytic enzymes, beta alanine supplement, and high intensity interval training(HIIT)as well as with increased mitochondrial density and improved blood flow due to increased capillarization.while a series of physiological adaptations are apparent, improvement in aerobic performance are also manifested in respiratory gas exchange(quantified by VT)(10).As in this study we can find that there is increase in the amount of oxygen consumed during posttest which ensure that the athlete do not fall into fatigue as fast as compared to pre examination.

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