

The Effects of *Portulaca oleracea* Seed Hydroalcoholic Extract on Pain Threshold

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Abstract— There are many plant extracts which can modulate pain response. The aim of this study was to investigate the effects of *Portulaca oleracea* seed hydroalcoholic extract on pain threshold in male mice. In this laboratory experimental study, animals were randomly divided to control and groups receiving low, moderate and high doses of *Portulaca oleracea* seed extract. Following intraperitoneally administration of extract, pain threshold was measured using tail flick test and data were analyzed using ANOVA. Our results indicated that 6mg/kg/body weight of hydroalcoholic *Portulaca oleracea* grain extract has anti-stabilizing activity on RBC membrane stability in male. Increased pain threshold was observed 30 minutes and 1 hour after administration of moderate dose of extract ($P < 0.05$ and $P < 0.01$, respectively), and also 30 minutes and 1 hour after administration of high dose of extract ($P < 0.001$). Our findings indicate that appropriate doses of *Portulaca oleracea* seed extract has pain reducing effects.

Keywords— *Portulaca oleracea*, Pain Threshold, Rat.

I. INTRODUCTION

PORTULACA oleracea is an annual succulent in the family Portulacaceae. Approximately forty varieties currently are cultivated. It has an extensive world distribution extending from North Africa through the Middle East and the Indian Subcontinent to Malesia and Australasia. It has smooth, reddish, mostly prostrate stems and alternate leaves clustered at stem joints and ends. The yellow flowers have five regular parts and are up to 6 mm wide. Seeds are formed in a tiny pod, which opens when the seeds are mature. Purslane contains more omega-3 fatty acids than any other leafy vegetable plant. Studies have found that Purslane has 0.01 mg/g of eicosapentaenoic acid (EPA). It also contains vitamins (mainly vitamin A, vitamin C, Vitamin

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E (alpha-tocopherol) and some vitamin B and carotenoids), as well as dietary minerals, such as magnesium, calcium, potassium, and iron. Also present are two types of betalain alkaloid pigments, the reddish betacyanins and the yellow betaxanthins. Both of these pigment types are potent antioxidants. The studies show that one hundred grams of fresh purslane leaves (one serving) contain about 300-400 mg of 18:3w3; 12.2 mg of alpha-tocopherol; 26.6 mg of ascorbic acid; 1.9 mg of beta-carotene; and 14.8 mg of glutathione. So, purslane is a nutritious food rich in omega-3 fatty acids and antioxidants [1]–[3]. The effects of portulaca on body systems has been proved in experimental studies. The recent studies demonstrate the neuroprotective role of purslane in the striatum and proposes its prophylactic potential against developing brain damage and Parkinson's disease [4]. Antitumor effect of *Portulaca oleracea* has also been reported [5], [6]. Effects of aqueous extract of *Portulaca oleracea* L. on oxidative stress, liver and spleen leptin have been demonstrated [7]. The aim of this study was to investigate the effects of *Portulaca oleracea* seed hydroalcoholic extract on pain threshold in male mice.

II. MATERIAL AND METHODS

A. Animals

Adult male *balb c* mice were purchased and raised in our colony from an original stock of Pasteur institute (Tehran, Iran). The temperature was at 23 ± 2 °C and animals kept under a schedule of 12h light: 12h darkness with free access to water and standard laboratory chow.

B. Protocol of Study

In this laboratory experimental study, animals were randomly divided to control (normal saline receiving) and groups receiving low (12.5 mg/kg/body weight), moderate (50 mg/kg/body weight), and high (100 mg/kg/body weight) doses of *Portulaca oleracea* seed extract. 30 minutes and 1 hour after intraperitoneally administration of extract, pain threshold was measured using tail flick test.

C. Statistical Analysis

All values are presented as mean \pm SEM. Statistical significance was evaluated by one-way analysis of variance (ANOVA) using SPSS 19. Significance was measured using Game-s Howell significant for the exact P values and significant differences are noted in the results. Differences with $P < 0.05$ were considered significant.

III. RESULTS

Increased pain threshold was observed 30 minutes and 1 hour after administration of moderate dose of extract ($P < 0.05$

and $P < 0.01$, respectively), and also 30 minutes and 1 hour after administration of high dose of extract ($P < 0.001$). There was no significant difference between pain threshold of control and animals receiving low dose of extract. There was not also significant difference between pain threshold of low and high dose receiving of extract (Figure 1).

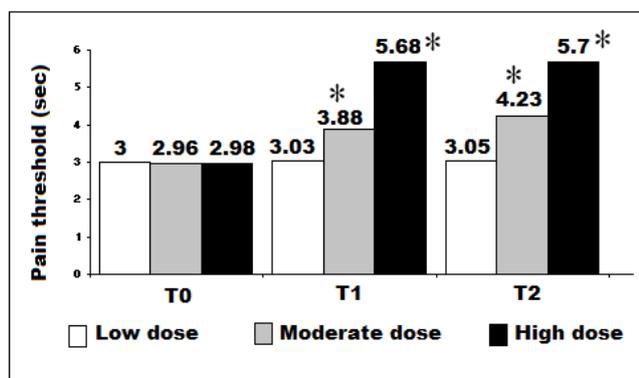


Fig. 1 Pain threshold before (T0) and 30 minutes (T1) and 1 hour (T2) after injection of *Portulaca oleracea* extract in male *balb c* mice. * indicates significant difference compared to control group.

IV. DISCUSSION

Our results indicated that appropriate dose of hydroalcoholic *Portulaca oleracea* seed extract has analgesic activity in male mice. In line with our findings, there are other studies showing that *Portulaca* has improving effects on neural system [4]. The antinociceptive effects of *Portulaca oleracea* has been also demonstrated in experiments on rat [8]. The results of experimental studies indicate that cultivar species of *Portulaca* also possesses some of the claimed traditional uses of the wild species in the relief of pain and inflammation [9]. Various compounds, including alpha-tocopherol, beta-carotene, glutathione, omega-3 fatty acids, antioxidants [1]-[3], N-cinnamoyl phenylethylamides, pyrrole alkaloid, phenylpropanoid acids and amides, and derivatives of benzaldehyde and benzoic acid, were isolated and identified from extract of *Portulaca oleracea* [10]. It has also been shown that alpha-tocopherol has a part in reducing inflammatory reactions [11], by which may have part in reducing the pain level. The reports indicate that antioxidants can relieve pain [12], therefore, because of considerable amount of antioxidants in *Portulaca oleracea* seed extract, the pain relieving effect of the extract mainly is attributable to antioxidants existing in the extract. Further research are required to determine that which components of *Portulaca oleracea* seed extract has analgesic activity.

V. CONCLUSION

We have shown that appropriate doses of *Portulaca oleracea* seed extract has pain reducing effects; according to which, it is of importance from clinical point of view in the field of pain management.

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