

BETALANINE ADMINISTRATION AIMED AT HYPERTROPHY IN ATHLETES

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Abstract: The administration of food supplements is a practice considered common among athletes and sportswomen, due to the improvement in physical performance, associated with the reduction of fatigue in the athlete's musculature. One of the products that has been widely used is betalanine, mainly due to the numerous benefits it brings. Beta-alanine is an ergogenic aid with high potential to potentiate the effect of intramuscular carnosine, whose effect is related to sports performance and reduction of muscle fatigue. This effect can be observed, mainly, in long-term training, playing physiological roles, as many athletes incessantly seek to increase their plasma concentration in order to potentiate their training.

Keywords: Physical activity. Betalanine. Hypertrophy.

INTRODUCTION

Beta-alanine (BA) is a non-essential amino acid found naturally in animal products such as pork, poultry or red meat and also synthesized in the liver. This food also has great value in performance in the diets of athletes and sportsmen. This phenomenon is due to its ability to increase carnosine synthesis.

Carnosine is a dipeptide formed by the amino acids BA and L-histidine. As the body is unable to absorb carnosine directly and, in opposition to L-histidine, BA has the ability to increase the muscular reserves of carnosine in the body. However, its intake is considered the limiting factor for the muscle synthesis of carnosine, given that, as one of the side effects that can occur, there is a risk of increasing muscle contractions due to a higher concentration of carnosine.

As the main intracellular buffer protein, the main function of carnosine is the regulation of organic pH at 7. Said protein stimulates the sensitivity of muscle fibers to calcium, thus increasing muscle excitation-contraction.

When observing the referred effects, it was stipulated that the supplementation of BA improves the performance in efforts of exercises of long duration. However, when administering BA in high-intensity but short-duration activities, glycolytic energy metabolism prevails over the high-energy phosphagen system and over oxidative phosphorylation. In skeletal muscles, the bioavailability of BA is a limiting factor for carnosine synthesis, so its supplementation has been shown to consistently increase the carnosine content in the musculoskeletal system.

BA supplementation is shown to be effective in seeking to maintain its ergogenic properties, given that the supplement is efficient in potentiating the action of carnosine. Due to this characteristic, beta-alanine is currently configured as one of the main sports supplements consumed in the market.

The increase in muscle mass is considered a vital factor for the development of strength and stimulation of muscle hypertrophy, being considered a primary intervention of physical exercise. Added to this, hypertrophy is one of the goals of many recreationally trained individuals. Adequate levels of muscle mass are an important issue from a health point of view because, if their levels are low, there may be a correlation with several increased risks of various diseases, such as the cardiovascular diseases and cardiometabolic risk in adolescents, as well as type II diabetes in middle-aged and elderly adults, for example.

Muscle hypertrophy occurs when muscle protein synthesis exceeds muscle protein breakdown and, consequently, results in a positive net protein balance over a cumulative time frame. This goal could be achieved with resistance training and controlled administration of protein, stimulating muscle protein synthesis and leading to a decrease in

muscle protein breakdown. From a nutritional point of view, protein intake associated with optimal training is a potent stimulus for muscle protein synthesis.

Muscle growth is considered optimal and efficient when done with greater volumes of effort to maximize the muscle growth response. When the energy production capacity is increased, it is possible to optimize training and produce a greater amount of muscle metabolites. Thus, the so-called cellular swelling is promoted and the hypertrophic capacity is potentiated. Beta alanine has the ability to improve muscle performance when performing resistance training, so there is an increase in the percentage of lean mass.

It is also known that certain factors influence the organic response of beta-alanine, such as the dosage consumed, duration of use, possible co-ingestion during meals, co-supplementation with other compounds and adherence to other training protocols.

Therefore, the present work seeks to establish the relationship between the contribution and the benefits of beta-alanine supplementation for muscle hypertrophy in resistance training protocols.

METHODOLOGY

The present work consists of a qualitative review of literature that sought to address results found in research on the use of beta-alanine and its influence on the physical performance of athletes and sportswomen, whether in a comprehensive, orderly or systematic way. To carry out the work, the following steps were followed:

- 1) Selection of the corresponding themes;
- 2) Selection of samples found and used;
- 3) Analysis of the characteristics of the original research;
- 4) Analysis of the results obtained;
- 5) Conducting the review.

The databases of scientific literature and

techniques used in carrying out the review were Google Scholar, Scientific Electronic Library Online (SciELO), Virtual Health Library, Latin American and Caribbean Literature on Health Sciences (LILACS), using the search engines: “beta alanine and car-sinosine”, “betalanine and hypertrophy” and “Betalani-training program”.

Thus, the present work seeks not only to analyze the interface of sports medicine, but also to highlight the various contents on the subject in question, aiming to shed light on an educational path, clarifying possible influences on physical performance, the process of hypertrophy and administration of betalanine.

RESULTS AND DISCUSSIONS

The percentage of betalanine produced in the human body is extremely low, occurring within the liver, mainly through the degradation of uracil. For this reason, the substances can be consumed externally to the body, in ways rich in carnosine, anserine, balenin, such as meat, fish and poultry. Therefore, it is indisputable that the ingestion of BA in food in high concentrations is essential because it causes significant increases in carnosine. This means that BA supplementation is the most effective and practical way to increase muscle carnosine content, increasing hypertrophy in resistance training practitioners.

The administration of betalanine can also represent a greater achievement of strength, or the ability to lift a load or even repetitions of series. B-alanine supplementation is shown to be effective in increasing energy production when lifting loads equivalent to the individual's maximum strength or when working at maximum energy production. This data could be verified by the fact that supplementation at an approximate dosage of 6.4g/day optimizes the performance of high-intensity and short-duration exercises,

such as counter-resistance training. And, if there is an increase in training volume, it can even decrease the dosage - to approximately 4.8/day of the supplement - and obtain even more significant results when addressing hypertrophy.

Progressive mechanical tension overload is considered one of the main factors for muscle growth and changes in muscle architecture, achieved by increasing the intensity of resistance training effort. If high loads are used in association with a low number of repetitions and long rest intervals, the greatest development of mechanical tension occurs. A smaller number of repetitions, but with high loads, advocates mechanical tension and results in high levels of said neural recruitment, made up of fast-twitch muscle fibers. It is observed, then, that the betalanine supplementation tends to second the production of energy, allowing, thus, the potentiation of the maximum force and, consequently, to support more loads in the resistance training. This way, the organism has a greater capacity to produce greater mechanical tension, promoting muscle growth.

Regarding the side effects of betalanine, the literature addressed that patients who used 40mg/mg of supplementation presented hot flashes, redness, paresthesia and headache, however, of short duration. However, none of the patients described in the literature presented the aforementioned symptoms at the ingestion of the same dose when inserted in a diet, suggesting, therefore, that doses of BA must be accompanied by a normal diet in order to limit the risk of paresthesia.

FINAL CONSIDERATIONS

Finally, it is observed that BA supplementation fits as beneficial to patients who want hypertrophy, given the performance and results in resistance training.

The fleshiness plays a physiological role in the musculature, especially during intense exercise. Thus, its ergogenic effects can be explained. Thus, beta-alanine supplementation, due to increased karsinosine synthesis, contributes to muscle hypertrophy. BA, as well as the release of karsinosine in the body, must be used in favor of athletes and

sportsmen in a way that is accompanied by professionals in sports medicine, nutrology and nutrition, in order to have maximum and profitable performance, whether for patients who already practice sports, or for patients who are now starting to practice physical activity.

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