THE EFFECT OF SHORT-TERM CONSUMPTION OF HMB SUPPLEMENTATION ON HS-CRP AFTER ECCENTRIC RESISTANCE EXERCISE IN YOUNG FUTSAL PLAYERS

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ABSTRACT
Beta-hydroxy-beta-methylbutyrate (HMB) is a Leucine metabolite with protein anabolic effect. The aim of the study was to examine the effect of short-term consumption of HMB supplementation on Hs-CRP after eccentric resistance exercise in young futsal players. Twenty-four young male futsal players were selected and randomly divided into two groups of 12 of supplementation and placebo. Subjects consumed HMB or placebo for 6 days before a session of eccentric resistance exercise. Blood samples were taken to measuring Hs-CRP in 4 times. The results showed that the effect of HMB supplementation on Hs-CRP as an inflammatory marker was significant. In conclusion this supplementation may be used as factor for decreasing the body inflammation caused by intense exercises.

Keywords: Beta-Hydroxy-Beta-Methylbutyrate, C - reactive Protein, Exercise-Induced Muscle Damage, Inflammatory Marker

INTRODUCTION
The best and most efficient way to increase capability and achieve the peak of fitness is combining effective exercise and nutrition (Cooke et al., 2010). It May be followed by intense physical activity, muscle tissue due to metabolic and mechanical factors one or both to be damaged. Enzymes Serum rates and proteins in skeletal muscles are Signs of the functioning of the muscle tissue. And each is very different physiological and pathological conditions. Creatine kinas and lactate dehydrogenize are the most applicable serum marker of muscle damage, That may change after intense physical activity (Dehkhoda and Keyvan, 2010). Sports activities are also affects the C-reactive protein (CRP). Which is an indicator of inflammatory diseases and are potentially at risk of cardio - vascular deceases, Therefore, any intervention which reduces inflammatory markers, such as sports activities can be -cause of CRP - is followed by reduction of cardio vascular events (Faramarzi et al., 2009)?

Most of the time exercise-induced muscle damage, steams from abnormal performance of Eccentric activity. A prominent feature of this type of contraction, Apply additional pressure on Muscle fibers and soft tissue finally, muscle damage is the first step of doing that activity. Causing injury and develop muscular inflammation resulting from Eccentric activity has been reported in several researches. Rate of hardness is strongly and duration of activity or levels of condition of muscle exercise also depends on muscle training (Flakoll et al., 2004).

The results of some previous studies have shown that the use of nutritional factors and dietary supplements could be appropriate strategies for prevention of cell damage and increased inflammatory markers. One of the supplements is betahydroxy- beta-methylbutyrate or HMB, Which steam from chemical breakdown product of leucine amino acid that is naturally produced in the liver (Ghanbari et al., 2010). Research shows that this material decrease protein breakdown and provide cell precursors, Synthesis of cholesterol in cell membrane, helps maintain and improve muscle mass. Also plays an important role in reducing, Body inflammatory (CRP) markers (Ghanbari et al., 2010; Hoffman et al., 2004).

Many athletes, especially in teamsports, consume beta-hydroxyl-beta-methyl Bout rat (HMB) as a food supplement. Much research has been conducted on the effects of supplement on markers of cell damage.
Most of these studies have confirmed the positive impact HMB Reduce muscle damage and inflammatory markers (Hsieh et al., 2006; Paola et al., 2010; Phinney, 1997; Ramezani and Majid, 2011). But the other researchers have obtained conflicting results, and have shown that this supplement do not reduce inflammatory and muscular damage markers (Saki, 2011; Soheyli et al., 2008), the other necessities of the research, is that little research has been on the effect of supplements on inflammation in the body. Considering the results obtained from the study of HMB supplement CRP In this research we will check out the changes in CRP inflammation-steamed from muscular injury in young futsal players after short-term use of this supplement. The results of this research may be able to help athletes use this supplement.

**MATERIALS AND METHODS**

The current research is a semi-experiment. And conducted in pretest - posttest in four steps. And Statistical population has formed all young male athletes' ages ranging between 17 to 29 years. Statistical population of the 24 individuals has been selected. And randomly were divided into experimental group (supplement) and control (placebo group).

### Table 1: Average and standard deviation of physical and anthropometric characteristics of subjects

<table>
<thead>
<tr>
<th>Index group</th>
<th>Fat .percentage M±SD</th>
<th>Body weight (kg/m²) M±SD</th>
<th>Weight (kg) M±SD</th>
<th>Height (cm) M±SD</th>
<th>Age (year) M±SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supplement group</td>
<td>16.6± 1.22</td>
<td>25.4± 1.8</td>
<td>77.0± 9.43</td>
<td>173.6± 7.35</td>
<td>22.9± 1.84</td>
</tr>
<tr>
<td>placebo group</td>
<td>15.4± 2.06</td>
<td>23.1± 2.86</td>
<td>74.6± 11.08</td>
<td>179.3± 5.65</td>
<td>22.5± 1.81</td>
</tr>
</tbody>
</table>

Data collection tools included medical scales and height meter SECA model made in Germany, Caliper SLIM GUIDE America make, free weights and fitness machines, required equipment and laboratory accredited laboratory kits were used to measure Hs-CRP Production Company.

In this study, we tried factors and variables that influencing Research and in various stages of implementation, such as nutrition, temperature, body mass index, location, age, gender, Lack of diseases and history of health and activity levels are accurately monitored 48 hours before the test. For this purpose according to the schedule set Subjects. Participants took part in this research in anticipated tests. In this study two groups Participants included Workout supplement and placebo groups. Research fellow Using the pre-test - post-test protocol, Perform research and collected the required information. Participants in both groups eccentric resistance exercise with intensity 120 percent one repetition maximum; including the implementation of the 4 sets of 10 repetitions each leg press movement Open feet And bending the legs, participated, a researcher at the introvert to extrovert Participants helped in the Participants alone bearing the weight. It should be noted that the exercise program used in this study have previously been used in other studies (Van et al., 2003), All movements are under the supervision of researcher and his colleagues carried out in the halls and fitness bodybuilding.

A week before the test resistance, blood samples were taken to determine baseline levels of Hs-CRP; of the subjects were asked to avoid engaging in strenuous exercise and heavy works before 2 days the first blood sample. After sampling measurements of height, weight, body composition, one repetition maximum (1RM) and familiarity with a test run took place. After the measurements without being informed participants, were randomly assigned to a group of HMB supplementation and placebo groups (carbohydrates) and they were told 3 grams daily intake of supplements (tablets 3 mg) for 6 days with breakfast in the (Hoffman et al., 2004; Hsieh et al., 2006; Saki, 2011). From all of subjects were asked in both groups to follow their usual diet during the study, on the morning of the test subjects attended in were fasting for 8 hours. And second brachial vein blood samples were used to measure levels of Hs-CRP (pre-test) Then, half an hour after a received standard breakfast, the subjects performed the exercise protocol. Immediately and 24 h after exercise protocol in the third and fourth stage of the post-test blood samples were taken.
For the classification and adjusted data and descriptive statistics for the analysis of raw data and inferential statistics were used. First, the Kolmogorov-Smirnov test to check the normality of data distribution - Other tests to check the homogeneity of variances Levine, repeated measures ANOVA to examine differences between the different samples, and post hoc test was used Ben Times. All statistical calculations were significant at 05/0 and were performed using SPSS version nineteenth.

RESULTS AND DISCUSSION
The means and standard deviations In Hs-CRP values of two groups of participants in different stages of the investigation are shown in figures 1.

The test results analysis Variance In repeated measures showed Significant difference between the values of Hs-CRP In supplement and placebo groups In different stages of the test, the test 1 (before supplementation), pretest 2 (before exercise protocol), Posttest 1 (immediately after the exercise protocol) and posttest 2 (24 hours after the exercise protocol) Therefore, in general, time showed a Hs-CRP significant effect on values of (P=0.001), and also a significant difference was observed between the two groups (P=0.014).

Enzymes or serum proteins in skeletal muscle demonstrate the efficiency of muscle tissue Are Status of efficiency of muscle tissue and both are very important biological and pathological conditions. And increase in these enzymes, can be a sign of necrosis or tissue damage caused by acute and chronic injuries. The intensity rate of activity which muscular tissue can tolerate is the Point of failure. If intensity and exercise desired activity exceeds much more than this limit. Enzymes such as creatine kinase (CK) and Lactate Dehydrogenize (LDH) and intracellular proteins can leak into the interstitial fluid. That these materials are collected by the lymphatic system and purse into bloodstream, Therefore amount of these enzymes can be an indicator to measure the extent of muscular injury.

Following tissue injury, infection, inflammation, burns, the set of reactions that ultimately act collectively to prevent further damage, protect the body, eliminating the infection and activation. Repair processes, provide possibility to return to normal living organism this is called homeostasis, inflammation process, and also called acute phase the set of the initial responses. Releasing cytokines and regulatory as the factors involved in inflammatory responses (such as IL-6), Stimulates the production and secretion of a large number of various glycoprotein’s, is called acute stage of proteins (e.g. CRP) of the liver. Often CRP in the liver in response to IL-6 is produced. CRP after binding to the bacterial surface proteins, such as antibodies and covering it leads to phagocytosis and complement (Van et al., 2005).
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Idea that HMB affect on anabolic and catabolic processes has led to are the notion that the anabolic and catabolic hormones, growth factors (such as IGF-1) and inflammatory mediators may play a role. In effects of HMB In sports activities. Previous researches in children have shown that applied training programs suddenly associated with a dramatic increase in energy consumption, Began to increase. In proinflammatory cytokines and thus leads to reduce the values of IGF-1. If exercise is not combined with a good diet and sufficient and to be imposed a negative energy balance for the body for period of times, it may even reduce the overall growth. However, if compatibility is successful practices and to reach a new steady state are reduced levels of pro-inflammatory cytokines, simultaneously, the suppression of IGF-1 reduced and a return in axis of anabolic GH (growth hormone) - IGF-1 may occur, causing increased values of IGF-1 is greater than the values of exercise. However, few studies of the relationship between physical activity, consumption of HMB and changes in hormones anabolic / catabolic and mediator, HMB and changes in anabolic / catabolic hormones, and inflammatory mediators have examined. Previous studies have shown had no effect on testosterone levels HMB / epinephrine is testosterone. In contrast, immature sheep that consumed HMB increased GH and IGF-1 values of with increased muscle strength and bone mass was seen. Increased values of IGF-1 can are caused by increased values of GH. But as recent research has shown, can be caused by isoform secreted by the Myogenic cells. In human studies, researches have shown that consumption HMB caused Reduction inflammatory markers [Reactive protein C (CRP)] in patients with chronic obstructive pulmonary disease (COPD) who are admitted in ICU ward. Nevertheless, conclusive statements about influence consumer HMB Further research are needed (Ramezani and Majid, 2011). According to the findings of the research on anti-catabolic effects and other effects of HMB on muscular injury, can be examined its effect on the inflammation and reactions its related, issues. The findings of the present research with findings from Hsieh (2006) and Saki (2011), was not in line (Ramezani and Majid, 2011; Soheyli et al., 2008). Of reasons for the difference among the findings are the number of participants, Sampling procedures, and duration of supplementation, participants noted the protocol used to prepare. In general, it can be argued that there are many researches on the possibility of obtaining high contradictory. Effects of Variability of human in behavioral measurements the first was conducted by Clark Hull. In the 1940s Hull suggested that the performance of with seven components (e.g. motivation) to be determined. Since then, however, many studies have confirmed that the human individuals studies of physiological processes (in the present study to investigate the effect of HMB, the main purpose is) are not affected, but of large number of variables, including social culture of the participants (e.g., facilities or restrictions), race, external or internal motivation, self-esteem and emotional state also affected (Soheyli et al., 2008). Overall, the results of statistical analysis show that a Short term course of HMB markers CRP has been affected, as one of inflammatory markers CRP, and also not seen a significant difference between the supplement and placebo groups, respectively.

REFERENCES


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