

Available online on 15.06.2024 at <http://ajprd.com>

Asian Journal of Pharmaceutical Research and Development

Open Access to Pharmaceutical and Medical Research

© 2013-24, publisher and licensee AJPRD, This is an Open Access article which permits unrestricted non-commercial use, provided the original work is properly cited

Open  Access

Research Article

Evaluation of Antidepressant Activity of *Tricholepis Angustifolia* In Experimental Animal

Nikhil Fuladi *, Vivek V Paithankar, Jugalkishor Vyas, Anjali Wankhade

Vidyabharati College of Pharmacy, C.K. Naydu Road, Camp, Amravati-444602

ABSTRACT

Depression is increasingly recognized as a highly prevalent and chronic disorder. Long term use of the commonly prescribed antidepressants, like Benzodiazepines has been associated with adverse effects such as withdrawal effects and dependence. Herbal medications used in traditional medicinal systems are a potential avenue for developing newer drugs with desirable profiles. In Ayurveda, the roots of *Tricholepis Angustifolia* have been employed for treating various neurological diseases. The present study was undertaken to assess the antidepressant property seen on chronic administration of ethanolic extract of roots *Tricholepis Angustifolia*(EETA) in Swiss Albino Rats using the Elevated Plus Maze Test. 30 inbred adult male Swiss Albino rats were divided into 5 groups (n=6). The test groups received EETA in doses of 200mg/kg bw, 400 mg/kg bw and 600 mg/kg bw. Standard and control groups received Diazepam and normal saline, respectively. All drugs were administered orally once daily for 05 days. On the 05th day, 45 minutes post-administration, the exploratory and disinhibitory behaviour of the animals were evaluated for a 5 minute period each in the elevated plus maze. EETA in doses of 200mg/kg bw, 400 mg/kg bw significantly ($p<0.05$) increased the time spent in open arms, number of rears in open arms, as well as open and total arm entries when compared to control group. Chronic administration of EETA has displayed antidepressant property in rat subjected to the elevated plus maze paradigm. The present study indicated the potential for use of EETA as an adjuvant in the treatment of depression.

Keywords: Depression, *Tricholepis Angustifolia*, Diazepam, Elevated plus maze.**ARTICLE INFO:** Received 14 Jan 2024; Review Complete 17 April 2024 ; Accepted 28 May 2024. ; Available online 15 June. 2024**Cite this article as:**Fuladi N, Paithankar V V, Vyas J, Wankhade A, Evaluation Of Antidepressant Activity Of *Tricholepis Angustifolia* In Experimental Animal, Asian Journal of Pharmaceutical Research and Development. 2024; 12(3):276:279 DOI: <http://dx.doi.org/10.22270/ajprd.v12i3.1196>

*Address for Correspondence:

Nikhil Fuladi, Vidyabharati College of Pharmacy, C.K. Naydu Road, Camp, Amravati-444602

INTRODUCTION

Anxiety is a common emotion encountered in our day to day encounters, presenting as a response to a negative situation^[1]. It is advantageous during physically or emotionally taxing situations where it may boost an individual's performance. But when anxiety becomes disproportionate and excessive to the situation, it interferes with performance and constitutes a psychiatric disorder which usually presents in a chronic state^[2, 3]. Anxiety disorder is increasingly recognized as a highly prevalent and chronic disorder with onset during the teenage years with an incidence of 18.1% and a lifetime prevalence of 28.8%^[3]. In 2007, the prevalence rate of anxiety in India was found to be 18.5 per 1000 population^[4]. Benzodiazepines (BZDs), such as Diazepam, have been the most widely used anxiolytic drugs for many years^[5]. Even though they are considered to be safe during short term therapy, the long term use of BZDs has been associated with adverse effects such as impaired motor

coordination, drowsiness, withdrawal effects and dependence^[6]. Another roadblock encountered in treating anxiety disorders with pharmacotherapy is the non-responder rate which has been reported to be as high as 40 %^[7]. Since thousands of years, a large number of people across the world use herbal medications as remedies for various diseases^[8].

Translation of these medications into allopathic practice will be beneficial in terms of developing adjuvants or even main therapy for various conditions such as anxiety disorders. *Tricholepis Angustifolia*; an annual herb, is native to the Mediterranean region but also extensively grown in India^[9]. The Sanskrit names of *Tricholepis Angustifolia* seeds have been employed to treat local swelling and pains, headache caused by pitta, lymphadenopathy, stomatitis, conjunctivitis and as a diuretic, anti dyspeptic, appetizer, digestive, astringent and also for treating cough (kaphagana). It is also used in Ayurveda as a Central Nervous System (CNS) tonic to treat vertigo, syncope and memory loss^[10,11].

Emamghoreshi et al showed positive results with regards to seeds of *Tricholepis Angustifolia* exhibiting antidepressant effects in an acute setting ^[12]. Hence the present study was conducted to evaluate the antidepressant potential of Ethanolic Extrat of *Tricholepis Angustifolia* on chronic administration.

MATERIALS AND METHODS

The experimental protocol was approved by the Institutional Animal Ethics Committee (IAEC) of Vidyabharati College of Pharmacy, Amravati. Animals: Inbred Male Albino Rat (Swiss strain), around 3 months of age, weighing between 125-250 grams were used for the study. The animals were obtained from the Animal House at our institution. The animals were housed at $24 \pm 2^\circ\text{C}$ with 12:12 hour light and dark cycle. They had free access to food and water ad libitum. The animals were acclimatized for a period of 7 days before the study. The study was conducted in accordance with the CPCSEA guidelines. Sample Size, Grouping and Dose of the Drugs: Animals were divided into 5 groups (Control, Standard & Test drugs) containing 6 animals making a total number of 30 animals (Table 1).

Table 1: Drugs/dose of the drugs, groups and number of mice in each group

Drugs / Dose	Group	Number of Mice (n=6)
Control-Normal Saline (0.1ml/10gm)	I	6
Standard – Diazepam (1.0 mg/kg)	II	6
EETA (200 mg/kg)	III	6
EETA (400 mg/kg)	IV	6
EETA (600 mg/kg)	V	6

Drugs and Chemicals

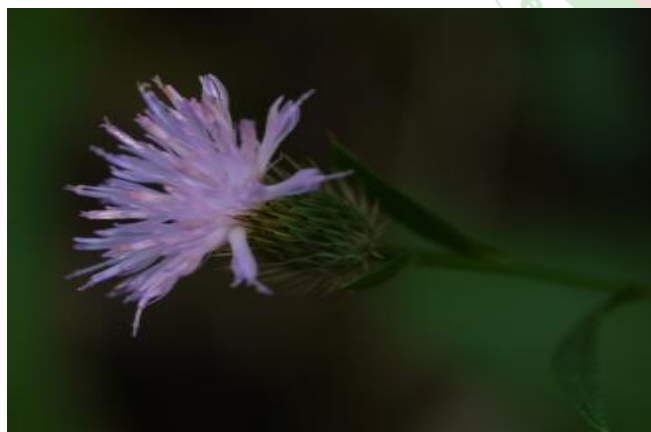


Figure 1: It shows *Tricholepis Angustifolia* flower used for the study

The standard antidepressant drug, Diazepam was obtained from S.H. Pharmacy Amravati. The test drug used was EETA.

Table 2: Effect of chronic administration of EETA on mice behaviour in elevated plus maze.

Drugs/Groups	Time spent in open arms (in sec)	Time spent in closed arms (in sec)	Number of rears in open arms
Normal Saline(0.1ml/10gm)	23.17 $\pm$ 2.02	276.83 $\pm$ 2.02	1.17 $\pm$ 0.47
Diazepam (1.0 mg/kg)	91.17 $\pm$ 2.75**	208.83 $\pm$ 2.75**	6.67 $\pm$ 0.88**
EETA (200 mg/kg)	68.00 $\pm$ 10.55**	232.00 $\pm$ 10.55**	5.00 $\pm$ 0.57**
EETA (400 mg/kg)	118.33 $\pm$ 6.07**	181.67 $\pm$ 6.07**	6.00 $\pm$ 0.73**
EETA (600 mg/kg)	45.83 $\pm$ 2.63*	254.17 $\pm$ 2.63*	0.67 $\pm$ 0.33

n=6. The observation are mean $\pm$ SEM. *p < 0.05, ** p < 0.01, as compared to control (ANOVA followed by Dunnett's multiple comparison test) EETA- Ethanolic Extract of *Tricholepis Angustifolia*

Control used was Normal Saline (Vehicle). The dried seeds were purchased from Shri Sivaji Botanical Garden, Amravati and their authenticity was verified by the Department of Botany, Vidyabharati Mahavidyalaya, Amravati

Preparation of extract

EETA was prepared at the Department of Pharmacognosy, Vidyabharati College of Pharmacy Amravati. Dried *Tricholepis Angustifolia* roots were homogenized to a fine powder. Hundred grams of powdered were infused in 500 ml cold distilled water for 24 hours, brought to the boil, then removed from the heat source and allowed to infuse for 15 minutes. The extract was then filtered, concentrated over the water bath and brought to dryness under vacuum. Upon extraction, 250 grams of dried roots of *Tricholepis Angustifolia* yielded 4 grams of aqueous extract which was viscous in consistency and brown in colour. The concentrations required of the coriander extract were prepared by serial dilution from a stock solution of 50 mg/ml of the extract in saline. All solutions were prepared freshly on test days and administered intraperitoneally (i.p.) in a volume of 0.1ml/10 g body weight of mice.

Apparatus

Elevated plus maze test (EPMT): The EPMT apparatus consists of four arms elevated 30 cm above the floor, with each arm positioned at 90° relative to the adjacent arms. Two of the arms are enclosed with high walls ($30 \times 7 \times 20$ cm), and the other arms are connected via a central area (7×7 cm) to form a plus sign ^[12]. **Behavioural assessment:** For chronic study the animals received drugs or vehicle once a day for 10 days. 45 minutes after the last dose on the 10th day of drug or vehicle administration, each animal was placed in the central arm of the Elevated plus maze, facing one of the closed arms. All required parameters, i.e. the time spent in the open and closed arms (in seconds), number of rears in the open arm and the number of open and total arm entries were observed in each arm for a five-minute period. **Statistical Analysis.**

All data calculated were expressed as Mean $\pm$ SEM for each group. The data were analyzed by one-way ANOVA and Post-hoc comparisons were performed by applying Dunnett's multiple comparison test. P < 0.05 was considered statistically significant.

RESULTS

The results given in table 2 and 3 indicate that AECSS in the dose of 50 mg/kg (Group IV) significantly increased the time spent in the open arms (in seconds), number of rears in the open arms, number of open arm entries and percentile ratio of open arm to total arm entries, when compared to the vehicle treated group (Group I).

Table 3: Effect of chronic administration of EETA on mice behaviour in elevated plus maze

Drugs/Groups	Number of Open Arm Entries	Number of Total Arm Entries	Percentage Ratio of Open/Total Arms
Normal Saline(0.1ml/10gm)	1.83 ± 0.40	6.83 ± 0.40	27.36 ± 6.21
Diazepam (1.0 mg/kg)	6.00 ± 0.51**	13.67 ± 1.08**	46.23 ± 7.13*
EETA (200 mg/kg)	3.00 ± 0.68	9.17 ± 1.57	50.40 ± 1.82
EETA (400 mg/kg)	6.50 ± 0.50**	13.00 ± 1.15**	45.69 ± 5.23**
EETA (600 mg/kg)	2.17 ± 0.30	3.83 ± 1.01	40.16 ± 2.76*

n=6. The observation are mean ± SEM. *p < 0.05, ** p< 0.01, as compared to control (ANOVA followed by Dunnett's multiple comparison test) EETA- Ethanolic Extract of *Tricholepis Angustifolia*

DISCUSSION

With a considerable populace under its umbrella, depression is a mental disorder that has received substantial focus over the past few decades in terms of research [13]. The current armamentarium of medications used to treat anxiety is spearheaded by the Benzodiazepine class of drugs [6]. The adverse effects associated with BZDs have galvanized the search for medications that possess more desirable safety profiles. The herbal drugs employed in traditional medicine for treating neurological disorders are an unexplored avenue which needs to be researched for demonstrating drugs with antidepressant potential [14]. In the present study using the EPMT, it was observed that EETA at a dose of 400 mg/kg (Group IV) showed a statistically significant increase in parameters such as time spent in the open arms (in seconds), number of rears in the open arms, number of open arm entries and percentile ratio of open arm to total arm entries when compared to the control group (Group I). However, at a dose of 200 mg/kg (Group III), EETA increased the time spent in the open arms and the number of rears in the open arms. This is clearly indicative of the antidepressant potential of the test drug.

The seeds of *Tricholepis Angustifolia* have shown therapeutic potential as a diuretic [15], antidiabetic [16] and anthelmintic [17]. In CNS studies, the seeds have also shown positive results when screened for their antioxidant [17,18], anticonvulsant [19] and sedative hypnotic [20] properties. Linalool (67.7%) and flavinoids (16.6%) are major phytochemical constituents of *tricholepis angustifolia* roots [21]. Linalool has shown to possess anxiolytic property [22,23]. The mechanism of anxiolytic action displayed by *tricholepis angustifolia* may be attributed to the flavinoids, which have structural similarity to Diazepam (that acts via Gamma amino butyric acid [GABAA] receptor complex) [24].

CONCLUSION

The present study shows that chronic administration of EETA has antidepressant activity when demonstrated in the Elevated plus maze test. However, further research needs to be conducted to identify the exact mechanism of antidepressants involved and to determine the use of *tricholepis angustifolia* seeds as an adjuvant to BZDs for treatment in humans.

REFERENCES

- Sam S. Importance and effectiveness of herbal medicines. Journal of pharmacognosy and phytochemistry. 2019; 8(2):354-7.
- WHO Traditional medicine strategy: 2014-2023. Hong Kong, SAR, China: World Health Organization; 2013.
- Lai PK, Roy J. "Antimicrobial and chemo preventive properties of herbs and spices". Curr. Med. Chem. 2004; 11(11):1451-60.

- Verma S, Singh SP. Current and future status of herbal medicines. Veterinary world. 2008 Nov 1; 1(11):347.
- Kala CP, Dhyani PP, and Sajwan BS, "developing the medicinal plants sector in northern India: Challenges and opportunities", Journals of Ethnobiology, Ethnomedicine, 2006; 2:1-15.
- Shiva M, "Natural medicines used in the traditional Chinese medical System", Journal of Ethnopharmacology, 1997; 92:1-21.
- Prajapati ND, Purohit SS, Sharma AK, Kumar T. A handbook of medicinal plants: A complete source book. In A handbook of medicinal plants: a complete source book 2003:554-554).
- Patel JK, Patel PY. Botanical therapeutics: discovery, development and manufacture-prospects and constraints. Journal of Natural Remedies. 2007 Jan 1:19-30.
- Kamboj VP, "Herbal medicine", Journal of Current science, 2000;78(1):35-38.
- MED HJ. Herbs used for brain disorders. Hygeia J Drtgs. 2010 Mar;1400:2.
- Jussawalla JM. Natures Materia medica, A handy Guide on prevention and treatment of Diseases by Rational Methods, Popular prakashan, Mumbai, 6th edn, 2001:268-269.
- Rajani GP, Prasad KVSRG. Effect of *Eclipta alba* Linn on Learning and memory enhancing in rats, Indian Journal of Pharmaceutical Education and Research, 41(4), 2007, 369-370.
- Lakshmi Chandra Mishra. Psychiatric diseases, Scientific basis for Ayurvedic therapies, CRC Press, Nagpur, 3rd edn, 2004; 439 -50.
- Wei Dai, Kunmiao Feng et al. Natural products for the treatment of stress-induced depression: Pharmacology, mechanism and traditional use. Journal of Ethnopharmacology Volume 285;2022:114692.
- Martins ekor, the growing use of herbal medicines, issue relating to adverse reaction and challenges in monitoring safety, 10th jan 2014.
- Kumar BA, Lakshman K, Velmurugan C et al. Antidepressant activity of methanolic extract of *Amaranthus spinosus*. Basic and Clinical Neuroscience. 2014;5(1):11
- Castagné V, Moser P et al. Behavioral assessment of antidepressant activity in rodents. Methods of Behaviour Analysis in Neuroscience. 2nd edition. 2009.
- Lewinsohn PM, Solomon A, Seeley JR, Zeiss A. Clinical implications of " subthreshold" depressive symptoms. Journal of abnormal psychology. 2000 May; 109(2):345.
- [internet] Depression. world health organization. 13 sep 2021.
- Chand SP, Arif H, Kutlenios RM. Depression (Nursing).
- American Psychiatric Association. Diagnostic and Statistical Manual of Mental Disorders. Washington, DC: APA Press, 2000.
- Tondo L, Isacson G, Baldessarini RJ. Suicidal behaviour in bipolar disorder: risk and prevention. CNS drugs. 2003 Jun; 17:491-511.
- Altshuler LL, Hendrick V, Cohen LS. Course of mood and anxiety disorders during pregnancy and the postpartum period. Journal of Clinical psychiatry. 1998 Jan 1; 59(2):29-33.
- Rohan KJ, Lindsey KT, Roecklein KA, Lacy TJ. Cognitive-behavioral therapy, light therapy, and their combination in treating seasonal

- affective disorder. *Journal of affective disorders*. 2004 Jun 1; 80(23):273-83.
25. Tsuang MT, Faraone SV. The genetics of mood disorders. Johns Hopkins University Press; 1990.
26. Ishaq H. Anxiolytic Effect of Herbal Medicine, Khamira Gaozaban AmbriJadwar Ood Salib Wala (KGJ) in Experimental Rat Models. *Pakistan Journal of Pharmaceutical Sciences*. 2014 Mar 1;27(2).
27. Rajput MS, Sinha S, Mathur V, Agrawal P. Herbal antidepressants. *IJPFR*. 2011;1(1):159-69.
28. Patten SB. Long-term medical conditions and major depression in the Canadian population. *The Canadian Journal of Psychiatry*. 1999 Mar; 44(2):151-7.
29. Chapman DP, Perry GS, Strine TW. Peer reviewed: the vital link between chronic disease and depressive disorders. *Preventing chronic disease*. 2005 Jan; 2(1).
30. Reynolds EH. Brain and mind: a challenge for WHO. *The Lancet*. 2003; 361(9373):1924-.
31. Frank NE, Karp JF, Rush AJ, "Efficacy of Treatments for Major Depression" *Psychopharmacology Bull*, 1993; 29:457-75.
32. <https://www.nimh.nih.gov/health/topics/depression>.
33. Williams S, Sah P, Anggono V, Lynch J, Meunier F. Action potentials and synapses. *Queensland Brain Institute*. Last modified November. 2017;9.
34. Faraz Saleem, Muhammad Owais Ismail, et al. Antidepressant Activity of Nardostachys jatamansi Extract in Animal Models of Depression, *Journal of Pharmaceutical Research International*, 2020; Article no. JPRI.63968
35. Evans-Lacko S, Aguilar-Gaxiola S, Al-Hamzawi A, et al. Socio-economic variations in the mental health treatment gap for people with anxiety, mood, and substance use disorders: results from the WHO World Mental Health (WMH) surveys. *Psychol Med*. 2018; 48(9):1560-1571.
36. Grover S, Dutt A, Avasthi A. An overview of Indian research in depression. *Indian journal of psychiatry*. 2010 Jan; 52(Suppl1): S178.
37. Depression. world health organization. 13 sep 2021 [Depression \(who.int\)](https://www.who.int/news-room/fact-sheets/detail/depression) Murphy JM, Laird NM, Monson RR, Sobol AM, Leighton AH. A 40-year perspective on the prevalence of depression: the Stirling County Study. *Archives of General Psychiatry*. 2000 Mar 1; 57(3):209-15.
38. Radden J. Is This Dame Melancholy?: Equating today's depression and past melancholia. *Philosophy, Psychiatry, & Psychology*. 2003;10(1):37-52.
39. Berrios GE. Melancholia and depression during the 19th century: a conceptual history. *The British Journal of Psychiatry*. 1988 Sep; 153(3):298-304.
40. Hasler G, Drevets WC, Manji HK, Charney DS. Discovering endophenotypes for major depression. *Neuropsychopharmacology*. 2004 Oct; 29(10):1765-81.

