RESEARCH PAPER

EVALUATION OF ANTIANXIETY ACTIVITY OF DELONIX REGIA LEAVES EXTRACT ON SWISS ALBINO MICE

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Abstract
Anxiety disorders are among the most prevalent psychiatric illnesses worldwide and continue to pose a significant public health challenge. The present study investigated the anxiolytic potential of the ethanolic leaf extract of *Delonix regia* using validated experimental models in Swiss albino mice. The extract was prepared by the maceration method and subjected to preliminary phytochemical analysis, which revealed the presence of flavonoids, alkaloids, tannins, glycosides, and phenolic compounds. Its antioxidant activity was evaluated in vitro using the 2,2-diphenyl-1-picrylhydrazyl (DPPH) free radical scavenging assay. The anxiolytic effect was assessed in vivo using the Elevated Plus Maze (EPM) and Actophotometer tests following oral administration of the extract at doses of 200 and 400 mg/kg. Diazepam (1 mg/kg) was employed as the standard reference drug.
The ethanolic extract exhibited a dose-dependent anxiolytic response, with the 400 mg/kg dose producing greater behavioural improvement than the 200 mg/kg dose. Although its efficacy was lower than that of diazepam, the extract significantly improved anxiety-related behavioural parameters compared with the control group. In addition, the extract demonstrated appreciable antioxidant activity in the DPPH assay, suggesting that its anxiolytic effect may be associated, at least in part, with its antioxidant properties. The observed pharmacological activity is likely attributable to the synergistic action of the bioactive phytoconstituents identified during preliminary screening.
Overall, the findings provide scientific evidence supporting the traditional use of *Delonix regia* as a medicinal plant for the management of anxiety. The study highlights the potential of the ethanolic leaf extract as a promising natural source of anxiolytic compounds with a favorable safety profile
Keywords: *Delonix regia*; anxiety disorders; anxiolytic activity; ethanolic leaf extract; Elevated Plus Maze; Actophotometer; DPPH assay; phytochemical screening; antioxidant activity; Swiss albino mice.
How to cite this article: Kulkarni BL, Satpute KL, Wadulkar RD, Patil OP, Kulkarni SL. Evaluation of Antianxiety Activity of Delonix regia Leaves Extract on Swiss Albino Mice. Int J Drug Deliv Technol. 2026;16(72s): 1678-1693. DOI: 10.25258/ijddt.16.72s.189

1. Introduction:-

A feeling of worry, nervousness, or unease about something with an uncertain outcome. A feeling of apprehension and fear, characterized by physical symptoms such as palpitation, sweating, and feelings of stress.

These exhibit symptoms such as trembling, sweating, elevated blood pressure, and dread (1). But daily living is hampered when these symptoms become overwhelming. In the entire planet, 1/8th of the people suffered from anxiety problems (2). Anxiety is ranked by WHO as the 6th largest contributor to global disability stated with the fact that every thirteenth person globally suffers from anxiety. According to the Mental health foundation survey, approximately more than two million adults are likely to suffer from mental health problems in the UK by 2030 (3).

1.1 Types of anxiety disorders

Depending on the type of anxiety, several symptoms of anxiety disorders exist. These may be psychologic, obsessive, somatic, emotional numbing, and hyper-arousal.
Psychological symptoms are tension, fear, apprehension, and lack of concentration. Sympathetic plus somatic symptoms are recognized as tachycardia, tremors, hyperventilation, sweating, chest pain, choking, GIT distress, fatigue and sleep disturbances (4).

Anxiety disorders can be categorized as:
1. Generalized anxiety disorder (GAD)
2. Panic disorders (PD)
3. Post-traumatic stress disorders (PTSD)
4. Social anxiety (SA)

5. Obsessive-compulsive disorder (OCD)

Anxiety disorders arise from a complex interaction of biological, psychological, and social factors. Biological factors include genetic predisposition, neurotransmitter imbalances, medical conditions, medications, and nutritional deficiencies. Psychological factors such as personality traits, low self-esteem, and negative emotional experiences also contribute, while social factors including stressful life events, occupational stress, inadequate social support, and adverse environmental conditions further increase the risk of anxiety. Despite being treatable, only about one-third of individuals with anxiety disorders receive appropriate care.(6)

Anxiety is regulated by a complex network of neurotransmitters in the central nervous system, primarily serotonin (5-HT), gamma-aminobutyric acid (GABA), norepinephrine (NE), and dopamine. The amygdala, along with other limbic structures, plays a central role in processing fear and anxiety, and its hyperactivity has been associated with anxiety disorders. Reduced serotonergic and GABAergic neurotransmission, along with dysregulation of noradrenergic signaling, contributes to the development of anxiety by impairing emotional regulation and increasing autonomic arousal. Selective serotonin reuptake inhibitors (SSRIs), serotonin-norepinephrine reuptake inhibitors (SNRIs), and benzodiazepines exert their anxiolytic effects by enhancing serotonergic, noradrenergic, and GABAergic neurotransmission. Emerging evidence also suggests that corticotropin-releasing factor (CRF), substance P, and tachykinins are involved in the pathophysiology of anxiety disorders. (5, 7)

1.2 Management of Anxiety

The management of anxiety depends on the type and severity of the disorder and individual patient characteristics. Treatment includes pharmacological and non-pharmacological approaches. Pharmacological therapy involves benzodiazepines, selective serotonin reuptake inhibitors (SSRIs), serotonin-norepinephrine reuptake inhibitors (SNRIs), azapirones, β-blockers, antihistamines, and tricyclic antidepressants (TCAs). Non-pharmacological approaches, particularly cognitive-behavioral therapy (CBT), behavioral therapy, relaxation techniques, and complementary therapies such as yoga and meditation, are also effective in reducing anxiety symptoms. (8)

Although synthetic anxiolytic drugs are effective, their long-term use is associated with several adverse effects, including drowsiness, sedation, impaired coordination, memory impairment, nausea, tolerance, and dependence. Abrupt discontinuation may also lead to withdrawal symptoms such as rebound anxiety, insomnia, tremors, and convulsions. These limitations have increased interest in developing safer and more effective plant-based anxiolytic agents. (9)

Herbal medicines have gained considerable attention as potential alternatives for the management of anxiety due to their favorable safety profile and lower risk of adverse effects compared with synthetic anxiolytic drugs. Several medicinal plants, including *Withania somnifera*, *Passiflora incarnata*, *Ginkgo biloba*, *Hypericum perforatum*, and *Gelsemium sempervirens*, have demonstrated promising anxiolytic activity in preclinical and clinical studies. Their therapeutic effects are primarily attributed to bioactive phytoconstituents that modulate neurotransmitter systems involved in anxiety. However, further well-designed clinical studies are needed to establish their efficacy and safety.(10-17)

2. Rationale for Selection of *Delonix regia* for Evaluation of Antianxiety Activity

The selection of *Delonix regia* (commonly known as Gulmohar) for the evaluation of antianxiety activity is based on its ethnomedicinal relevance, rich phytochemical profile, and preliminary pharmacological evidence,

3. MATERIAL AND METHOD

The design of the present methodology will involve a systematic sequence of experimental procedures to achieve the proposed objectives under established scientific guidelines. It will encompass all the steps from the collection and authentication of *Delonix regia* leaves to the extraction of the plant material, qualitative phytochemical screening, and evaluation of antioxidant activity using the DPPH free radical scavenging assay. The methodology will further include pharmacological screening for anxiolytic activity using standardized experimental models. All procedures will be carried out using appropriate instruments, reagents, solvents, and validated protocols to ensure the reliability, accuracy, and reproducibility of the experimental findings.

The materials required for the present study will include chemicals such as ethanol, methanol, and other analytical-grade reagents. The instruments to be used will include an actophotometer, hot plate, and UV-visible spectrophotometer. An Elevated Plus Maze apparatus will be employed for the evaluation of anxiolytic activity. Fresh leaves of *Delonix regia* will be collected from the local area and authenticated by a qualified botanist before use. Healthy Swiss albino mice of either sex will be selected as the experimental animals for the pharmacological evaluation of the anxiolytic activity of the plant extract.

3.1 Plant Material Collection

The fresh leaves of Delonix regia was collected from local market. The plant material was cleaned, reduced to small fragments, air dried under shade at room temperature and coarsely powdered in a mixer. The powdered material was stored or taken up for extraction process.

3.2 Extraction of Plant Material

a) Selection of Solvent

The selection of solvent will be based on the extractive value, nature of phytochemical constituents present in the leaves of *Delonix regia*, and findings from the literature review. Ethanol and distilled water will be selected as the extraction solvents due to their effectiveness in extracting a broad range of phytoconstituents.

b) Selection of Extraction Method

Based on the literature review, the majority of the phytochemical constituents present in *Delonix regia* leaves

are reported to be heat stable, and the maceration method has been widely employed for their extraction. Maceration will be selected as the extraction method because it is degradation of phytochemicals.

simple, cost-effective, and efficient, allowing better solvent penetration and effective extraction of bioactive constituents while minimizing

3.3. Preparation of extract

The leaves of *Delonix regia*, were collected, washed, dried and powdered separately. 50g of dried powder of the leaves was weighed and transferred into a conical flask and it was macerated with sufficient amount of ethanol for about a week day. Process is repeated with water. The whole mixture was filtered and filtrate was collected, concentrated in a china dish on a hot plate till the residue was obtained. The extracts were collected, labeled and stored for further experimental use. (18)

(%) yield = Wt. Of extract obtained/ Wt. of powdered drug×100

Extraction of *Delonix regia* by Maceration method

3.4 Phytochemical screening of extracts

Test for Alkaloids (Wagner's test)

A fraction of extract was treated with 3-5 drops of Wagner's reagent (1.27 g of iodine and 2 g of potassium iodide in 100 ml of water) and observed for the formation of reddish-brown precipitate (or colouration).

Test for Carbohydrates (Molisch's test)

Few drops of Molisch's reagent were added to 2 ml portion of the various extracts. This was followed by addition of 2 ml of conc. H_2SO_4 down the side of the test tube. The mixture was then allowed to stand for two-three minutes. Formation of a red or dull violet colour at the interphase of the two layers was a positive test.

Test for Cardiac glycosides (Keller Kelliani's test)

5 ml of each extract was treated with 2 ml of glacial acetic acid in a test tube and a drop of ferric chloride solution was added to it. This was carefully underlayed with 1 ml
concentrated sulphuric acid. A brown ring at the interface indicated the presence of deoxy sugar characteristic of cardenolides. A violet ring may appear below the ring while in the acetic acid layer, a greenish ring may form.

Test for Flavonoids (Shinoda test)

To the extract, a few magnesium turnings and a few drops of concentrated hydrochloric acid were added and boiled for five minutes. Red coloration identifies the presence of flavonoids.

Test for Phenols (Ferric chloride test)

A fraction of the extracts was treated with aqueous 5% ferric chloride and observed for formation of deep blue or black colour.

Test for Phlobatannins (Precipitate test)
Deposition of a red precipitate when 2 ml of extract was boiled with 1 ml of 1% aqueous hydrochloric acid was taken as evidence for the presence of phlobatannins.
Test for Amino acids and Proteins (1% ninhydrin solution in acetone).
2 ml of filtrate was treated with 2-5 drops of ninhydrin solution placed in a boiling water bath for 1-2 minutes and observed for the formation of purple colour.
Test for Saponins (Foam test)
To 2 ml of extract was added 6ml of water in a test tube. The mixture was shaken vigorously and observed for the formation of persistent foam that confirms the presence of
saponins.
Test for Sterols (Liebermann-Burchard test)
1 ml of extract was treated with drops of chloroform, acetic anhydride and conc. H_2SO_4 and observed for the formation of dark pink or red colour.
Test for Tannins (Braymer's test)
2 ml of extract was treated with 10% alcoholic ferric chloride solution and observed for formation of blue or greenish colour solution.

Test for Terpenoids (Salkowski's test)
1 ml of chloroform was added to 2 ml of each extract followed by a few drops of concentrated sulphuric acid. A reddish-brown precipitate produced immediately indicated the presence of terpenoids.

Test for Quinones
A small amount of extract was treated with concentrated HCl and observed for the formation of yellow precipitate (or coloration).

Test for Oxalate
To 3 ml portion of extracts were added a few drops of ethanoic acid glacial. A greenish black colouration indicates presence of oxalates.

Image no.1: Phytochemical tests of *Delonix regia* leaves

3.5 Free Radical Scavenging Activity (DPPH Assay)

The free radical scavenging capacity of the ethanolic extracts of *Delonix regia* bark was determined using the DPPH method. It was measured by a decrease in absorbance at 517nm of a solution of colored DPPH in methanol brought about by the sample. A stock solution of DPPH (1.3 mg/ml in methanol) was prepared. The test solution was prepared with a 1mg/ml concentration of ethanolic extracts.
From this solution, 1 ml of solution was taken in test tubes & by dilution with the same solvent up to 10 ml. This is a stock solution. From stock solutions 0.10, 0.15, 0.25, 0.50, and 0.60 ml were taken in different test tubes. Whose concentration was then 10 µg/ml, 15 µg/ml, 25 µg/ml, 50 µg/ml, 60 µg/ml respectively.
Freshly prepared DPPH solution 75 µl (1.3 mg/ml) was added in each of these test tubes containing (5 µg/ml, 25 µg/ml, 50 µg/ml, 75 µg/ml) and kept in dark for 30 min, the absorbance was taken at 517 nm using a UV Visible spectrophotometer (Shimadzu). Ascorbic acid was used as a reference standard and dissolved in distilled water to make the stock solution with the same concentration of ethanolic extracts. The control sample was prepared containing the same volume without any extract and reference ascorbic acid. 95% methanol was used as a blank. % Scavenging of the DPPH free radical was measured using the following equation. (20)

$$\% \text{ inhibition} = \{(A \text{ control} - A \text{ sample}) / (A \text{ control})\} \times 100$$

A control = Absorbance of DPPH alone
A sample = Absorbance of DPPH along with different concentrations of extracts.

4. Experimental Animals:

Albino mice of weight (25-35g) of either sex were used in the current study. Animals were procured from Crystal Biological Solutions, Pune-412308, Reg No. 2030/PO/RcBiBt/S/18/CCSEA. The animals were housed in polypropylene cages, approximately six per cage under conditions of controlled temperature (22±3°C) and humidity (30-70%) with a 12hr light/dark cycle and free access to water and the specific diet, and kept in the animal house of Dayanand College of Pharmacy, Latur.

Sr. No	Species	Gender	Weight (gm)	No. of Animal
1.	Albino mice	Either sex	25-35 gm	06 animals x 04 groups = 24

Table No.1: Animal Required

4.1 Selection of dose

The experimental doses of Delonix regia leaf extract were selected based on a comprehensive review of the published literature. Previous studies demonstrated that these doses were safe and exhibited significant pharmacological activity in rodents. Therefore, 200 mg/kg and 400 mg/kg body weight, administered orally, were selected for the present investigation to evaluate the anti-anxiety activity in Swiss albino mice.

4.2 Ethical Approval

The study was conducted in accordance with ethical guidelines and approved by the Institutional Animal Ethics Committee at Dayanand College of Pharmacy, Latur [DCOP/IAEC/2024-25/02]. Care has been taken to minimize animal suffering and adhere to principles of animal welfare.

4.3 Treatment

Animals were divided into four groups

Sr.No.	Groups	Treatment	Dose	No. of animal
1.	Control	Distilled water	1 ml/kg	6
2.	Standard	Diazepam	1 mg/kg	6
3.	Test 1	EEDR	200 mg/kg	6
4.	Test 2	EEDR	400 mg/kg	6

Table No.2: Experimental design

4.4 Screening for antianxiety activity

The ethanolic extract Delonix regia leaves were tested for antianxiety activity using Elevated plus maze apparatus and actophotometer.

4.4.1 METHODS

a) Evaluation of antianxiety activity

1. Elevated plus maze test

The Albino Mice (20-25 g body weight) were housed in pairs for 10 days prior to testing in the apparatus. During this time the mice were handled by the investigator on alternate days to reduce stress. Animals were divided into 4 groups of 6 mice as control, Standard drug treated, and two extract treated group. Sixty min after oral and 20 min after i.p. administration of the test & standard drug respectively the mice were placed in the center of the maze, facing one of the enclosed arms. (19)

Parameters observed

- Time spent in open arm
- Time spent in close arm
- Number of entries in open arm
- Number of entries in close arm

2. Actophotometer

The Albino Mice (20-25 g body weight) were housed in pairs for 10 days prior to testing in the apparatus. During this time the mice were handled by the investigator on alternate days to reduce stress. Animals were divided into 4 groups of 6 mice as control, Standard drug treated, and two extract treated group. After turning on the equipment animals were placed individually in activity cage for 10 min. After that basal activity score was noted. (19)

Delonix regia leaves extract was administered to the mice and after 30 min animals' activity score was noted and percent decrease in motor activity was calculated.

Parameters observed

- Total activity score.
- .**RESULTS**

5.1 Calculation of % yield of Extract:

The following formula was used for the calculation of % yield of extract:

$$\%\textbf{Yield} = \frac{\textbf{Weight of Extract Obtained}}{\textbf{Weight of Starting Material}} X\textbf{100}$$

Given:

- Weight of leaves powder (starting material) = **50 g**
- Weight of extract obtained = **5 g**

Calculation:

$$\%\ \textbf{yield} = \textbf{5}/50\boldsymbol{X}\textbf{100}$$

Percentage yield = 10%

The percentage yield of the extract obtained through maceration was found to be 10%, calculated using the formula: (Weight of extract / Weight of starting material)
× 100. This indicates that 5 g of extract was successfully obtained from 50 g of dried leaf powder, reflecting a satisfactory extraction efficiency.

5.2 Phytochemical Investigation of Ethanolic Extract of Leaves of *Delonix regia*

Sr. No.	Phytochemical	Results
1.	Alkaloids	+
2.	Glycosides	+
3.	Carbohydrates	+
4.	Flavonoids	+
5.	Phenols	+
6.	Phlobatannines	+
7.	Proteins	–
8.	Saponins	–
9.	Sterols	–
10.	Tannins	+
11.	Curcumin	–
12.	Terpenoids	+
13.	Quinones	+
14.	Oxalates	–

Table No. 3 : Phytochemical tests of *Delonix regia* leaves

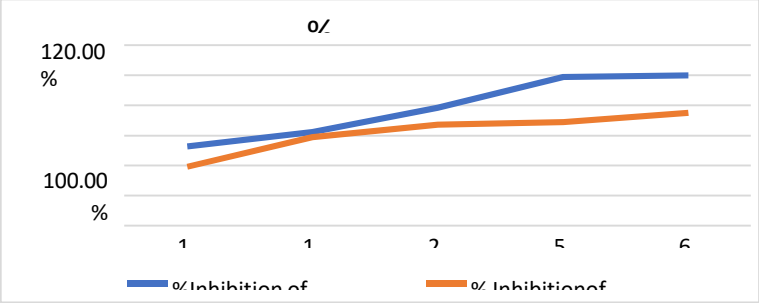
Phytochemical analysis of *Delonix regia* leaf extract showed the presence of alkaloids, glycosides, carbohydrates, flavonoids, phenols, phlobatannins, tannins, terpenoids, and quinones. Proteins, saponins, sterols, curcumin, and oxalates were found to be absent. This confirms the chemical diversity present in the leaves of *Delonix regia*.

5.3 *In vitro* study of antioxidant activity by using DPPH agent

centration (µg/ml)	Sample Absorbance	hibition of sample	% Inhibition of Ascorbic Acid
10	0.400	39.39%	52.72%
15	0.270	59.09%	62.33%
25	0.215	67.42%	78.57%
50	0.204	69.09%	98.79%
60	0.164	75.15%	99.86%

Table No. 4 : % Inhibition of Sample and Ascorbic acid by DPPH assay

Absorbance of Control: - 0.66



Graph No.1: - % Inhibition of Sample and Ascorbic acid by DPPH assay

The antioxidant activity of *Delonix regia* leaf extract showed a concentration-dependent increase in percentage inhibition. At 10 µg/mL, the extract exhibited 39.39% inhibition, which gradually increased to 75.15% at 60 µg/mL. Although the extract demonstrated lower antioxidant activity compared to ascorbic acid, it still showed significant free radical scavenging potential. These results suggest the presence of active antioxidant compounds in the leaves of *Delonix regia*.

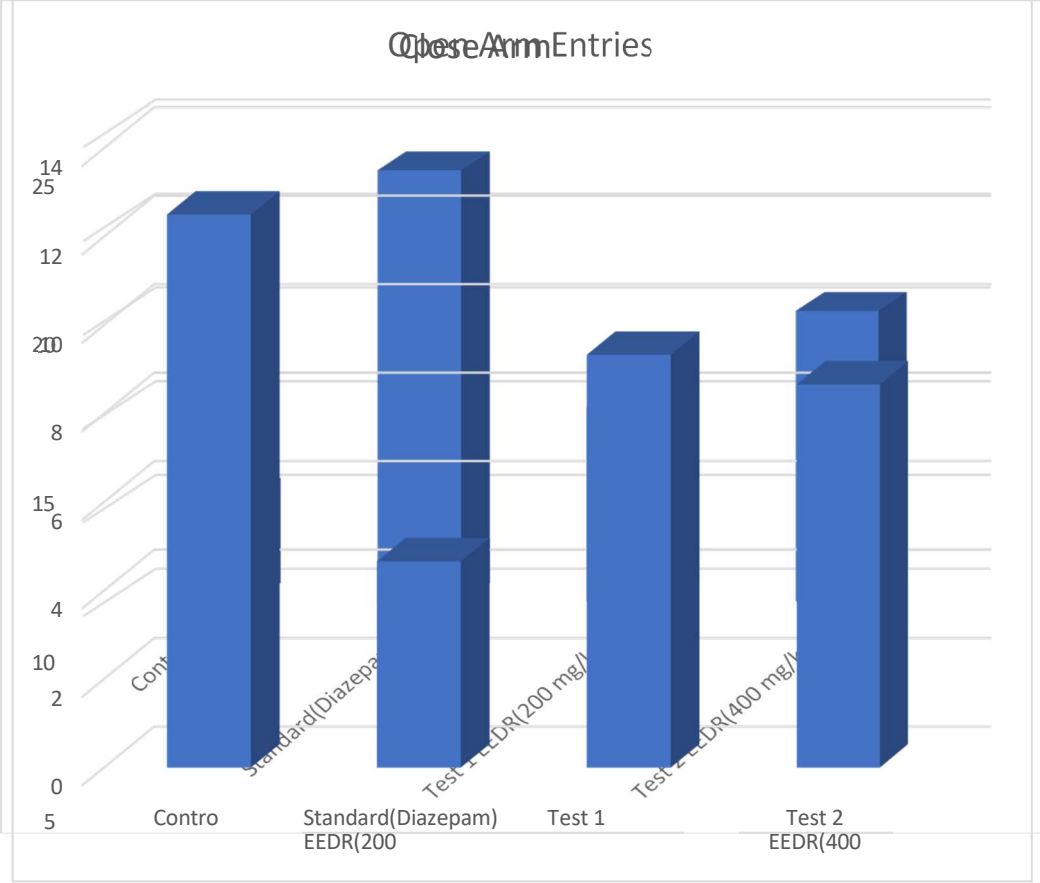
5.2 In Vivo Antianxiety activity

Elevated plus maze

Image No.2: Elevated plus maze apparatus

Groups	ose Arm Entry	Arm Time Spent	en Arm Entry	Open Arm Time Spent
Control group	12.5±1.41	235.5±7.78	5.6± 1.03	51.16± 1.43
Standard (Diazepam)	4.66±2.16	62.33±9.35	23±0.75	221± 0.23
Test 1 EEDR (200mg/kg)	9.33±1.78	110.66±8.84	10.33±0.75	157.5±8.84
Test 2 EEDR (400mg/kg)	8.66±1.16	147±6.18	15.5±1.04	167.83±6.18

Table No: 5 : *Delonix regia* leaves extract mean reading from Elevated plus maze test



Graph No. 2: Result of EPM test of ethanolic leaves extract of *Delonix regia*

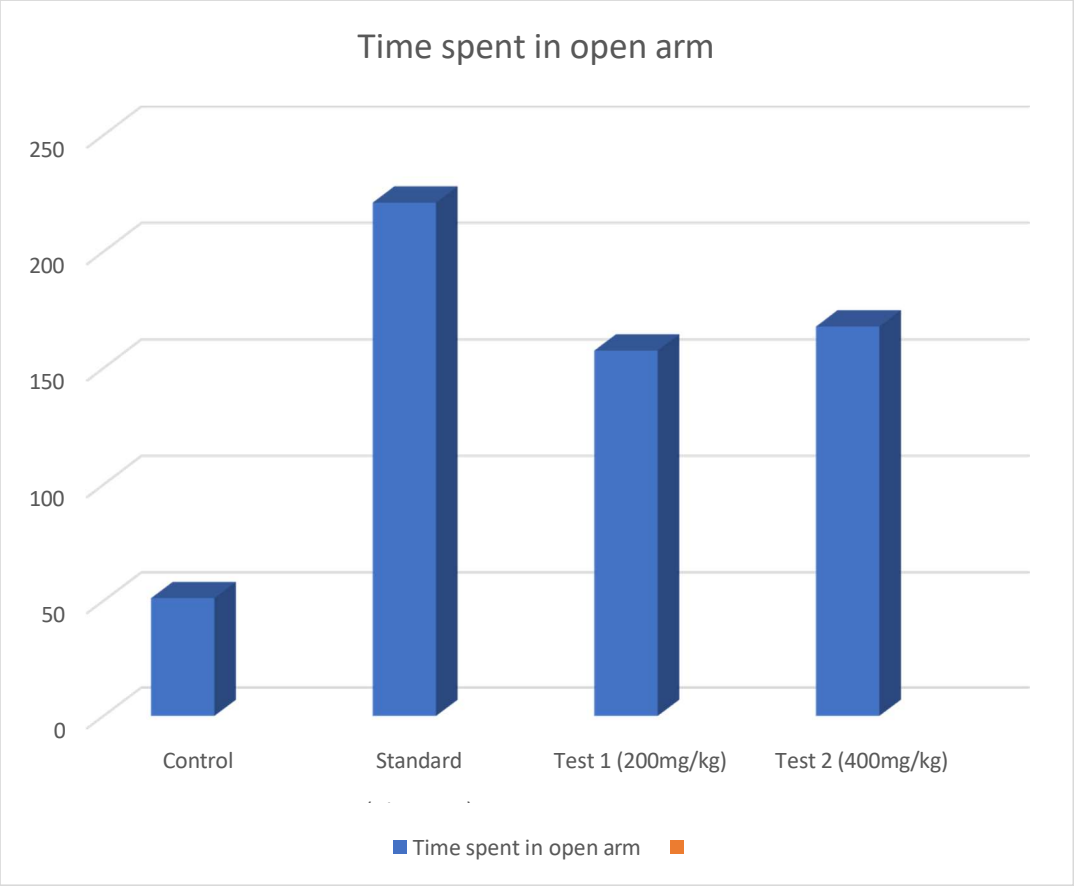
(Number of Open Arm Entries)

The number of entries in the open arm was significantly higher in the standard group compared to the control, indicating enhanced anxiolytic activity. Both doses of EEDR (200 mg/kg and 400 mg/kg) showed a dose-dependent increase in open arm entries, with the 400 mg/kg dose approaching the efficacy of the standard treatment.

Graph No.3: Result of EPM test of ethanolic leaves extract of *Delonix regia*

(Number Of Close Arm Entries)

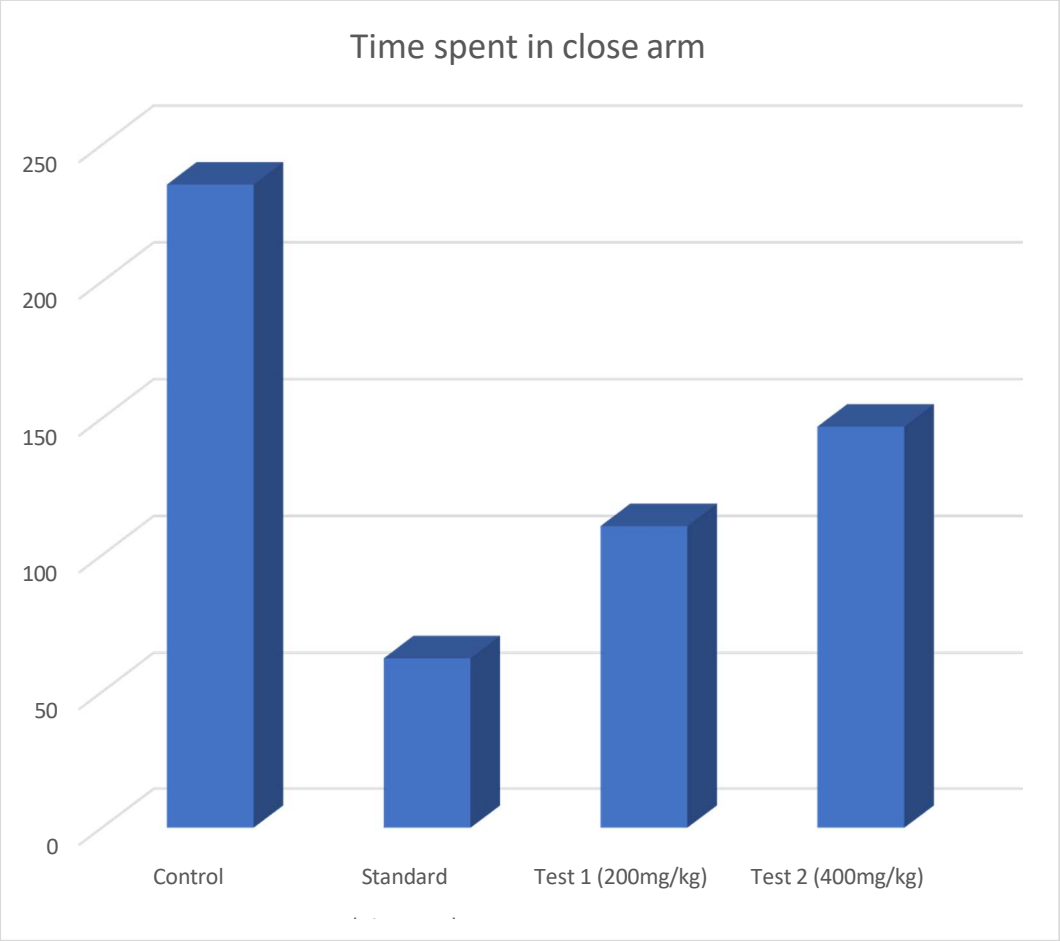
The number of entries in the closed arm was highest in the control group, indicating elevated anxiety-like behavior. Treatment with the standard drug significantly reduced closed arm entries, suggesting anxiolytic activity. EEDR at both 200 mg/kg and 400 mg/kg doses also showed a reduction in closed arm entries compared to control, with the higher dose producing a more notable effect, indicating potential anxiolytic properties in a dose-dependent manner.



Graph No. 4: Result of EPM test of ethanolic leaves extract of *Delonix regia*

(Time Spent in Open Arm)

The time spent in the open arm was significantly higher in the standard-treated group compared to the control, reflecting strong anxiolytic activity. EEDR-treated groups (200 mg/kg and 400 mg/kg) also showed increased time in the open arm relative to control, with the 400 mg/kg dose exhibiting a more pronounced effect. This suggests that EEDR possesses anxiolytic-like properties in a dose-dependent manner, though less potent than the standard.



Graph No. 5: Result of EPM test of ethanolic leaves extract of *Delonix regia*

(Time spent in Close Arm)

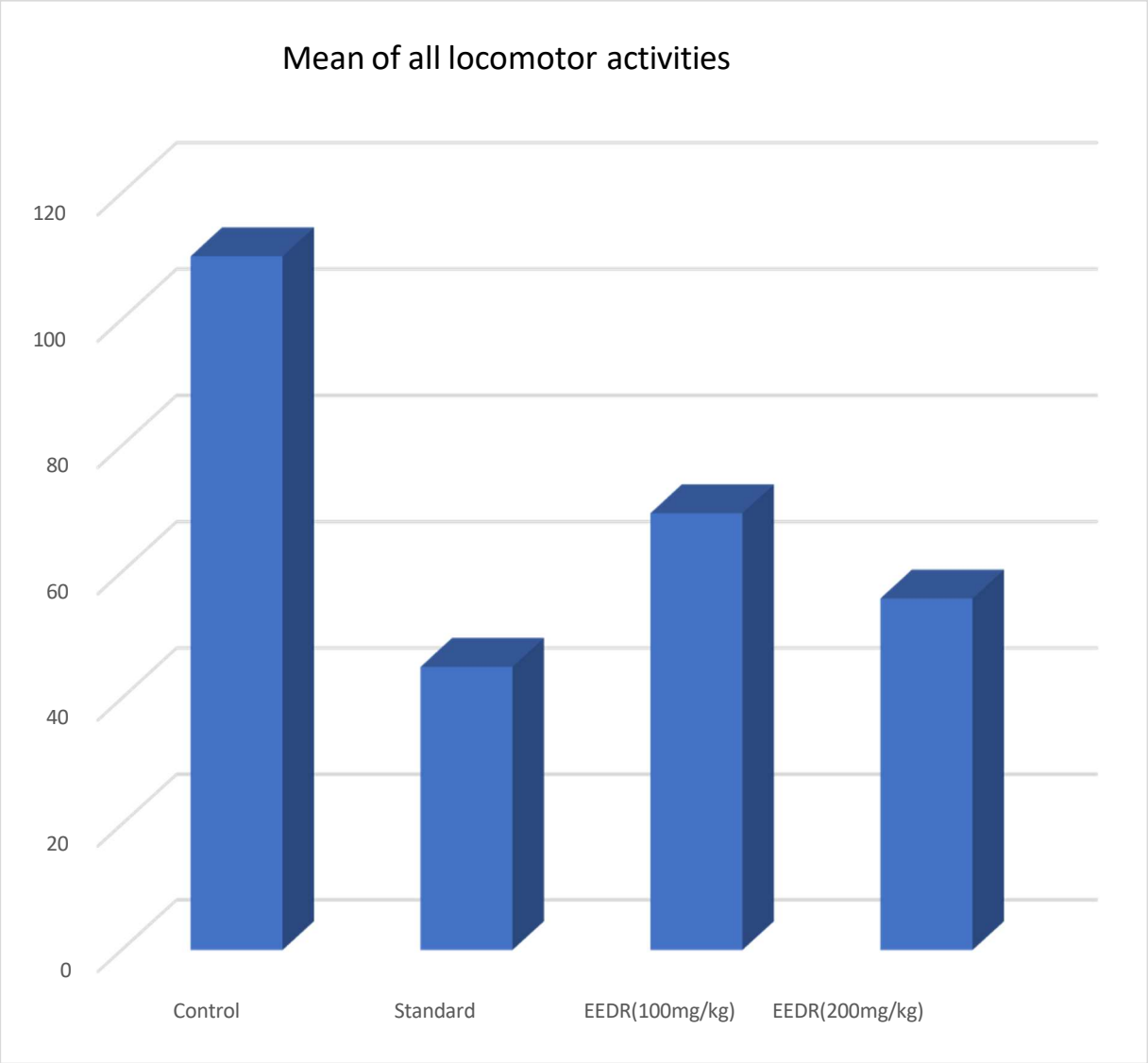
The control group exhibited the highest duration spent in the closed arms, indicating elevated anxiety-like behavior. In contrast, the standard treatment significantly reduced time spent in the closed arms, suggesting strong anxiolytic activity. EEDR at both 200 mg/kg and 400 mg/kg doses also decreased the time in closed arms compared to control, with a dose-dependent reduction observed, supporting the anxiolytic potential of EEDR**.**

Actophotometer

Image No. 3 : Actophotometer

Sr. No.	Treatment	Dose	Mean &SE
1	Control	1 ml/kg	110± 1.41
2	Standard	1mg/kg	45±0.97
3	EEDR	200mg/kg	69.33±4.13
4	EEDR	400mg/kg	55.83±2.20

Table No.7 : *Delonix regia* leaves extract mean reading from Actophotometer



Graph No. 6: Mean of Locomotor Activities in Mice

The control group exhibited the highest mean locomotor activity, indicating normal spontaneous movement. In contrast, the standard group showed a marked reduction in locomotor activity, consistent with central nervous system depressant or anxiolytic effects. EEDR at 200 mg/kg and 400 mg/kg also reduced locomotor activity in a dose-dependent manner, suggesting and sedative or anxiolytic potential of the extract.

Discussion

Anxiety disorders remain among the most prevalent psychiatric conditions worldwide, and the limitations of currently available anxiolytic drugs, including adverse effects, tolerance, and dependence, have encouraged the search for safer plant-based alternatives. The present study investigated the anxiolytic potential of *Delonix regia* leaf extract using established experimental models.

The observed anxiolytic activity may be attributed to the presence of bioactive phytoconstituents such as flavonoids, alkaloids, tannins, saponins, quercetin, kaempferol, and scopoletin. These compounds have been reported to modulate GABAergic and serotonergic neurotransmission and possess antioxidant properties, which may collectively contribute to their anxiolytic effects.

Behavioral evaluation using the Elevated Plus Maze demonstrated a significant increase in open-arm exploration in extract-treated groups, indicating reduced anxiety-like behavior. The higher dose (400 mg/kg) produced effects comparable to diazepam, suggesting dose-dependent anxiolytic activity.

These results suggest that *Delonix regia* is a promising natural source of anxiolytic agents with potential therapeutic value.

However, the present study is limited to preclinical evaluation. Further studies are required to isolate and standardize the active constituents, elucidate their molecular mechanisms, and confirm their efficacy and safety through well-designed clinical trials.

CONCLUSION

The present study comprehensively investigated the antianxiety potential of *Delonix regia* leaf extract using validated animal models and standard phytochemical methods. The findings clearly indicate that the extract of *Delonix regia* possesses significant anxiolytic activity.

In behavioral assays such as the Elevated Plus Maze and Actophotometer tests, the extract produced results comparable to standard anxiolytic drugs like diazepam, without exhibiting sedative or toxic side effects.

This aligns with the growing demand for plant-based therapeutics in the management of psychiatric disorders.

In conclusion, *Delonix regia* represents a promising candidate for the development of herbal formulations targeting anxiety disorders. Further research involving clinical trials, bioavailability studies, and molecular mechanism elucidation is warranted to validate and optimize its therapeutic application in human subjects.

References

1. Shri, R. (2010). Anxiety: Causes and Management. The Journal of Behavioral Science, 5(1), 100–118

2. Bandelow, B., & Michaelis, S. (2015). Epidemiology of anxiety disorders in the 21st century. Dialogues in Clinical Neuroscience, 17(3),327. https://doi.org/10.31887/DCNS.2015.17.3/BBANDELOW

3. Edwards, J., Goldie, I., Elliott, I., Breedvelt, J., Chakkalackal, L., Foye, U., Kirk-Smith, A., Smith, J., Yanakieva, S., Bashir, Z., Amos, J., & Mental Health Foundation. (2016). Fundamental Factors About Mental Health 2016. In *Fundamental Facts About Mental Health 2016*.

4. MacLeod, C. (1999). Anxiety and anxiety disorders. In *Dalgleish, Tim (Ed); Power, Mick J. (Ed). (1999). Handbook of cognition and emotion. (pp. 447 477). New York, NY, US: John Wiley & Sons Ltd. xxi, 843 pp.SEE BOOK*

5. Chattopadhyay, J., Cogen, R. M., Collins, J. K., … Disorders Collaborators, M. (2021). Global prevalence and burden of depressive and anxiety disorders in 204 countries and territories in 2020 due to the COVID-19 pandemic. *The Lancet*, *398*, 1700–1712. https://doi.org/10.1016/S0140-6736(21)02143-7

6. Kim, J., & Gorman, J. (2005). The psychobiology of anxiety. Clinical Neuroscience Research. https://doi.org/10.1016/j.cnr.2005.03.008

7. Sharma, H. L., & Sharma, K. K. (2017). Principles of Pharmacology (3rd ed.). Paras Medical Publishers.

8. Bandelow B, Sher L, Bunevicius R, et al. Guidelines for the pharmacological treatment of anxiety disorders, obsessive-compulsive disorder and post-traumatic stress disorder in primary care. Int J Psych Clin Pract 2012;16:77–84.

9. Charles, R. C., & Robert, E. S. (2004). Modern Pharmacology with Clinical Applications (B. Sun, R. Kerins, & J. Ajello, Eds.; Fifth). Lippincott Williams & Wilkins, Wolters Kluwer Company.

10. Thakur, P., & Rana, A. (2013). Anxiolytic potential of medicinal plants. International Journal of Nutrition, Pharmacology, Neurological Diseases, 3(4), 325. https://doi.org/10.4103/2231-0738.1198389

11. Khanum, F., Organisation, D., & Khanum, F. (2015). Anxiety-Herbal Treatment: A Review. January 2010.

12. Bhattacharya, S. K., Bhattacharya, A., Sairam, K., & Ghosal, S. (2000). Anxiolyticantidepressant activity of Withania

somnifera glycowithanolides: An experimental study. Phytomedicine, 7(6), 463–469. https://doi.org/10.1016/S0944-7113(00)80030-6

13. Akhondzadeh, S., Naghavi, H. R., Vazirian, M., Shayeganpour, A., Rashidi, H., & Khani, M. (2001). Passionflower in the treatment of generalized anxiety: a pilot doubleblind randomized controlled trial with oxazepam. Journal of Clinical Pharmacy and Therapeutics, 26(5), 363–367.
14. Rex, A., Morgenstern, E., & Fink, H. (2002a). Anxiolytic-like effects of Kava-Kava in the elevated plus maze test--a comparison with diazepam. Progress in Neuropsychopharmacology and Biological Psychiatry, 26(5), 855–860. https://doi.org/16/S0278-5846(01)00330-X
15. Di Renzo, G. (2000). Ginkgo biloba and the central nervous system. In Fitoterapia. https://doi.org/10.1016/S0367-326X(00)00180-5
16. Kumar, V., Jaiswal, A. K., Singh, P. N., & Bhattacharya, S. K. (2000). Anxiolytic activity of Indian Hypericum perforatum Linn: An experimental study. Indian Journal of Experimental Biology, 38(1), 36–41.
17. Dutt, V., Dhar, V. J., & Sharma, A. (2010). Antianxiety activity of Gelsemium sempervirens. Pharmaceutical Biology, 48(10), 1091–1096. https://doi.org/10.3109/13880200903490521
18. Ravi Kumar, A., Shaik, R., & Yeshwanth, D. (n.d.). Phytochemical evaluation of Delonix regia, Samanea saman, Bauhinia variegata. International Journal of Research in Pharmacy and Chemistry. Retrieved from http://www.ijrpc.com.
19. Pulla, R. Pharmacological Evaluation of Antianxiety Activity of Desmostachya Bipinnata Leaves in Animal Models. International Journal of Current Pharmaceutical Research. https://doi.org/10.22159/IJCPR.2017V9I5.22159
20. Nariya, P. B., Shukla, V. J., & Acharya, R. N. (2012). Phytochemical screening and in vitro evaluation of free radical scavenging activity of Cordia macleodii bark.(HOOK. F. & THOMSON). *Free Radicals and Antioxidants*, *2*(3), 36-40.
21. Dutt, V., Dhar, V. J., & Sharma, A. (2010). Antianxiety activity of Gelsemium sempervirens. Pharmaceutical Biology, 48(10), 1091–1096. https://doi.org/10.3109/13880200903490521