



## The effects of mallow's hydro alcoholic extract on reducing the anxiety caused by convulsion in mice

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### ABSTRACT

Convulsion is a limited brain event due to abnormal discharge of brain neurons which is still a medical challenge despite medical advances. Anxiety is a natural feeling that is experienced in threatening situations. Anxiety patients use benzodiazepines constantly which have side effects. This study was carried out to investigate the effects of mallow's hydro alcoholic extract on reducing the anxiety caused by convulsion. Forty mature mice from Balb/C race were randomly divided into five groups: Control, pentylenetetrazole and 50, 100 and 200 mg/kg doses of extract. The extract was injected intraperitoneally. Convulsion was enforced using pentylenetetrazole 65 minutes before injection. Evaluation was done using elevated plus maze and remaining times in closed and open arms were analyzed using variance analysis and Duncan test. According to results, pentylenetetrazole reduced the activity, the percentage of open arm entries, and time spent in the open arms significantly. Activities of all experimental groups were normal (about control group). The percentage of open arm entries was normal (about control group) for 100 and 200 groups. Mice of 200 mg/kg group were more willing to stay in open arms in proportion to control group. So, ethanol extract of Mallow in 200 mg/kg dose can reduce the anxiety of PTZ-induced convulsions.

**Keywords:** Mallow, convulsion, anxiety, pentylenetetrazole, mice

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### INTRODUCTION

Convulsion occurs because of sudden and abnormal electrical discharge in cerebral cortex and is followed by changes in sensory situation, behavior, movement, perception and consciousness appearances. Changes are short time such as white eyes (climbing pupil) for one second. The convulsion appearance is related to involved part of brain. Most of convulsions are sudden and transient [1]. Epilepsy is one of the neural system disorders which is 0.5-1% of human beings are living with this disease and about 50 million people are suffering from it. About 20 to 30% of these patients are resistant to medical treatment [2].

Anxiety is a common psychiatric symptom which is associated muscle tension, irritability, difficulty in sleeping and irritability. It is more common in women than men and has 7.17% twelve months prevalence rate [3].

Epilepsy is a chronic disease in children and adults and has a close relation with psychiatric problems. Considering the anxiety symptoms and depression and adaptation to epilepsy situation, patient must accept the disease and treatment. No predictable attacks enhance also the patient's anxiety [4]. So, checking these disorders which are the most common symptoms of epilepsy and accurate diagnosing of them is really important for controlling the disease [3].

Traditional medicine tries to replace synthetic drugs by using extant chemical compounds of plants or by mixing various parts of different plants. On the other words, the goal of traditional medicine is improving the performance of one system in relation to other systems and this is the reason that herbal drugs have wider therapeutic range in

proportion to chemical and synthetic drugs [2]. Using anti-epilepsy drugs has many side effects including reducing white blood cells, liver toxicity and teratogenic effects during pregnancy and can cause sexual disorders. Therefore, it seems that herbal drugs with fewer side effects can be good replacement for curing this disease [5]. Mallow (*malva sylvestris*) is a wild permanent herbaceous plant with 90 cm height which grows in many regions and is cultivated also in some regions. Usable parts of this plant are its leaves and flowers. Mallow is a rich source of A, B, and C vitamins and is used as an effective plant for reducing symptoms of cold such as cough and also for curing Inflammation of the airways, urinary tract, gastrointestinal tracts and skin rash. Studies have showed that Mallow has anti-bacterial, Anti-fungal and anti-viral effects against many of human pathogens [6].

Many studies indicate that most of plants don't have harmful effects in spite of drugs. This study was carried out to investigate the effects of mallow's hydro alcoholic extract on reducing the anxiety caused by convulsion.

### EXPERIMENTAL SECTION

Forty mice were kept in standard polycarbonate cages with steel network ceilings for two weeks to adapt to environment. Samples had free access to food and water, natural light, 20-22°C temperature and 60% of humidity. Cage floor were covered with sawdust which were replaced every 2 days. Samples were divided randomly into five groups: control, pentylenetetrazole and 50, 100 and 200 mg/kg doses of extract. The extract was injected intraperitoneally. Convulsion was enforced using pentylenetetrazole 65 minutes before injection. Plus elevated maze was used to evaluate the anxiety. This is the standard model for evaluating the anxiety [6] and includes two open arms (50\*10cm) and two closed arms (50\*40\*10cm).open and closed arms were opposite and about 50 cm higher than room floor.

This model is experimental and doesn't need training. The base of this test is searching sense and instincts of rodents. Three parameters are measured in this test: open arm entries (%), time spent in the open arms (%) and movement activity are calculated via following formula:

$$\text{Open arm entries Ratio} = \frac{\text{Open arm entries number}}{(\text{Open arm entries number} + \text{Closed arm entries number})} * 100$$

$$\text{The ratio of time spent in the open arms} = \frac{\text{Time spent in the open arms}}{(\text{Sum of the time spent in the open and close arms})} * 100$$

$$\text{Movement activity} = \text{the number of open arm entries} + \text{the number of closed arm entries}$$

Significant increase in the percentages of open arm entries and time spent in the open arms plus no change in movement activity shows anxiety reduction in this test [7]. The ratio of time spent in the open arms (OAT) parameter is less sensitive than (OAE) parameter for evaluating anxiety and anti-anxiety behaviors of animal.

### RESULTS AND DISCUSSION

According to results, mean movement activity of mice in three experimental groups was normal (about control group) but pentylenetetrazole reduced this parameter significantly (Figure 1).

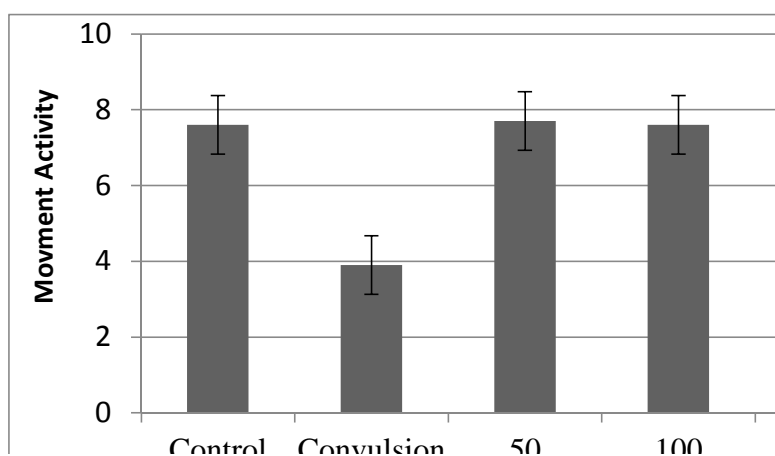
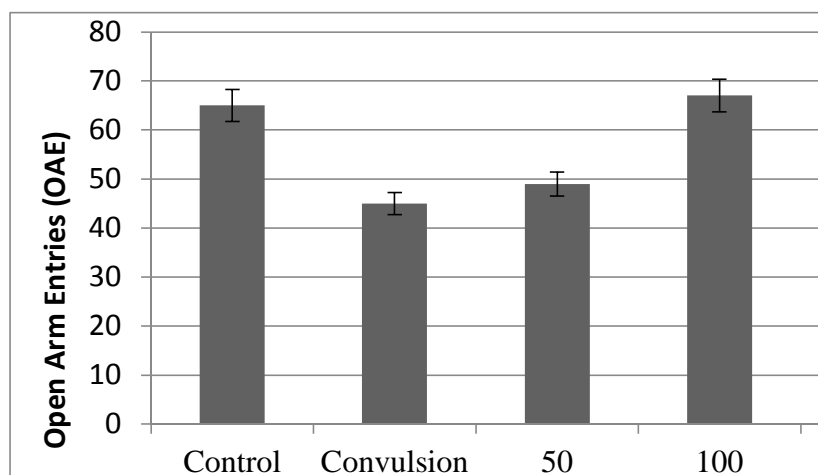


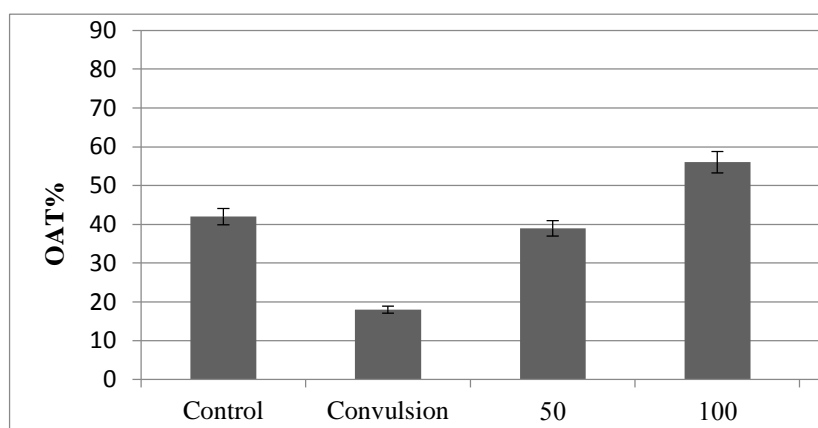
Fig 1: Movement activity in all Groups

Mean open arm entries of 100 mg/kg and 200 mg/kg groups were normal whereas pentylenetetrazole reduced it significantly (Figure 2).



**Fig 2: Percentage of open arm entries (OAE %) in all Groups**

The ratio of time spent in the open arms was normal for 50 and 100 groups (about control) and 200 mg/kg group increased the percentage of time spent in the open arms in proportion to control group (Figure3).



**Fig 3: percentage of time spent in the open arms (OAT %) in all Groups**

Anxiety is the most common psychiatric symptom in patients with epilepsy and epilepsy is the most common chronic neurological disease so that about 1% of US population suffers from this disease. There is about 20-40 million epilepsy patients in world. Studies have shown that anxiety and depression can cause a lot of problems, use high levels of health care services and cause many disorders in people performances [1].

Epilepsy patients are more than general population and anxiety and depression are from the most common neural-mental disorders in epilepsy patients which are followed by signs such as individual and social disorders, reduction in life performance and quality, more drug requirement plus side effects and more mortality [2, 8].

In this study to investigate the effects of mallow's hydro alcoholic extract on reducing the anxiety caused by convulsion. According to results, PTZ reduced movement activity of mice significantly, and the extract had medicinal effects by significant increase of movement activity about normal group (control). Also PTZ reduced the probability of open arm entries significantly whereas 100 and 200 mg/kg groups of the extract increased it up to control group but 50 mg/kg group was not significantly different from PTZ group [4].

PTZ treated mice showed less desire to stay in the open arms in proportion control group but in PTZ treated mice which received 50 and 100 mg/kg doses of the extract, time spent in the open arms was increased significantly up to normal level (control group). Also, 200 mg/kg dose of extract had positive effect on increasing the percentage of time spent in the open arms in proportion to control group [5].

**CONCLUSION**

According to results, Mallow plant is able to reduce anxiety caused by convulsion. But, for final proof of this claim, using wider range of extract and also comparing it with other plants are recommended.

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**REFERENCES**

- [1] Rabani M, Jafarian A, Hasanzadeh F, Hashemi S, Haghirabadi A, Sabet S. *J Shahrekord Univ Med Sci.* **2004**; 6(2): 22-30.
- [2] Hirtz D, Thurman DJ, Mohamed M, Chaudhuri AR, Zalutsky R. *Neurology.* **2007**, 68(5):326-37.
- [3] Doron R, Lotan D, Rak-Rabl A, Raskin-Ramot A, Rehavi M. *Life Sciences.* **2012**, 90: 995-1000.
- [4] Kaplan E. and Sadok, B. *Behavioral Science summary.* **2006**, 120-125
- [5] White HS. *Epilepsia.* **1999**, 40(5):S2-10.
- [6] Piri M, Nasehi M, Shahab Z, Zarrindast MR. *Neurosci Lett.* 2012; 528(2):93-8.
- [7] Vezirian M, Khazaeli A, Naghavi Naiini. *Journal of Medicinal Plants*, **2011**, 1, 29-38.
- [8] Yosofi M, Hojjati M, Moshtaghi A, Rafieian MJ *Shahrekord Univ Med Sci.* **2011**,13(4):51-59