

The Effect of Oral Consumption of Portulaca Oleracea Extract on Delayed Muscle Contusion

**Mohammad Sajadian^{1*}, Maryam Afrouzi², Mehdi Taghavinezhad³,
Masoumeh Khorshidi Mehr⁴**

^{1*}Department of Physical Education, Shoushtar Branch, Islamic Azad University, Shoushtar, Iran.
E-mail: m.sajadian86@gmail.com

²Department of Physical Education, Shoushtar Branch, Islamic Azad University, Shoushtar, Iran.

³Department of Physical Education, Shoushtar Branch, Islamic Azad University, Shoushtar, Iran.

⁴Department of Physical Education, Shoushtar Branch, Islamic Azad University, Shoushtar, Iran.

ABSTRACT

Sports, despite its many benefits to athletes and the general public, can also cause injuries. One of the most common of these injuries is delayed onset muscle soreness which often occurs as a result of extroverted activities in all individuals, especially during strenuous exercise. Therefore, this study aimed to investigate the effect of short-term use of portulaca oleracea supplement on the index on delayed muscle contusion in women. The present study is quasi-experimental in terms of method and applied in terms of effect. For this purpose, 20 active female subjects (who had three training sessions per week) were divided into an experimental group (n = 10) and a placebo group (n = 10). Subjects took 1200 mg of portulaca oleracea supplement daily for 7 days from 72 hours before to 72 hours after exercise. The research hypothesis was analyzed using the statistical method of analysis of variance with repeated measures (factor design within and between groups). After observing a significant difference, the Ben Foroni post hoc test was used. The significance level was also determined for all calculations ($p < 0.05$). The results of the research showed that; The concentration of lactate dehydrogenase, which is a major biochemical marker of muscle contusion, was significantly reduced in the experimental group (portulaca oleracea supplement) compared to the placebo group. Hence it was observed that; Portulaca oleracea supplement reduces muscle soreness.

KEYWORDS

Exercise Activity, Portulaca Oleracea Extract, Muscle Contusion, Athlete.

Introduction

Muscle bruising and pain are a common experience which occurs after performing unusual and intense activities, especially after resistance and extrovert activities. This issue is always a concern of coaches and athletes in various sports [12].

Physical activity and sports can cause harm, despite the many benefits to athletes and the general public. These injuries can vary depending on the level of physical fitness and training conditions of different people. [10] One of the consequences of exercise is muscle bruising. Muscle contusion is one of the most common sports injuries which is independent of the level of physical fitness and occurs frequently throughout a person's life and according to the severity and the

factors that cause it; it is divided into two types, acute and delayed. [1].

Symptoms of delayed muscle bruising include: Decreased range of motion, decreased muscle strength, muscle stiffness, and dryness, swelling, and inflammation, microscopic muscle damage, increased serum and plasma creatine kinase (CK) and lactate dehydrogenase (LDH) enzymes, and increased inflammatory response [2].

Although some researchers have reported the effect of resistance training on the spread of pain, bruising, and inflammation, but because weight training, especially the extroverted type, is always associated with muscle damage and inflammation [3].

The results of some research have shown that; inflammatory factors increase in response to strenuous exercise. On the other hand, in healthy specimens, a proven course of intense activity leads to an inflammatory response. Several studies show; Lactate dehydrogenase (LDH) and creatine kinase (CK) are important enzymes that participate in the conversion of lactic acid to pyruvate and the formation of adenosine triphosphate from adenosine diphosphate in the anaerobic system, respectively, and are also known as indicators of oxidative stress. Serum levels of skeletal muscle enzymes and proteins are signs of muscle tissue function and are very different in each of the physiological pathological conditions. Inflammatory markers are the most common serum signs of muscle damage that may change after strenuous physical activity [4,9]. Most of the time, muscle damage caused by exercise is prominently the result of the abnormal eccentric activity. The distinctive feature of this type of contraction is the application of double pressure on the muscle fibers, soft tissue, and finally muscle damage in the first time [7]. In muscle injuries, the enzyme creatine kinase shows the most changes and is a measure of muscle damage [5].

Today, the use of nutritional supplements such as antioxidants to prevent muscle damage, especially delayed muscle contusion, has received much attention from athletes and coaches in various sports. Medicinal plants have been used by humans for many years to fight disease as well as improve muscle pain [11]. One of these plants is portulaca oleracea, which has anti-inflammatory properties. Studies have shown that; Portulaca oleracea may have anti-inflammatory and analgesic properties on the other hand; studies have shown that; taking 1200 mg of portulaca oleracea supplement reduces quadriceps muscle pain while running on stairs. Portulaca oleracea, which grows all over the world and is widely used as a vegetable or spice, is the richest plant source of omega-1 and due to its tocopherol, beta-carotene, flavonoids, vitamin A and glutathione are important sources of antioxidants [6].

Prevention and treatment of bruises are one of the main concerns of coaches, athletes, and therapists, as pain and discomfort may interrupt exercise and injure the athlete [13, 14]. Delayed muscle cramps are generally the result of extroverted exercise. Athletes in various sports have been suffering from it for many years and researchers are trying to find a fundamental solution to deal with it and prevent it. According to the results of previous research, Muscle injury indices increase due to bruising from extroverted exercise during which negatively affects the performance of athletes. Also, the physical indicators of muscle contusion such as sergeant jump, swelling around the thigh, joint angle, and muscle pain always increase following extroverted exercises and play a negative role in the performance of athletes [8]. Given all the above, what is the effect of oral consumption of portulaca oleracea extract on delayed muscle soreness?

Methodology

The aim of this study was the effect of oral consumption of portulaca oleracea extract on delayed muscle contusion. The statistical population of the present study consisted of women who went to a club in Shushtar. A purposeful random sampling method was used to select the subjects and from the active people, 51 people were selected as subjects. Athletes were trained in one session on how to properly implement the training protocol and safety tips. In this way, first, the movement was done by the researcher and sufficient explanations were provided about it. Subjects then took turns performing the movement without weights and additional loads. During the implementation of the protocol, the subjects were given the necessary tips and feedback on how to perform the movement also, the general and specific warm-up of resistance exercises, body warm-up duration, how to perform the courses, and rest intervals between courses were explained to the subjects. The training protocol was such that the athlete sat on the chair of the machine and put his feet under the machine and the researcher selected the weight of the machine equal to 45% of muscle strength (1 RM) of each person. Athletes performed forward thigh and forearm movements in 4 sets, each set to the point of fatigue, and rested for 1 minute between each set. At the beginning of the plan, blood sampling will be performed in the early morning hours on an empty stomach. To do this, the athletes were asked to go to the gymnasium of Shushtar city on a regular day from 9:00 AM on an empty stomach. Sampling was done from the brachial vein of the right hand in a sitting position of 10 ccs before training and also after the training. 24, 48, and 72 hours after training fasting blood samples were taken again from athletes. After blood sampling and placing the blood samples of athletes in the cold box and observing the cold zone to prevent the decline of factors, the samples will be taken to the laboratory of Shushtar city immediately after blood sampling. After transferring the samples to the laboratory for serum sampling in a centrifuge made by Behdad Company, we performed serum at a speed of 6000 rpm. After serum collection, the samples were numbered and coded for testing and some of the serums were poured into tubes (disposable tubes) after centrifugation, and their lids were closed with para-film and will be placed in the freezer at a temperature of -20 degrees Celsius.

Table 1. Description of CK Factor (international unit per liter) in Two Groups

Indicator Dose		First Blood sampling	Second Blood sampling	Third Blood sampling	fourth Blood sampling
placebo	Average	118.08 18.06	115.65 23.90	134.112 23.70	145.23 21.21
Supplement of purslane	The standard deviation	117.31 8.90	120.11 12.09	133.54 9.09	129.14 16.01

The results of the two-way mixed analysis of variance to investigate the effect of portulaca oleracea supplement on CK concentration after muscle contusion are presented in Tables 1 to 3.

Results

The results of intragroup effects tests (effect of blood sampling stages), ie the study of the difference between the concentrations of the inflammatory index CK in the four blood samples are shown in Table 1.

Table 2. Results of Intragroup Analysis of Variance to Evaluate the Effect of Portulaca Oleracea Supplement on CK Inflammatory Index Concentration after Delayed Muscle Contusion

Source of changes	sum of squares	Degrees of freedom	average of squares	The value of F	Significance level
Blood sampling steps	22674	4	4670	12.14	0.001
Blood sampling steps	3097	4	967	2.98	0.14
Error	32198	60	549		

The table information shows that: The interaction effect of blood sampling stages and the group was not significant ($p = 0.14$ and $F = 1.23$), i.e the mean concentration of CK inflammatory index in each of the 4 blood sampling stages did not change between the 2 groups. The main effect of blood sampling steps is significant ($p = 0.001$, and $F = 12.14$) That is, there is a significant difference between the average concentration of CK index in 4 stages. To determine the location of differences, a post-test with Bonferroni correction was used, the results of which are presented in Table 3.

Table 3. Results of Bonferroni Post hoc Test to Examine the Differences in Ck Index at Different Times

Time i	Time j	difference in averages	standard error	standard error
3 days before training	24 hours before training	3.72	5.32	0.54
	24 hours later	-28.14	6.99	0.002
	48 hours later	-22.19	8.14	0.003
	72 hours later	-14.71	7.10	0.51
243 days before training	24 hours later	-28.87	5.48	0.0001
	48 hours later	-21.20	7.43	0.032
	72 hours later	-17.13	6.32	0.40
24 hours later	48 hours later	14.65	5.76	0.61
	72 hours later	21.23	7.12	0.59
48 hours later	72 hours later	8.98	5.10	0.91

The results of the post hoc test show; the mean CK index increased at 24 and 48 hours after training compared to 7 days and one hour before training. No significant difference was found between the mean CK in one hour before training and pre-test, and also between 24, 48, and 72 hours after training. The results of the intergroup test, ie the evaluation of the difference between the mean concentrations of the CK inflammatory index between the four groups, are given in Table 4.

Table 4. Test Results for Differences in CK Inflammatory Index Concentration between the Two Groups

Source of changes	sum of squares	Degrees of freedom	average of squares	The value of F	Significance level
group	2906	1	2906	3.30	0.032
Error	62341	16	3265		

The table information shows that; the main effect of the group is significant. ($P = 0.032$ and $F = 3.30$), so there is a significant difference between the mean of CK inflammatory index in the two groups. Results show the mean CK index was 130.31 in the placebo group and 115.54 in the suppository supplement group; That is, consumption of portulaca oleracea had a significant effect on reducing the inflammatory index of CK after muscle contusion.

Conclusion

Statistical data show the interactive effect of blood sampling steps and the group is not significant, That is, the average concentration of Ck inflammatory index in each of the 4 stages of blood sampling does not change between the 4 groups. Also, the main effect of blood sampling steps is significant That is, there is a significant difference between the average concentrations of CK index in the 4 stages. To determine the location of the differences, a post-test with Bonferroni correction was used, the results of which are shown in Table 4. The results of the post hoc test show the mean CK index increased at 24 and 48 hours after training compared to 7 days and one hour before training. No significant difference was found between the mean CK in one hour before training and pre-test, and also between 24, 48, and 72 hours after training. Table information shows that the main effect of the group is significant. Therefore, there is a significant difference between the mean of CK inflammatory index in the two groups. Results show the mean CK index was 130.31 in the placebo group and 115.54 in the suppository supplement group; That is, consumption of portulaca oleracea had a significant effect on reducing the inflammatory index of CK after muscle contusion. Because taking this supplement reduces the concentration of inflammatory enzymes caused by muscle soreness, we recommend taking this supplement to reduce muscle soreness in all athletes and other people.

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