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# EFFECTS OF L-CARNITINE WITH MASS PROTEINS AND NATURAL SUPPLEMENTED ON LIVER FUNCTION TEST OF BODYBUILDING

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**Abstract:**

The study aimed to determine the effect of natural and artificial nutritional supplements on AST, ALT, ALP, and blood sugar. The cross-sectional study included 20 bodybuilders. Study samples were collected by making a tour to the gyms of bodybuilders aged between 20 and 30 years, and for a period of 3 months, which lasted from the beginning of October 2023 until the beginning of January 2024. The study samples included two groups. The first group of bodybuilding players, which numbered 10 players, took natural nutritional supplements such as bananas, milk, peanuts, and nuts. The second group included 10 players who took artificial nutritional supplements, which were L-carnitine and mass protein. Samples were collected at 3 intervals from each A group that was before they started taking the supplements, after a month of taking the supplements, and after two months of taking the supplements, and each group separately. **Results:** After 30 and 60 days of using natural nutritional supplements, bodybuilders' AST levels increased by 29.0±3.82 and 32.7±2.87, respectively, compared to the pre-supplement values of 25.7±2.67. Bodybuilders utilizing artificial nutritional supplements had higher AST levels after 30 and 60 days (31.7± 4.32, 32.7± 4.16) compared to before supplementation (26.0± 4.16). The study found that bodybuilders who took natural nutritional supplements experienced a significant increase in ALT levels after 60 days (30.7± 2.55) compared to their pre-supplement values (25.3± 3.77). The ALT level rose after 30 and 60 days. Taking artificial nutritional supplements resulted in a difference in ALT levels (25.7± 4.11, 32.7± 3.67) compared to pre-supplement values (22.0± 3.13). The ALP level rose to (77.0± 7.44) after 60 days of receiving artificial nutritional supplements. **Conclusion:**. The use of artificial nutritional supplements affected liver function, as AST, ALT, and ALP increased. Decreased blood sugar concentrations in natural and synthetic nutritional supplements.

**Keywords:** Bodybuilding, L-carntine with mass proteins, natural supplemented, AST, ALT, ALP, blood glucose

## INTRODUCTION

Sport is defined as a normal physical effort or skill practiced according to agreed-upon rules for the purpose of entertainment, competition, pleasure, excellence, developing skills, or strengthening self- or body-confidence[1]. Physical education is the integrated aspect of education that works to develop the individual and adapt him physically, mentally, socially, and emotionally through selected physical activities that are appropriate for the stage of growth, and which are practiced under the supervision of good leadership to achieve the highest human values[2].

Bodybuilding is more than a sport. It is considered a culture and an art. Bodybuilders are judged based on their muscular appearance, which includes several years of strength training, followed by a phase in which the athlete focuses on significantly reducing body fat to improve the appearance of the muscles. Bodybuilders fall into the category of weightlifters, and a distinction must be made between recreational bodybuilders and competitive bodybuilders who perform on stage [3, 4]. Bodybuilding is one of the sports that works to strengthen muscles, increase their size, and enlarge them, which gives the person an attractive appearance and strong muscles However, this sport has disadvantages such as Liver and kidney diseases, Enlargement of the prostate, Depression and psychological disorders, Heart disease, especially myocardial hypertrophy, high levels of cholesterol in the blood[5,6]

Nutritional supplements include many elements, including amino acids, carbohydrates, vitamins and minerals. The importance of nutritional supplements lies in the following: Providing the body with the energy needed for sporting activities, helping with recovery from training, maintaining muscle fibers after exercise, and rebuilding damaged cells,

increasing the anatomical cross-sectional area of muscle fibers, gain muscle strength[7]. AST, and LT marker of liver function, AST is found in the cells of the body, in the heart and liver, and to a lesser extent in the kidneys, muscles, and blood cells. The levels of the enzyme are low in healthy people, and when an injury occurs and damage to a specific tissue such as the heart, liver, or muscles, and damage occurs to energy production capabilities, the level of the enzyme rises through its release into the blood, such as an infarction[8]. Its levels increase when a metabolic defect occurs in the liver, which leads to a change in cell permeability and causes its secretion into the bloodstream outside the cells as a result of the breakdown of the cell membrane of the liver cells. This occurs in liver diseases such as cirrhosis, liver cancer, and cirrhosis[9].

## 1. MATERIALS AND METHODS

The cross-sectional study included 20 bodybuilders. Study samples were collected by making a tour to the gyms of bodybuilders aged between 20 and 30 years, and for a period of 3 months, which lasted from the beginning of October 2023 until the beginning of January 2024. The study samples included two groups. The first group of bodybuilding players, which numbered 10 players, took natural nutritional supplements such as bananas, milk, peanuts, and nuts. The second group included 10 players who took artificial nutritional supplements, which were L-Carnitine and mass protein. Samples were collected at 3 intervals from each A group that was before they started taking the supplements, after a month of taking the supplements, and after two months of taking the supplements, and each group separately. 5 ml of venous blood samples were drawn from the bodybuilders, and private data was collected in the study sample according to a form prepared for this purpose, which included age, date of sample collection, smoking (Appendix 1), as people with kidney and liver diseases were excluded. Blood was placed on gel tube, then centrifuged. The serum was transferred to Eppendorf test tubes using micropipettes for preservation at (-20 degrees Celsius) in deep freezing, for the purpose of biochemical procedures ALT, AST, ALP and blood glucose.

### Ethical approval

This study was conducted based on the ethical standards stipulated in the Declaration of Helsinki. Before taking the sample, The patient's informed written and verbal agreement was obtained, after the review and approval of the study protocol and subject's information by the local ethics committee according to the document number 13938 (including the number and the date in 11 / 9 /2023) to get this approval.

### Statistical analysis

The Minitab-17 statistical program was used to examine the results using the analysis of variance (ANOVA) test and the Duncan-test with a 0.05 probability level.

## 2. RESULTS

The results of the study showed an increase in the levels of AST in bodybuilders who took natural nutritional supplements after 30 and 60 days, which amounted to (**29.0± 3.82**, **32.7± 2.87**) compared to the levels of AST before they took the nutritional supplements, which were (**25.7± 2.67**). The AST levels after 30 and 60 days for bodybuilders who were taking artificial nutritional supplements reached **(31.7± 4.32**, **32.7± 4.16**) of taking the supplements compared to the AST levels before taking the nutritional supplements which were (**26.0± 4.16**). The results of the study showed an increase in the levels of ALT in bodybuilders who took natural nutritional supplements after 60 days, which amounted to (**30.7± 2.55**) compared to the levels of ALT before they took the nutritional supplements, which were (**25.3± 3.77**). While the ALT level increased after 30 and 60 days. A day of taking artificial nutritional supplements, which amounted to (**25.7± 4.11**, **32.7± 3.67**) of those taking the supplements compared with the ALT levels before they took the nutritional supplements (**22.0± 3.13**). The ALP level increased after 60 days of taking artificial nutritional supplements, reaching (**77.0± 7.44**).

**Table 1: The effect of natural and artificial supplements on ALT, AST, and ALP**

| Type of supplemented | Periods | ALP | ALT | AST |
|---|---|---|---|---|
| Natural | | 69.0 ± 7.51 a | 25.3 ± 3.77 b | 25.7 ± 2.67 b |
| | | 71.7 ± 5.94 a | 25.3 ± 2.59 b | 29.0 ± 3.82 ab |
| | | 71.3 ± 6.27 a | 30.7 ± 2.55 a | 32.7 ± 2.87 a |
| Artificial | | 69.0 ± 8.22 a | 22.0 ± 3.13 b | 26.0 ± 4.16 b |
| | | 69.5 ± 8.26 a | 25.7 ± 4.11 ab | 31.7 ± 4.32 a |
| | | 77.0 ± 7.44 b | 32.7 ± 3.67 a | 32.7 ± 4.16 a |
| | | 0.05 * | 0.05 * | 0.05 * |

***Similar letters in the same column mean that there is no significant difference between them**

As shown in Table 2, The results showed a decrease in the level of glucose in bodybuilders who practice bodybuilding and take natural nutritional supplements after 60 days that was(**83.8± 7.33**). As for people who take artificial nutritional supplements containing high proteins, including Mass protein and L-carnitine, glucose decreased after 30

and 60 days of taking the nutritional supplements that were (**85.7± 8.76**, **83.1± 9.11**) , at a probability level (p-value>0.05).

**Table 2: The effect of natural and artificial supplements on blood glucose**

| Type of supplemented | Periods | Random Blood Sugar |
|---|---|---|
| **Natural** | 0 | 91.7 ± 6.74 a |
| | 30 | 90.0 ± 8.59 a |
| | 60 | 83.8 ± 7.33 b |
| **Artificial** | 0 | 90.0 ± 8.01 a |
| | 30 | 85.7 ± 8.76 ab |
| | 60 | 83.1 ± 9.11 b |
| **P - Value** | 0.01 ** | |

***Similar letters in the same column mean that there is no significant difference between them**

## 3. DISCUSSION

These results agreed with the findings of [10] who observed an increase in both AST and ALT in athletes who take nutritional supplements and athletes who do not take nutritional supplements. The results also agreed with [11], who showed an increase in liver enzymes. The reason was attributed to An increase in liver enzymes leads to damage and destruction of some liver cells as a result of vigorous exercise, as a result of increased liver metabolism due to the increase in the level of amino acids, which leads to stress and damage to some cells [12].

Heimburger (1996) pointed out that smoking athletes who take nutritional supplements have increased liver enzymes, as smoking leads to the formation of carbon monoxide gas, which leads to a lack of oxygen in the liver cells and thus damage to those cells, which increases the secretion of ALT, which is found in a greater percentage in the liver. also indicated that the increase in the levels of AST, ALT, and ALP is due to a defect in the metabolic processes in the liver[13]. The increase in AST, ALT, and ALP indicates the susceptibility of some compounds to stimulate the oxidation process, which leads to liver stress and thus[14]. The release of large amounts of free radicals that affect the formation and function of hepatocytes [15]. Likewise, high levels of free radicals lead to inflammation, arthritis, and kidney inflammation, and lead to various diseases such as cancer, high blood pressure, diabetes, atherosclerosis, and early inflammation [16]. These results were in agreement with [17] regarding the effect of some nutritional supplements for bodybuilders.

A study conducted by Ko et al (2023) indicated that L-carnitine has great effectiveness in stimulating insulin secretion[18]. It is known that an increase in insulin in plasma leads to a decrease in glucose production in the liver, or the reason may be due to the action of arginine on the production of nitric oxide, which is an intermediary for insulin secretion. of pancreatic beta cells and thus the glucose concentration decreases [19]. In addition, oxidative imbalance, decreased activity of antioxidant enzymes, and dysfunction of the cell lining lead to high blood glucose and diabetes. It was found that arginine works to prevent oxidative stress and improve the regulation of internal antioxidants [20].

## 4. CONCLUSION

The types of nutritional supplements, specifically protein, consumed by players who practice the bodybuilding game with the aim of building huge muscles, contain a large amount of protein, and eating it for a long time or in large quantities severely affects the liver and causes damage from ammonia toxins that weaken the kidneys. It is also described that too much of it causes what is known as oxidation. Unnatural protein is one of the causes that harm the liver. The use of artificial nutritional supplements affected liver function, as AST, ALT,and ALP increased, while natural nutritional supplements did not effect on ALP levels. Decreased blood sugar concentrations in natural and synthetic nutritional supplements.

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