



Scholars Research Library

Der Pharmacia Lettre, 2016, 8 (15):184-188  
(<http://scholarsresearchlibrary.com/archive.html>)



## Comparing the effects of hop's hydro alcoholic extract and diazepam on reducing the anxiety in mice

Fahimeh Sistani<sup>1</sup>, Mehrdad Modaresi<sup>2\*</sup> and Ilnaz Sajjadian<sup>1</sup>

<sup>1</sup>Department of Psychology, Isfahan (Khorasgan) Branch, Islamic Azad University, Isfahan, IRAN

<sup>2</sup>Department of Animal Science, Isfahan (Khorasgan) Branch, Islamic Azad University, Isfahan, IRAN

### ABSTRACT

Anxiety is one of the most important usual disorders in human communities which cause many other diseases. Considering numerous side effects of tranquilizers and anti-anxiety chemical drugs, people tend to use herbal drugs to treat anxiety disorders increasingly. Current study was carried out to compare the effects of hop's hydro alcoholic extract and diazepam on reducing the anxiety of laboratory mice. Sixty female mice from the weight range of 25-30 gram were divided into six groups (control, anxiety, diazepam and 50, 100 and 200 mg extract doses). Anxiety was enforced using dark box and measured using plus elevated maze. Elapsed time and the number of presence in open arms for five minutes were recorded as anxiety indices. Obtained data were analyzed using variance analysis tests. Results showed that extract in all doses increased average open arm time and movement activity in proportion to anxiety group. According to results, hop extract in all dosed could reduce the anxiety and acted like diazepam. Therefore, it is recommended as a replacement for diazepam.

**Key words:** anxiety, diazepam, hop, plus elevated maze, mice.

### INTRODUCTION

Anxiety is a complicated mental status which can be useful sometimes. It can even be used as a normal feeling and a matching component of the response to acute stress under conditions that threaten the integrity of the person or it could be a pathological condition that impairs the patient's life [1].

This mental status is accompanied by physical symptoms such as tightness in the chest and throat, difficult breathing, palpitations, dizziness, mental confusion and sweating [2].

Anxiety disorders are divided into panic disorders, obsessive-compulsive disorder, post-traumatic disorder, social anxiety disorder, phobias and generalized anxiety disorders [3].

Studies have shown that neurotransmitters system imbalance, changes in the signal transmission path and deformation of neural circuits are involved in this pathology. Anxiety disorders are related to hypothalamus-Pituitary- adrenal axis. GABAergic and serotonergic systems play considerable roles in regulating anxiety system, and activating gaba receptor improves anxiety disorders [2].

Drugs which cooperate with these neurotransmitters may have anti-anxiety effects. Currently, most drugs that are prescribed to treat anxiety are sedative and hypnotic. These drugs are mainly benzodiazepines which are used to

cure social phobia disorder and anxiety because of facilitating gaba controlling action and selective serotonin reuptake inhibition [4].

Herbs are an important part of traditional medicine in many countries, and have also special value in new therapeutic approaches. Pharmaceutical plants are important for human health not only for curing diseases but also for preventing diseases. In Iran also, the growing use of herbal medicines and traditional medicine can be seen [5].

Hop plant (*Humulus lupulus*) is one of the cannabis family plants from Nettle order which is used in industry and medicine highly. This plant is used as a sedative and tranquilizer, to open the blockage of the ducts of the liver and spleen and blood purifier and is used to treat syphilis [5].

Hop is a tranquilizer plant which its properties are related to its bitter resins, especially the alpha acid, and dimethyl tribiotin DL. Hop acts via increase in activity of gaba neurotransmitters and preventing central nervous system [6]. Zanoil and Zavatti studied morphological, phytochemical and pharmacology of hop and found interesting results. Female flower of this plant is known as bittering agent in beer industry and has been used for a long time to cure sleeping disorders [7].

Considering the calming role of hop in traditional medicine this research was carried out to compare the effects of hop's hydro alcoholic extract and diazepam on reducing the anxiety of laboratory mice.

#### MATERIALS AND METHODS

Six mature mice from 25-30 gram weight range were used in this study. Mice were kept under standard situation (25-30 temperature and normal humidity) for two weeks. Standard food and water in special containers were prepared for samples. Animals were divided into six groups with 10 mice in each group:

- **Control group:** did not have any drug or anxiety
- **Anxiety group:** anxiety was enforced but did not receive any drug
- **Diazepam group:** after enforcing the anxiety, diazepam was injected (1.2mg/kg)
- **Three experimental groups:** received 50, 100 and 200 mg/kg of hydro alcoholic extract intraperitoneal. After injections, plus maze was used to evaluate the antianxiety effect of extract. This apparatus includes two open arms and two closed arms which are connected by a plate and is located 50 cm above ground [5].

Mice were located on central part slowly toward open arms and arms entries were recorded for five minutes. After each use, the device was cleaned with a cloth soaked in alcohol.

Drugs were used and 50 minutes later, mice were transferred to dark box to enforce the anxiety. Then, mice were placed in maze center individually and elapsed time in each arm was recorded using chronometer. Elapsed time in maze center and open arms is a lack of anxiety sign whereas remaining time in closed arms shows the anxiety [8]. More open arms time indicates more antianxiety effect of drug. Four parameters were measured during five minutes: the number of open arms or closed arms entries, remaining time in arms (four legs of animal must be in arm), ratio of open arm entries, and ratio of open arm time and movement action as follows:

Ratio of open arm entries= (open arm entries)/ (open arm entries +closed arm entries) ×100

Ratio of open arm time = (open arm time)/ (open arm time +closed arm time) ×100

Movement activity= open arm entries + closed arm entries

Significant increase in ratio of open arm entries and ratio of open arm time plus no changes in movement activity shows anxiety reduction. However, ratio of open arm entries is less sensitive than ratio of open arm time.

Obtained data were analyzed for descriptive and inferential statistics. One way analysis of variance was used to determine significant differences between groups.

**RESULTS AND DISCUSSION**

The ratio of open arm entries was not different significantly in anxiety and all treatment groups (Figure 1).

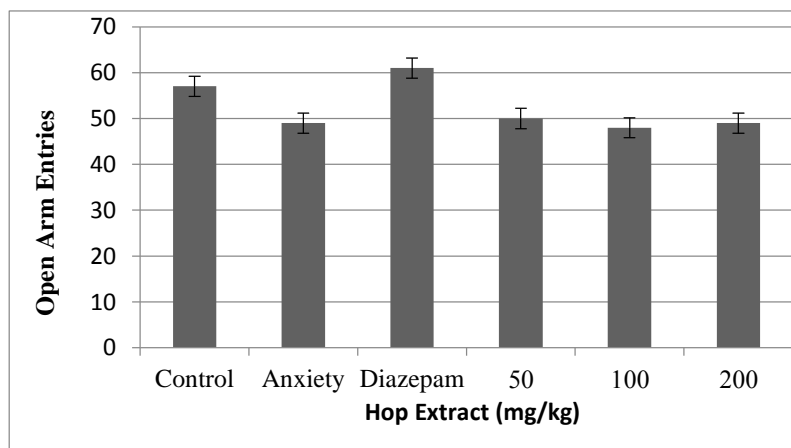


Figure 1. The ratio of open arm entries in all groups

The ratio of open arm time was similar to diazepam or more which shows significant effect of extract on reducing the anxiety (Figure 2).

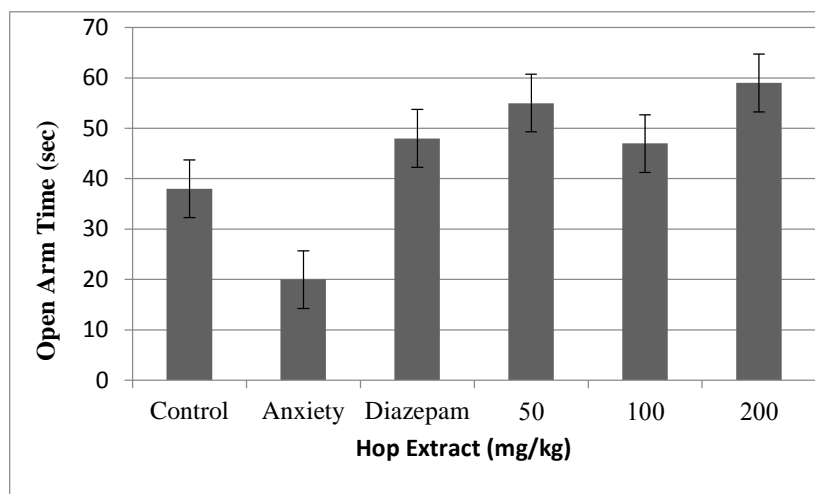


Figure 2. The ratio of open arm time in all groups

Movement activity of experimental groups was similar to diazepam or more which shows significant effect of extras on reducing the anxiety (Figure 3).

Probably, there is no subject more unpleasant than anxiety with such unpleasant feeling of fear and nervousness. This emotional state is observed in many mental disorders. Anxiety disorders are from the most common mental disorders. Studies have shown that these disorders cause a lot of trouble, spend many health cares and disturb people performances [9].

According to NCS report (a study about rate of mental disorders simultaneity or comorbidity) one of every four person has symptoms of at least one anxiety disorder. Twelve months' rate of these disorders is 17.7% and women have higher rate (30.5% lifetime versus 19.2%). Higher socioeconomic levels reduce the anxiety [10].

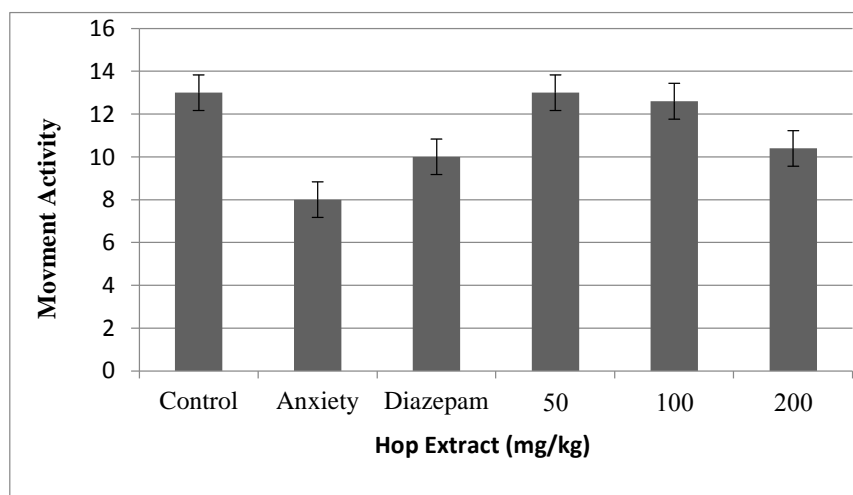


Figure 3. Movement activity in all groups

Benzodiazepines and barbiturates are used to cure anxiety. Harmful side effects of these drugs have encouraged researchers to find less harmful drugs. In this regard, producing herbal drugs is much desired; especially that herbal drugs have less side effects whenever they are used with other component of same plant [11].

Considering the importance of the issue and side effects of synthetic drugs which are used for curing anxiety and insomnia, it is necessary to find and produce new drugs. One of target plants in this category is hop [9].

According to results, the ratio of open arm time was similar to diazepam or more which shows significant effect of extras on reducing the anxiety. Hosseini *et al.* (2015) studied 100, 200 and 400 mg/kg of wild tulip's extract and reported that hydro alcoholic extract of this plant reduced the anxiety which is in agreement with our results.

Movement activity of experimental groups was similar to diazepam or more which shows significant effect of extras on reducing the anxiety. This is in agreement with reports of Babri *et al.* (2012) about the effects of teshnehdari plant's extract on anxiety and depression of male Syrian mice. Mice received 50, 100, 160 and 220 mg/kg of extract for 14 days and were studied using plus maze. 100 and 160 doses of extract reduced the anxiety significantly, which shows efficiency of this plant in anxiety reduction [12].

In similar study, Komaki *et al.* (2015) studied the effect of thyme's extracts on anxiety of male Wistar rats. Results showed that thyme may cause anti-anxiety behavior of rats in the elevated plus maze test which is not affected by movement activity [13].

On the whole, hydro alcoholic extract of hop had positive effect on average open arm time in all doses, which shows its effect on anxiety reduction.

### CONCLUSION

This study showed that this plant can act such as diazepam and reduce the anxiety, but more studies and wider range of extract are proposed for more accurate results.

### REFERENCES

- [1] Zarrindast MR, Nasehi M, Piri M, Bina *Pharmacol Biochem Behav.* **2010**; 94(3):387-96
- [2] Ghayour M, Behnam-Rassouli M, Ghayour N, Kamyabi-Abkooh A. *JMPI.* **2012** ;( 41): 64-73
- [3] Lee, C., Rodgers, R.J. *Psychopharmacology.* **1990**; 102:507-513
- [4] Atashpour H, and Shafghati. AS. *Journal of Tarbiat*, fourth year, Isfahan. **1998**: 4: 32-37
- [5] Alasvand M, Modaresi M., *JOCPR.* **2015**: 7(11): 556-560.
- [6] Rezaei A., Pashazadeh M, Jalilzadeh M.. *Journal of Medicinal Plants.* **2013**: 4:169-174.

- [7]Vezirian M, Khazaeli A, Naghavi Naiini. *Journal of Medicinal Plants*. **2011**; 1:29-38.
- [8] Piri M, Nasehi M, Shahab Z, Zarrindast MR. *Neurosci Lett* .**2012**; 528(2):93-8.
- [9]Vafaei A., Mollashahi Z., Zahedi M.andTaherian A. *Sabzevar Journal of Medical Sciences*. **2008**; 15(2): 65-72.
- [10] Kaplan e and sadok, b. *Psychiatry-Psychiatry: Behavioral Science summary*. **2006**; 120-125
- [11] Doron R, Lotan D, Rak-Rabl A, Raskin-Ramot A, Rehavi M. *Life Sciences*. **2012**; 90: 995-1000.
- [12]Rajbnia M. A comprehensive guide and prescription medicine. Tehran: Elm and Danesh Publication.**2014**: 53
- [13]Karachian N. Alaei H. QharaviNaiini M. Pilevarian A. *Physiology and Pharmacology*. **2006**; 10(4): 313-322.