Available online at www.derpharmachemica.com

ISSN 0975-413X
CODEN (USA): PCHHAX

Der Pharma Chemica, 2016, 8(15):116-121
(http://derpharmachemica.com/archive.html)

The Comparison of anxiolytic effects of *Valeriana officinalis* Herbal tea vs. *Lavandula angustifolia* on the male rats

[a]*Manouchehr yousefi

[a]*Department of Animal Science, Faculty of Agriculture, Higher Educational Complex of saravan, Saravan, Iran*

ABSTRACT

Anxiety is a common disorder that a lot of people suffer from it and accompanies physiologic symptoms such as tachycardia, perspiration disorders, lack of sense, and sometimes paralysis of limbs etc. This study was performed to compare the anxiolytic effects of herbal tea bag of Lavandula angustifolia versus Valeriana officinalis and these effects were evaluated and compared with the control group. In order to do this, 18 male rats weighing 150 to 200 grams were applied. The rats were divided into three groups including control, valerian (treated group by Herbal tea of Valeriana officinalis) and valender (treated group by Herbal tea of Lavandula angustifolia).valerian and lavender groups rats (n = 6/group) had ad libitum access to the tea from Valeriana officinalis 3% (w/v) for valerian group and tea from Lavandula angustifolia 3% (w/v) for lavender group , for a period of 24 hours before the test. Then, the behaviour of rats was tested to sedative (locomotor activity) and anxiolytic (elevated plus maze) activity. All the data were given as means±S.E.M. Data were analysed by one-way ANOVA following by Tukey test. The study indicated that anxiolytic effect of Lavandula angustifolia herbal tea is greater than herbal tea of Valeriana officinalis on the male rats.

Keywords: Anxiety, Anxiolytic, *Valeriana officinalis* , Lavandula angustifolia, Rat, X-maze

---

INTRODUCTION

Pathological anxiety is one of the most common emotional disorders and treatment of phobias or panic attacks is still not trivial. Pharmacological treatments play an important role in the therapeutic concept Benzodiazepines have been used as anxiolytics in general practice for many years [1], these are relatively safe drugs for a short term treatment of anxiety despite their drugs dependence potential and side effects [2, 3]. However, the realization that benzodiazepines present a narrow safety margin between the anxiolytic effect and those causing unwanted side effects has prompted many types of research to evaluate new compounds in the hope that other anxiolytic drugs will have less undesirable effects [4, 5]. There are many herbal teas that have anxiolytic effects. *Lavandula angustifolia* (LA) is part of the Labiatae family and belongs to the lavender genus which grows naturally in the Mediterranean region [6]. Lavender is reported to be an effective medical plant treating inflammation, depression, stress, seizure and migraine headaches [7, 8, 9]. Lavender is also reported to be an effective medical plant in the treatment of restlessness in the case of anxious mood. Intake administration of LA has been shown to have anxiolytic effect in clinical studies [10, 11]. *Valeriana officinalis L*. (Valerianaceae family) is a medicinal plant used in complementary and alternative medicine for its sedative and anxiolytic properties [12, 13]. Valerian's effects on the central nervous system have been well documented and attributed to many of it active compounds: valepotriates, baldrinals, valerenic acid, valerenal and valeranone, and other constituents in the essential oils [14, 15, 16]. Albeit, the anxiolytic properties of valerian

have been demonstrated in animals [17, 18]. This study evaluated the effectiveness *Valeriana officinalis* versus *Lavandula angustifolia* which is more effective for anxiolytic effects.

MATERIALS AND METHODS

The aim of this study was to research in which 18 male Wistar rats weighing 150 to 200 grams were randomly selected and tested . All animals were housed under standard environmental conditions of temperature, relative humidity and light (at 23±2 °C, 40—60% humidity, 12 h light: 12 h dark cycle) (lights on at 08:00 h). Animals are divided into three groups of control, valerian(*Valeriana officinalis* Herbal tea treated group) and lavender (*Lavandula angustifolia* Herbal tea treated group) each including 6 rats. The *Valeriana officinalis* rhizome powder and *Lavandula angustifolia* flowers were used for this study. Valerian and lavender Groups rats (n = 6/group) had ad libitum access to the tea from *Valeriana officinalis* 3% (3gram per 1000 ml w/v) in drinking water and tea from *Lavandula angustifolia* 3% (w/v) respectively, for a period of 24 hours before the test. Then, the behavior of rats was tested in order to observe sedative (locomotor activity) and anxiolytic (elevated plus maze) activity. Elevated plus maze (EPM) is made up of wood and includes two open arms (each 5×10 cm) and two closed arms (each 50× 10 × 40 cm) and a central plate (10 ×10 cm). Open arms are across from each other and so are the closed arms and are located 50 cm above the floor of the room. This is an experimental non-conditional anxiety testing model and does not require any animal training and learning[19-21]. In the day of- the test, the animals were transferred to the laboratory in the afternoon between 17:00 p.m. and 21:00 p.m, and then in order to test the anxiety level , the animal was located in an elevated plus-maze (in the plate and across from the open arm) and the important anxiety testing indices including the number of entrances to open and closed arms and the time of staying in open and closed arms were tested and recorded for 5 minutes[22-25].The total number of entrances into two arms are considered as a locomotor activity. The statistical analysis of data was performed by one-way analysis of variance (ANOVA) followed by Tukey post hoc analysis. In all cases, differences were considered significant ($p< 0.05$)[26-28].

3. FINDINGS OF THE STUDY

ANOVA showed that there was a significant difference in rat behavior on time spent in open arms of EPM between valerian and lavender groups compared to control group. Tukey test analysis showed a significant increase in time spent on open arms in valerian group compared with the control group ($p<0.05$) (Fig 1). In addition, the lavender group spent more time in the open arms than valerian group and it was significant ($p<0.05$). The number of entries into the open arms was not significantly different between the treated groups versus the control group (Fig 2). Time spent on closed arms for treated group by Herbal tea of *Lavandula angustifolia* decreased significantly but this decrease was not significant in treated group by Herbal tea *Valeriana officinalis* (Fig 3). The number of closed arms entries and a total number of open and closed arms increased but not significantly (Figures4 and 5).

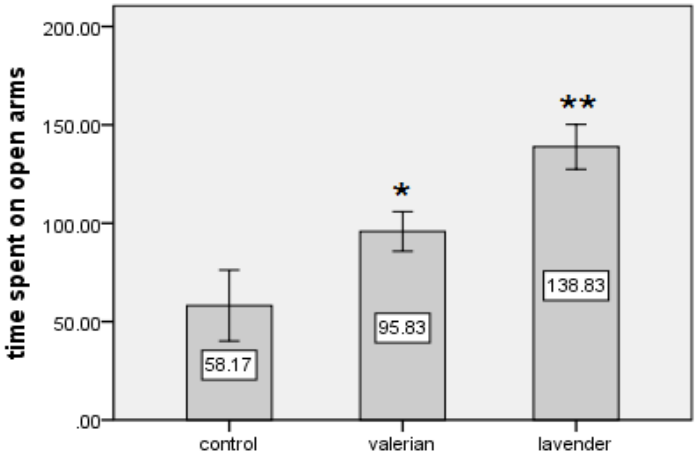

Fig 1: shows that the period of staying in open arms for experimental groups is significantly more than the control group (P<0.05) using ANOVA and then Tukey test

**: shows the significant difference compared to control(P<0.05)*

***: shows the significant difference (P<0.001)*

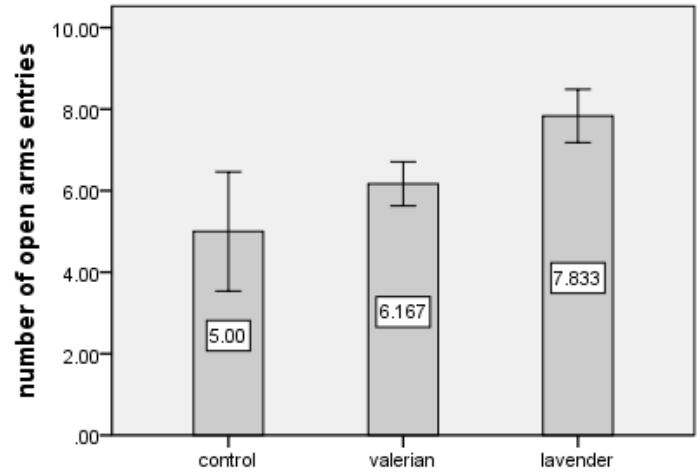

Fig 2: Shows the number of entrances into the open arm

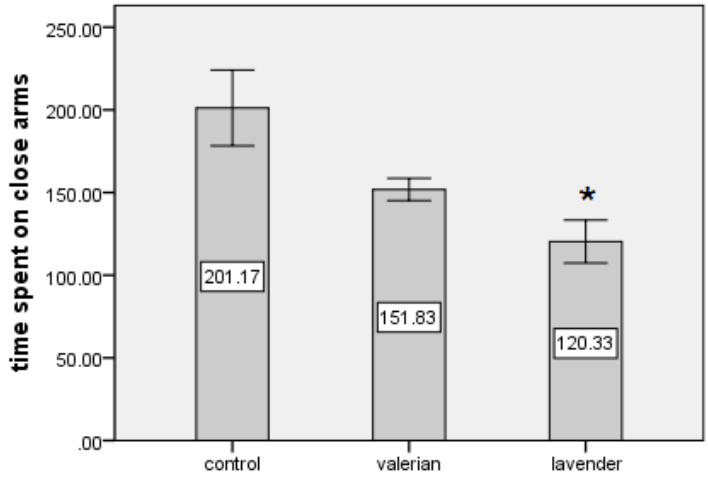

Fig 3: shows that the period of staying in closed arms for experimental groups is less than the control group using ANOVA and then Tukey test

**: shows the significant difference (P<0.05)*

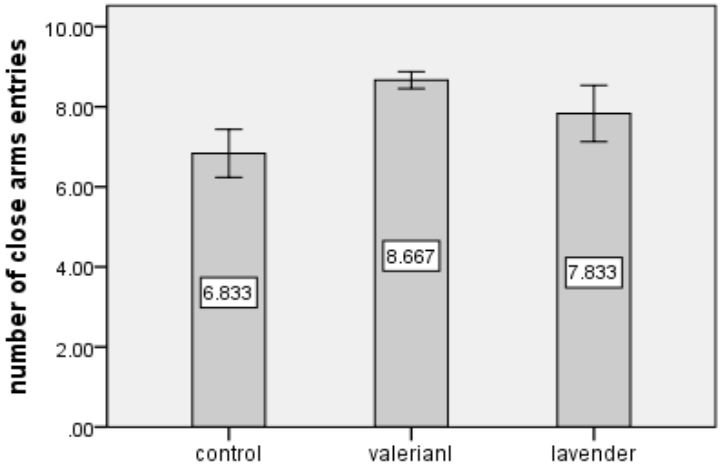

Fig 4: shows that the number of entrances into closed arms in the experimental groups is more than the control group

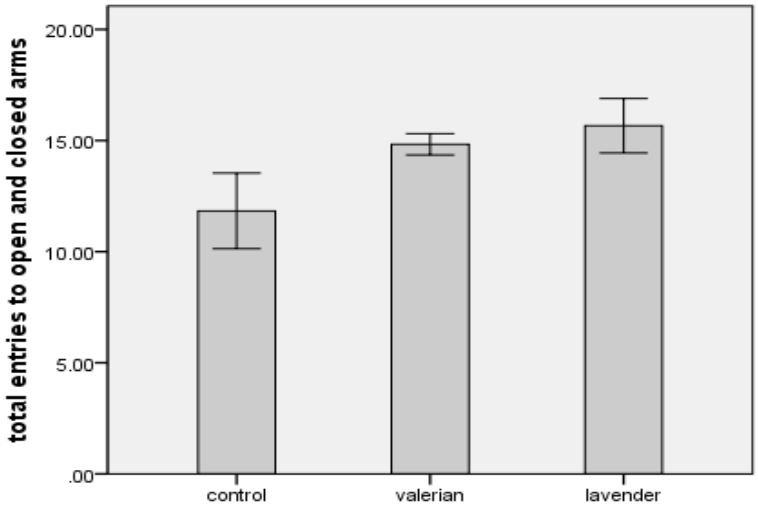

Fig 5: shows that the total number of entrances into open and closed arms in the experimental groups is more than the control group

DISCUSSION

An increase of the time and the proportion of the entrances into the open arms without a changed locomotor activity is regarded as a powerful marker for an anxiolytic substance effect [28]. The closed arms entries are selectively correlated with the locomotor activity [29, 30]. The drugs that cause stimulation and increase the locomotor activity were reported to increase the number of closed arm entries [31]. In the elevated plus maze, an anxiolytic or anxiogenic-like effect is evaluated by the relation of entries into an open arm and the time spent on the open arms of the plus-maze in comparison to the same parameters of the control group. An increase of the time spent and a number of entries into the open arm without changed locomotor activity was regarded as a powerful marker for the anxiolytic effect . The enhancement of total arm entries might suggest a nonspecific locomotor stimulant effect which is the coload on "locomotor activity" and "anxiety", whereas closed arm entries load highly and selectively on locomotor activity [30, 31, 32]. Increase time spent in open arm, percent entries in open arm, total entries, and closed arm entries indicated anxiolytic effects. The present study showed the treated groups by of Herbal tea of *Valeriana officinalis* and *Lavandula angustifolia* induced anxiolytic behavior but did not increase locomotor activity significantly and this indicates that Herbal tea of *Lavandula angustifolia* has anxiolytic effects stronger than Herbal tea of *Valeriana officinalis* . The active components of *Lavandula angustifolia* are thought to be linalool, linalyl acetate, cineole, terpinen-4-ol and camphor [33, 34, 35]. The presence of linalool, linalyl acetate in the plant extract supports the claim that the extract has a sedative effect [36]. Some studies reported the parable mechanisms. Chronic injection of lavender oil altered dopamine D3 receptor subtype homeostasis in the olfactory bulb and induced behavioral change [37, 38]. Also, Lavender oil potent anxiolytic properties via modulating voltage-dependent calcium channels [34]. Linalool, a monoterpene compound prevalent in the essential oil of Lavender, interferes with glutamatergic transmission [35]. Lavender oil is also suggested to modulate GABAergic neurotransmission, especially on GABAA receptors, and enhance the inhibitory tone of the nervous system [39, 40, 41]. The cholinergic system is suggested to play a role in lavender analgesic, antianxiety, antidepression, and anticonvulsant effects of lavender [42, 43].Previous studies showed the binding of valerian extract to GABAA receptors in rat cortical membrane preparation. It has been shown that valerian extract, aqueous or hydroalcoholic, contained GABA and other amino acids that could displace labeled muscimol [16, 44]. Suggesting that specific constituents of valerian extract can directly bind to GABAA receptors. The GABA content of valerian extract could also be responsible for the stimulated release and reuptake of GABA. This could be an indirect mechanism of GABA agonistic activity of valerian extract [45, 46]. Additionally, derivatives of valerenic acid inhibit the local catabolism of GABA by inhibition of the enzyme GABAse, which could also increase GABA concentration [47]. These mechanisms might have been operational in our in vitro brainstem model, but in vivo models, the role of exogenous GABA in producing central nervous system (CNS) sedative effects is questionable because of the very low permeability of GABA across the blood-brain barrier . The significance of the inhibition of GABA catabolism by valerenic acid derivatives in vivo models is not yet known.

CONCLUSION

The results of this study showed that herbal tea of lavender has anxiolytic effects stronger than herbal tea of valerian and this effect was significantly compared to control and valerian groups.

REFERENCES

[1] Holm, M,*Danish medical bulletin*., **1988**, 35(5), 495-499.
[2]Ballinger, B.R,*British Medical Journal*., **1990**, 300(6722), 456.
[3]Lader, M.H, *European Neuropsychopharmacology*., **1999**, 9, 399-405.
[4]Griffiths, R.R., et al, *Neuroscience & Biobehavioral Reviews.*,**1985**, 9(1), 133-151.
[5]Grundmann, O., et al, *Journal of ethnopharmacology.*, **2007**, 110(3), 406-411.
[6]Barrett, P.R., *Growing & Using Lavender: Storey's Country Wisdom Bulletin A-155*. **,1996**: Storey Publishing.
[7]Sasannejad, P., et al, *European neurology*., **2012**, 67(5), 288-291.
[8]Hajhashemi, V., Ghannadi, A., Sharif, B,J*ournal of ethnopharmacology*., **2003**, 89(1), 67-71.
[9]Akhondzadeh, S., et al,*Progress in Neuro-Psychopharmacology and Biological Psychiatry.*,**2003**, 27(1), 123-127.
[10]Kasper, S., et al, *International clinical psychopharmacology.*,**2010**, 25(5), 277-287.
[11]Woelk, H., Schläfke, S, *Phytomedicine*., **2010**, 17(2), 94-99.
[12]Bradley, B.F., et al,*Human Psychopharmacology: Clinical and Experimental*., **2009**, 24(4), 319-330.
[13]Houghton, P.J,*Journal of Pharmacy and Pharmacology.*, **1999**, 51(5), 505-512.
[14]Houghton, P.J,*Journal of ethnopharmacology.*,**1988**, 22(2), 121-142.
[15]Leathwood, P ., Chauffard, F,*Planta medica.*,**1985**, 51(02), 144-148.
[16]Cavadas, C., et al, Arzneimittel-Forschung., **1995**,45(7), 753-755.
[17]Bent, S., et al, *The American journal of medicine.*,**2006**, 119(12), 1005-1012.
[18]Miyasaka, L.S., Atallah, Á.N., Soares, B, *Valerian for anxiety disorders.The Cochrane Library,***2006**.
[19]Khom, S., et al, *Neuropharmacology*., **2007**, 53(1), 178-187.
[20]Dietz, B.M., et al, *Molecular Brain Research.*, **2005**, 138(2), 191-197.
[21]Hattesohl, M., et al, *Phytomedicine*., **2008**, 15(1), 2-15.
[22]Murphy, K., et al,*Phytomedicine*., **2010**, 17(8), 674-678.
[23]Miladi-Gorji, H., et al,*J. Medicinal Plants*., **2007**,19(5), 23-8.
[24]MILADI, G.H., et al, *The role of morphine dependence on the level of anxiety in Rat*.**2008**.
[25]Pellow, S., File, S.E, *Pharmacology Biochemistry and Behavior.*, **1986**, 24(3), 525-529.
[26]Zhang, Z.,Schulteis, G, *Pharmacology Biochemistry and Behavior*., **2008**, 89(3), 392-403.
[27]Tsuda, M., et al,*European journal of pharmacology*., **1996**, 307(1), 7-14.
[28]Pellow, S., et al,*Journal of neuroscience methods.*, **1985**, 14(3), 149-167.
[29]Clément, Y., et al,*Neural plasticity*.,**2007**.
[30]Rodgers, R.,Johnson, N,*Pharmacology biochemistry and behavior*., **1995**, 52(2), 297-303.
[31]Varty, G.B., et al,*Neuropsychopharmacology*., **2002**, 27(3), 371-379.
[32]Espejo, E.F, *Behavioural brain research*., **1997**, 86(1), 105-112.
[33]Jager, W., et al, *J Soc Cosmet Chem.*,**1992**, 43(1), 49-54.
[34]Schuwald, A.M., et al., *Plos one.*,**2013**, 8(4), 59998.
[35]Brum, L.S., et al, *Neurochemical Research*., **2001**, 26(3), 191-194.
[36]Bisset, N.G., *Herbal drugs and phytopharmaceuticals: a handbook for practice on a scientific basis*. **1994**: Stuttgart: Medpharm Scientific Publishers xvi, 566p. ISBN 3887630254 En Originally published in German,**1984**, (EBBD, 190000550).
[37]Jäger, W., et al, *Journal of Essential Oil Research.*,**1992**, 4(4), 387-394.
[38]Kim, Y., et al, *Journal of ethnopharmacology.*, **2009**, 125(1), 31-35.
[39]Guillemain, J., Rousseau, A.,Delaveau, P,*Effets neurodépresseurs de l'huile essentielle de Lavandula angustifolia Mill*. in *Annales pharmaceutiques françaises*., **1989**, Masson.
[40]Silva Brum, L., Elisabetsky, E.,Souza, D, *Phytotherapy Research*., **2001**, 15(5), 422-425.
[41]Aoshima, H., Hamamoto, K, *Bioscience, biotechnology, and biochemistry.*, **1999**, 63(4), 743-748.
[42]Hritcu, L., Cioanca, O., Hancianu, M, *Phytomedicine*., **2012**, 19(6), 529-534.
[43]Barocelli, E., et al., *Life sciences*., **2004**, 76(2), 213-223.
[44]Yamada, K., et al., *Biological and Pharmaceutical Bulletin.*,**1994**, 17(2), 359-360.
[45]Santos, M., et al., *Synaptosomal GABA release as influenced by valerian root extract--involvement of the GABA carrier*. *Archives internationales de pharmacodynamie et de thérapie.*,**1993**, 327(2), 220-231.

[46] Santos, M.S., et al., *Planta medica*., **1994**, 60(03), 278-279.
[47] Riedel, E., Hänsel, R.,Ehrke, G., *Planta medica*., **1982**, 46(12), 219-220