WWW.IJRPR.COM

International Journal of Research Publication and Reviews

Journal homepage: www.ijrpr.com ISSN 2582-7421

Anti Depressant Activity Delonix Regia

Dr R Nirmala[1]*, Lubna[2]

[1] Associate Professor, Surabhi Dayakar Rao College of Pharmacy, Gajwel, Siddipet, 502312, India
[2]student, Surabhi Dayakar Rao College of Pharmacy, Gajwel, Siddipet, 502312, India

A B S T R A C T

Delonix Regia Belongs to the family Fabaceae. Depressions are widespread psychiatric disorders affecting around 5% of the population. Furthermore, it is difficult to predict which patient will respond to any given treatment. In the traditional systems of medicine, many plants have been used to treat anxiety and depression for thousands of years. The present study was designed to evaluate the antidepressant activity of the alcoholic and aqueous extracts of Delonix Regia leaves in rodents. The antidepressant activity was tested by using forced swim test and Open Field Test. The results infer that reduced immobility time elicits antidepressant activity. It was concluded that alcoholic and aqueous extracts of Delonix Regia leaves having antidepressant activity. Alcoholic extract of Delonix Regia leaves showing more significant activity over the aqueous extract.

Keywords: *Delonix Regia*, Antidepressant activity, forced swim test, Open Field Test.

INTRODUCTION

Traditional medicines play animportant role in health services around the globe. About three-quarters of the world population relies on plants and plant extracts for healthcare[1]. The rational design of novel drugs from traditional medicine offers new prospects in modern healthcare. Delonix regia (Boj. Ex. Hook) (Family:Caesalpiniaceae) is a medium-sized tree found in greaterparts of India. The decoction of the leaves is traditionally used in treating gastric problems, body pain, depression and rheumatic pains of joints [2, 3]. Ethanolic extracts of flower and bark were investigated to anti-depressant activity in rats [4].The leaves are reported to antibacterial [5] and antimalarial [6]. Delonix regia contains proteins, flavonoids, tannin, Phenolic compounds, glycosides, sterols, and triterpenoids. However, no data were found regarding the pharmacological and phytochemical evaluation of the leaves of the plant.

There are many significant research work done on bark, leaves of *Delonix Regia* plants and they have very good pharmacological activities. However, the literature review revealed that limited numbers of research work has been carried out on this plant. That's why the study was conduct to investigate the CNS depressant activity of two solvent soluble fraction (aqueous and alcohol solvent soluble) of *Delonix Regia* leaves using mice and rat model.

The aim of the present study was to investigate the Antidepressant activity of the ethanol extract of the leaves of Delonix regia

MATERIALS AND METHODS

Plant Material

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.

Drugs and Chemicals

Drugs and Chemicals used in this study were of analytical grade and of highest purity procured from standard commercial sources in India. Diazepam was purchased from Nicholos Piramal Ltd.

Extraction of plant material

Preparation of Aqueous Extract:

Fresh leaves of Delonix regia were collected and washed under tap water. The leaves extract used was prepared by taking 20gms of finely cut leaves into 250ml beaker containing 200ml of water. The contents were mixed well and then the mixture was boiled up to 80-1000C for 4-5hrs. Further the extract was filtered with whatmann filter paper. The filtrate was boiled until the concentrated residue is formed. The concentrated product was sealed in sample covers and stored under room temperature and used for further experiment to check the activities.

Preparation of Alcoholic Extract:

Fresh leaves of *Delonix regia* leaf were collected and washed under tap water. The leaves extract used was prepared by taking 20gms of finely cut leaves into 250ml beaker containing 200ml of alcohol. The contents were mixed well and then the mixture was boiled up to 50-60^{0}C for 4-5hrs. Further the extract was filtered with whatmann filter paper. The filtrate was boiled until the concentrated residue is formed. The concentrated product was sealed in sample covers and stored under room temperature and used for further experiment to check the activities.

Experimental animals

Wistar rats (150-200 g) and Swiss albino mice (18-22g) of either sex selected for the study. Animals were housed in appropriate cages in uniform hygienic conditions and fed with standard pellet diet (Amrul Laboratory Animal Diet) and water ad libitum. All the animals were maintained under standard conditions, that is room temperature 26 ± 1°C, relative humidity 45 - 55% and12:12 h light – dark cycle. Animal studies had approval of IAEC.

Selection of dose for animal study

The dose considered for the experiment on rats was obtained from conversion of human dose of *Delonix regia* (3-5 g/kg). The conversion factor of human dose (per 200 g body weight) is 0.018 for rats and 0.002 for mice (Ghosh 1984). Hence the calculated dose for the rats (considering human dose3 and 5 g/kg) is 200 mg/kg and for mice is 20 mg/kg. Acute toxicity was done at dose of 2000mg/kg body weight.

Acute Oral Toxicity

The acute oral toxicity of aqueous and alcoholic extracts of Delonix regia was determined by using rats and mice which were maintained under standard conditions. The animals were fasted 12 hour prior to the experiment, up and down procedure OECD guideline no. 425 were adopted for toxicity studies. Animals were administered with single dose of individual extract up to 2000mg/kg and observed for its mortality during 2days and 7days study period (short term) toxicity and observed up to 7days for their mortality, behavioral and neurological profiles.

Antidepressant Activity

The aqueous and alcoholic extracts of *Delonix regia* leaves were tested for antidepressant activity using despair swim test and tail suspension test. Animals were divided into four (I-IV) groups.

Group I - Control group received distilled water (1ml, p.o).

Group II - Standard group received Diazepam (10mg/kg i.p).

Group III - Test group received aqueous extract of *Delonix regia* (200mg/kg p.o).

Group IV - Test group received alcoholic extract of *Delonix regia* (200mg/kg p.o).

Despair Swim Test Apparatus

For the determination of antidepressant activity, forced swim test (FST) protocol was employed. During the test, animals were individually placed in a glass cylinder (20 cm in height, 14 cm in diameter) filled with water up to a height of 10cm, at 25 ± 2°C. All animals were forced to swim for 5 min and the duration of immobility was observed and measured during the 5 min interval of the test. Immobility period was regarded as the time spent by the rats to float in water with no struggle and making only those movements necessary to keep its head above the water. In order to check the fitness level of each test animal, a pre-test was carried out 24 h before the FST by subjecting each test animal to a session of 15 min swimming.

Tail suspension test

Tail suspension test was performed based on the method prescribed. The mice were suspended 58cm above the floor by means of an adhesive tape, placed approximately 1cm from the tip of the tail. The total duration of immobility was quantified during a test period of 5min. Mice were considered immobile when they were completely remain motionless.

Open field test (OFT)

This test was carried out on mice's to evaluate the effects of investigational drug on mobility of animal. Open field equipment was made of plywood which is white in colour and measured 72 by 72 and wall is 36cm long In this test mice's were treated individually with DMSO, standard drug Diazepam (10mg/kg) and testing drugs alcoholic extracts of *Delonix regia*(200/ml). Then placed them independently in the middle of the open field for 5 minutes to count Total Locomotion (TL) i.e. the total number of square crossed both outer and inner ones, Peripheral Locomotion (PL), and Central Locomotion (CL) respectively. The other factors, which were also evaluated, are number of rearing, leaning, grooming and defecation.

Statistical analysis

The values were expressed as mean ± SEM data was analyzed using one-way ANOVA followed by T-test. Two sets of comparision had made. i.e. Normal control Vs All treated groups. Differences between groups were considered significant at $P<0.001$ and $P < 0.05$ levels.

RESULTS AND DISCUSSIONS

Antidepressant Activity

Forced Swim Test

Antidepressant activity of aqueous and alcohol solvent soluble fraction of the leaves of *Delonix regia* studied at a dose of 200 mg/Kg, using Forced Swim Test experiment.The anti-depressant activity of AQEDR and ALEDR was assessed using Forced Swimming Test in Swiss albino rats were illustrated in Table 1. It was observed that AQEDR and ALEDR at a dose of 200mg/kg exhibited significant reduction in immobility time when compared to control in dose dependent manner. Similarly the animals treated with diazepam (10mg/kg) as expected showed significant decrease in immobility time.

Table 1: Effect of extracts of *Delonix regia* on Anti-depressant activity

S. No	Group	Dose(i.p; mg/kg)	Immobility period		% change in activity
			Before	After	
1	Control	5ml/kg	132	--	---
2	Diazepam	10mg/kg	181	67	64.15%
3	AQEDR	200mg/kg	179	66	61.91%
4	ALEDR	200mg/kg	302	194	37.62%

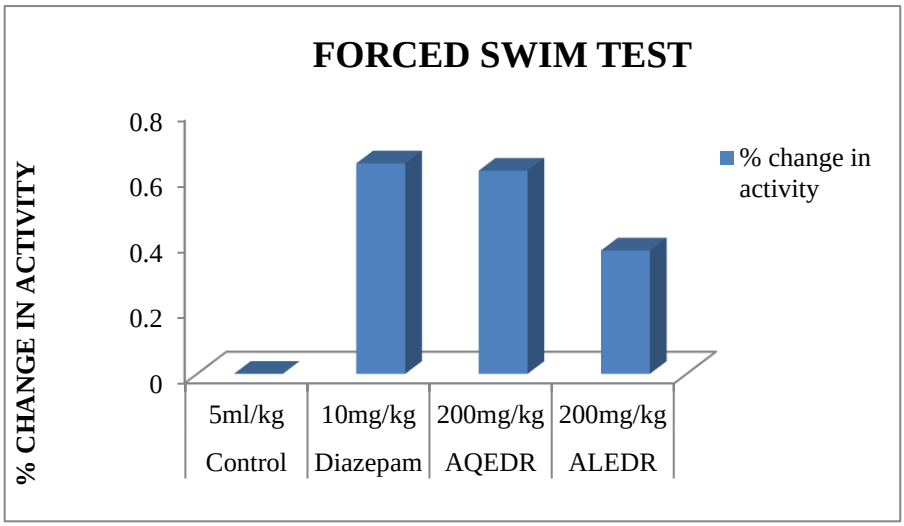

Fig-1: Effect of extracts of *Delonix regia* on Anti-depressant activity

Open Field Test

Antidepressant activity of aqueous and alcohol solvent soluble fraction of the leaves of *Delonix regia* studied at a dose of 200 mg/Kg, using Forced Swim Test experiment. In tail suspension test, the alcoholic and aqueous extracts of leaves of *Delonix regia* at a dose of 200 mg/kg i.p. significantly decreased the immobility time. The magnitude of the antidepressant effects of 200 mg/kg i.p. of alcoholic and aqueous leaves of *Delonix regia* was comparable to that of Diazepam 10 mg/kg i.p. (Table 2, 3).

Table 2: Effect of Ethanolic and Aqueous Extracts of *Delonix regia* Leaves on Open Field TEST

S.No	Treatment	Dose (mg/kg)	Duration of immobility		% Change in activity
			Before	After	
1.	Control	---	40	-----	------
2.	Standard	10	26	121	86.89%
3.	AQEDR	200	46	183	76.36%
4.	ALEDR	200	61	167	63.42%

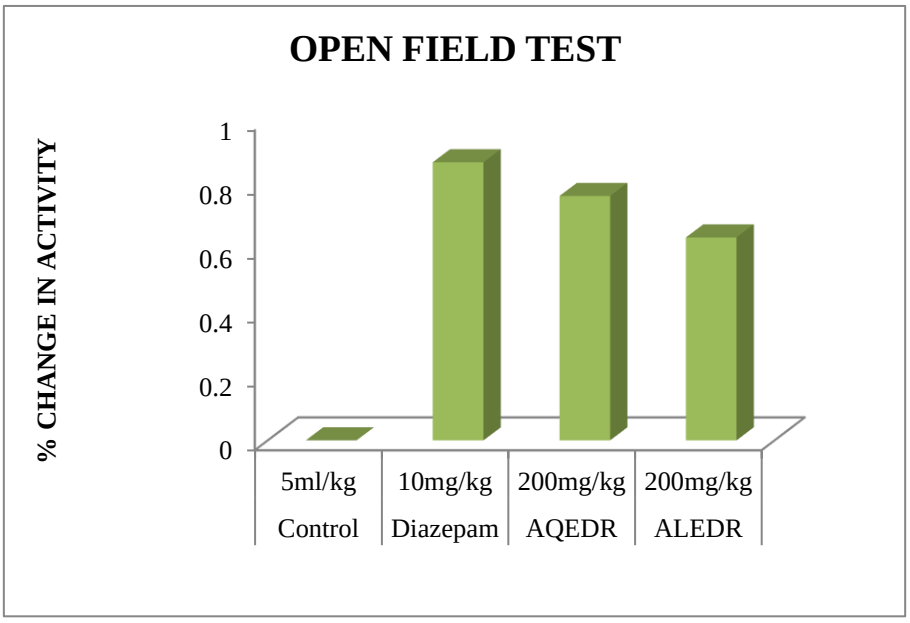

Fig-2: Effect of extracts of *Delonix regia* on Anti-depressant activity

Table3: Effects of *Delonix regia* on duration of immobility time in open field test (OFT)

Treatments	Dose (mg/kg)	TL	CL	PL	L	G	D
Control	---	141.2±1.01	31.0±1.50	114.9±9.25	8.2±9	1.6±3.54	0.43±2.00
Diazepam	10	154.4±2.24	38.1±2.15	118.6±3.24	9.3±3.62	0.39±2.10	0.0±0.0
AQEDR	200	123.5±2.98	26.1±0.13	95.3±8.50	11.6±0.34	1.42±5.24	0.0±0.0
ALEDR	200	134.0±1.56	29.3±2.25	27.2±6.14	11.2±2.50	2.53±1.36	0.0±0.0

Values are expressed as Mean ± S.E.M (n=10). *P <0.05, **P<0.01, ***P<0.001 when compared with control groups. TL: Total Locomotion, PL: Peripheral Locomotion, CL: Central Locomotion (CL), L: leaning, G: grooming, D: defecation.

For the open field test number of line crosses and the frequency of rearing are usually used as measures of locomotor activity, but are also measures of exploration and anxiety. A high frequency of these behaviors indicates increased locomotion and exploration and/or a lower level of anxiety. The number of central square entries and the duration of time spent in the central square are measures of exploratory behavior and anxiety. A high frequency/duration of these behaviour indicates high exploratory behavior and low anxiety levels.

CONCLUSION

The results obtained in this study indicate that the methanol fractions of the leaves of Delonix regia have significant CNS Depressant activities in animal model systems. The medicinal values of the plant leaves may be related to their constituent phytochemical. So, further detailed investigations are needed to isolate and identify the active compounds present in the plant extract and its various fractions and their efficacy need to be done. It will help in the development of novel and safe drugs for the treatment of different types of CNS disorders.

ACKNOWLEDGEMENT

The authors are thankful to Sura Lab, Hyderabad.

REFERENCES

1. Sofowora, A., 1982,Medicinal Plants and Traditional Medicine in Africa, John Wiley and Sons Ltd., Chichester. New York. Toronto. Singapore, pages 6,10,11,74,114,256.
2. Abayomi, S (1993). Historical review of traditional medicine in Africa, Spectrum Book ltd pp: 9-25. Ibadan.
3. Herborn, J.B (1998). Phytochemical methods, A guide to modern techniques of plant analysis, pp. 5-11, 2nd edition.
4. Colombo, M.L and Bosisio, E (1996). Pharmacological activites of chelidonium majus L (papveraceae), Pharmacol. Res 33: 127-134.

5. El-seedi, H.R., Ohara, T., Sata, N. and Nishiyama, S (2002). Antimicrobial terpenoids from Eupatorium glutinosum (Asteraceae), J. Ethnopharmacol 81:293-296.

6. Baker, J.E., Brotz. H., Leichert, L.I.O., Labischinski, H and Hecker, M (2003). Proteomic approach to understanding antibiotic action, Antimicro. Agents. Chemotherapy 47: 948-955.