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Research

Evaluate The Antidepressant Activity Of Anti-Depressant Activity Of Boerhavia Erecta L in Stress Induced Mice

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Abstract

Depression, also referred to as depressive disorder, is a severe medical condition that commonly impacts people's Induce emotions, thoughts, and behaviors. Depression is characterized by sadness and/or a loss of interest in past interests. Numerous mental and physical problems can result from it, and it can affect your performance both at work and at home. To treat depressive episodes, different formulations of antidepressants are used. In this study, mice under stress were used to test the antidepressant effects of whole pant Boerhavia erecta L. Ethanolic extracts of the entire plant Boerhavia erecta L. contain alkaloids, flavonoids, and phenolic content, according to phytochemical analysis. All five extracts Petroleum Ether, Chloroform, Acetone, Ethanol, and Water were subjected to antioxidant activity tests after phytochemical analysis. based on screening for phytochemicals. The tail suspension test and the forced swim test were used to measure the behavioral parameters of both extracts. EEBE (200 mg/kg) and EEBE (400 mg/kg) along with imipramine (0.5 mg/kg) were used as standard, according to the results of several animal models. Lastly, a histopathological analysis was also conducted to determine the organ toxicity in animals that had been given drugs. The use of Boerhavia erecta L. as a whole plant to treat various depressive episodes is strongly supported and justified by this study.

Keywords: Boerhavia erecta L, Imipramine, forced swim test, tail suspension test.

INTRODUCTION

Depression a prolonged sense of sadness and loss of interest are the major symptoms which leads to mood illness. The fifth edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-5) published by the American Psychiatric Association divides depressive disorders into four categories: major depressive disorder, persistent depressive disorder (dysthymia), premenstrual dysphoric disorder, and depressive disorder associated with another medical condition. All depressive illnesses include the characteristics of sorrow, emptiness, or irritability with physical and cognitive alterations that have a major impact on the person's ability to function[1]. In terms of prevalence, misery, dysfunction, morbidity, and economic cost, depression is an illness of substantial public health significance. Women are more prone to depression than males[2].

In a social context that is rapidly developing, the constraints placed on people by society are becoming more and more obvious. Long-term stress can harm brain development[3], and depression is one of the most frequent diseases that go along with it. Depression is more frequent than ever, harming people's physical health, and stress will raise the likelihood of developing the illness. Depression, usually referred to as major depression, clinical depression, or melancholia, is a severe mental condition that is accompanied by mood disorders[4].

MATERIALS AND METHODS

Chemicals and Reagents

Dragandroff reagent and hydrochloride. All other chemicals used were completely of analytical grade.

Plants Collection and Authentication

The roots of *Boerhavia erecta L* whole plant was collected from Trirupati. Both the plants were authenticated by the Scientist from Madava chetty , Assistant professor, Department of botany. The *Boerhavia erecta L* (XCH- 40389) were deposited in the herbarium for further reference.

Extraction

The collected plant materials were washed in running tap water to remove the soil debris, shade dried at room temperature of 25±1^{O}C for few weeks and grounded using mechanical blender to get coarse powder. The dried parts of the plant materials were dried and transfer into a thimble, after that it is then placed inside the Soxhlet. Extract with 750ml Petroleum ether for about 16 hours. Collect the extract, in a container. Allow the marc to dry at room temperature and take the weight of marc. Marc is then extracted with 750ml Chloroform for about 16 hours. Marc weight is noted. It is then successively extracted with 750ml Acetone for 8hours then with Ethanol. Each time the weight of extract is collected in separate container and marc weight is noted. The marc thus obtained after ethanol extraction is then macerated with 750ml distilled water for 24 hours. The water extract is collected and marc weight is noted. All the extracts were used for further studies and phytochemical investigation.

Preliminary Qualitative Phytochemical analysis

All the five extracts were dissolved in 5 ml of distilled water, filtered and the filtrates were used to perform the carbohydrates analyses, proteins,amino acids and proteins, tannins, flavnoids, saponins, phenols and phenolic compounds etc.

Pharmacologial Study Animals

The Swiss albino mice (18-22 g) of either sex were used for the study. The animals were obtained from animal house. On arrival, the animals were placed at animal house, Salem and randomly allocated to treatment groups in polypropylene cages with paddy husk as bedding. Animals were housed at a temperature of 24±2^{o}C and relative humidity of 30 – 70 %. A 12:12 light: day cycle was followed. All animals were allowed to free access to water and fed with standard commercial pelleted rat chaw. All the experimental procedures and protocols used in this study were reviewed.

Acute Toxicity Study[8]

Acute toxicity studies were performed according to OECD-423 (Organization of Economic and Cooperation Development) guidelines. Swiss albino mice (3 Male and 3 Female) selected by random sampling technique were employed in this study. The animals were fasted for 4 h with free access to water. Ethanolic whole plant extract of *Boerhavia erecta L* were administered orally at a dose of 5 mg/kg initially and mortality if any was observed for first 24 hrs and after 72 hrs. If mortality was observed in two out of three animals, then the dose administered was considered as toxic dose. However, if the mortality was observed in only one animal out of three animals then the same dose was repeated again to confirm the toxic effect. If no mortality was observed, then

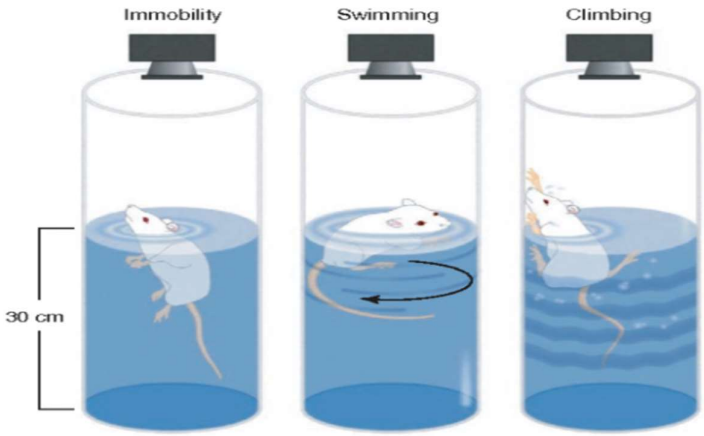
higher (50, 300 and 2000 mg/kg) doses of plant extracts were employed for further toxicity studies. Animals are observed individually after dosing at least once during the first 30 minutes, periodically during the first 24 hours, with special attention given during the first 4 hours, and daily thereafter, for a total of 14 days.
General behavior of the animals were also observed during the acute toxicity study. Based on the mortality LD50 and ED50 were calculated.

Antidepressant Activity Dosage Schedule

Swiss albino mice were randomly divided into six groups, each consisting of six animals and were treated as follows. Group I, animals were served as control received normal saline solution (10ml/kg). Group II, animals were served as reference control administered with Imipramine, 0.5 mg/kg. (i.p.). Group III and IV were administered orally with 200 and 400mg/kg of *Boerhavia erecta L.* All the test compounds were administered once daily for 30 days. The animals were subjected to test on Forced Swim Test and Tail Suspension Test after 30 minutes of drug administration on 7th, 14th, 21st and 30th day.

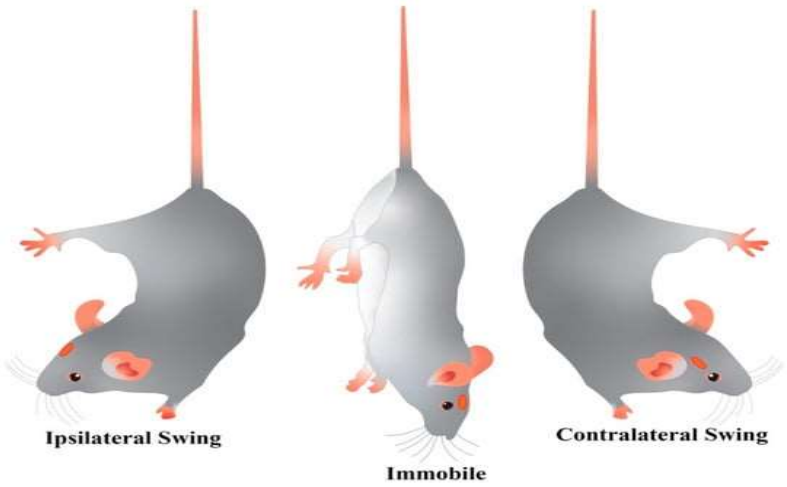
Forced Swim Test[9]

The FST is the most popular pharmacological in vivo paradigm for evaluating the efficacy of antidepressants. The mice that were made to swim in a small area where they couldn't escape developed a recognisable immobile behaviour. This behaviour reveals a depressive state that a test medication can either exacerbate or alleviate. The device was a clear plexiglass cylinder (20 cm high×12 cm diameter) that was filled with water at 24°C to a depth of 15 cm. Animals are initially very active when they are first placed in the cylinders, swimming erratically in circles, attempting to climb the wall, or diving to the bottom. After two to three minutes, activity starts to slow down and is broken up by longer periods of floating or immobility. After about 6 minutes, there is a plateau where the animals are sedentary for 80% of the time. The animals are taken out of the water after 15 minutes and allowed to dry in a heated enclosure (32°C) before being put back in their original cages. It has been discovered that floating behaviour during this 5-minute window is repeatable among mouse groups. When an animal stays passively floating in the water with its nose just above the surface and its body slightly bent but upright, it is deemed to be immobile. It was proposed that the animals' immobility represented a low mood state in which they had given up on trying to escape and had accepted their place in the experiment. The animals were individually made to swim for 5 minutes after extract administration. During the study, immobilisation time was recorded.



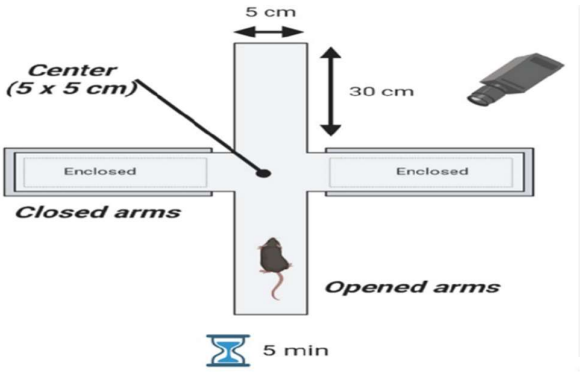
Tail Suspension Test[10]

For assessing the pharmacological effects of antidepressant medications or stress- evoked behaviour in mice, the tail suspension test is frequently utilised. The tail suspension test induces immobility by using the uncontrollable, unavoidable stressor of tail suspension. The method described by Steruetal was followed in the tail suspension test (1985). Each mouse was connected by its tail to a separate piece of adhesive tape such that it was hanging 1 cm off the top and 60 cm from the bottom surface. The test was conducted in a quiet, peaceful, and dark environment, and a 6-minute recording was made. From the second minute (after the first minute for stabilisation) until the finish, the amount of time spent immobile in seconds was recorded. Only when the mouse hung passively and was fully still was immobility taken into account.



Elevated Plus Maze Test [11]

The elevated plus maze test is the most extensively used to access the anxiety that depend upon the study of spontaneous behaviour. The equipment comprised of two open arms (25 cm×10 cm) and two closed arms (25 cm×10 cm×20 cm) that extend from a familiar central platform (10 cm×10 cm) the entire maze was elevated to a height of 90 cm above the floor height. After treatment with both the extracts, the animals were placed in the centre of the elevated plus maze and observed the number of open and closed arm entries and time spent on open and closed arm by the mice. The animals were individually placed in the centre of the elevated plus maze and observed the number of open and closed arm entries and time spent on open and closed arm by the mice.At the end of the study, the animals were anaesthetized with ketamine, blood was collected through sinus puncture for biochemical estimations. The animals were also sacrificed with excess anaesthesia, dissected and liver, kidney were removed. The organs were subjected to biochemical estimations and for histopathological observations.



Statistical Analysis

All of the tests were carried out in triplicate values. The triplet mean SEM is used to express the experimental results. Data were analysed by One-way ANOVA followed by Tukey's multiple comparison tests. Graph Pad Prism Software, Version 9.2.0 (332) was used for statistical analysis. (San Diego, USA Graph Pad Software).

RESULTS AND DISCUSSION

Extractive Values

Table 1. Extractive Values of *Boerhavia erecta.*L Whole plant

Extraction	Colour	Consistency	Percentage Yield %
Pet. Ether	Dark Black	Semi Solid	2.13
Chloroform	Dark Blue	Semi Liquid	2.48
Acetone	Greenish	Thick Solid	3.6
Ethanol	Green	Semi Solid	14.9

Water	Dark Greenish	Semi Liquid	1.36

Table.1, highlights the extractive values which reveals the colour, consistency and percentage yield of different extracts of *Boerhavia erecta*.L . Among the various extracts of *Boerhavia erecta*.L , the ethanolic extraction is showing better percentage yield. The consistency seems to be semi solid and semi liquid for almost all extracts of plants.

Preliminary Phytochemical Analysis

Table 2. Preliminary qualitative phytochemical analysis of *Boerhavia erecta L*

Plant Constituents	Petroleum Ether	Chloroform	Acetone	Ethanol	Water
Carbohydrate	+	-	+	+	+
Alkaloid	-	-	-	+	-
Flavonoids	-	-	+	+	-
Phenol	-	-	+	+	+
Saponins	+	+	+	+	-
Tannins	-	-	-	-	-
Cardiac Glycosides	-	-	-	-	-
Terpenoids	-	-	-	+	+
Protein and amino acids	-	-	-	-	-
Gums and Mucilage	-	-	-	-	-
Fixed oil and fats	-	-	-	-	-

The phytochemical analysis shows the presence of Carbohydrate, Alkaloids, Flavonoids, Phenol, Saponins Terpenoids, Proteins, Gums and fixed oils among various extracts of *Boerhavia erecta L* whole plant (Table 2).

Quantitative Phytochemical Analysis

Table 3: Estimation of plant extraction yield, total flavonoid, alkaloid and phenolic contents in the whole plant extract of *Boerhavia erecta*.L

Sample	Amount of flavonoid in terms of quercetin units(µg)	Amount of alkaloid in terms of caffeine units(µg)	Amount of phenolic in terms of Gallic units(µg)
Pet. Ether fraction of *Boerhavia erecta*.L	33.22±0.80	60.3±1.1	35.5±1
Chloroform fraction of *Boerhavia erecta*.L	40.3±1.9	84.3±0.8	42.12±0.72
Acetone fraction of *Boerhavia erecta*.L	96.4±1.1	144.6±1.4	65.36±1.3
Ethanol fraction of *Boerhavia erecta*.L	232.5±2.1	245.2±2.5	102.27±2.03
Aqueous fraction of *Boerhavia erecta*.L	52.1±1.7	101.2±0.8	50.21±0.89

Table shows the quantitative analysis which reveals the amount of flavonoid, alkaloids and phenolic content in various extracts of *Boerhavia erecta*.L. Among the various extracts ethanoic extraction of plant has shown highest amount of flavonoid, alkaloids and phenolic content.

Acute Toxicity Study

The results (Table) of acute toxicity study of both the extracts it was non-toxic. Both the extracts did not produce any mortality even at the highest dose (2000 mg/kg) which was considered as LD50 and ED50 was 200 mg/kg.

Table 4: LD50 values of the extract.

S.no	Groups	No.of Animals/group	Dose mg/kg	No. of death animals Extract
1	I-II	3	5	0
2	III-IV	3	50	0
3	V-	3	300	0
		LD50		2000 mg/kg
		ED50		200 /kg

Antidepressant activity Forced Swim Test

Table 5: Effect of Boerhavia erecta L extracts on Forced Swim Test in mice.

			Forced Swim test Immobility time (Sec)			
	Groups	**Dose**	**7 Day**	**14 Day**	**21 Day**	**30 Day**
I	Control	1 ml	190.84±1.29	186.83±1.60	187.67±1.87	193.67±2.26
II	Stress Control	1 ml	210.84±3.08[a]	215.17±3.65[a]	207.67±2.97[a]	212.83±2.42[a]
III	Imipramine	0.5mg/kg	115.16±1.14[b]	95.82±0.84[b]	79.33±0.88[b]	42.50±0.99[b]
IV	EEBE	200mg/kg	158.34±1.64[b]	132.32±1.34[b]	116.83±1.42[b]	95.17±0.87[b]
V	EEBE	400mg/kg	140.16±1.71[b]	127.18±1.52[b]	97.83±0.95[b]	67.16±0.65[b]

Values are expressed as mean± SEM of 6 animals. Data were analysed by One-way ANOVA followed by Tukey's multiple comparison tests. a P<0.001, indicates that Group II (negative control) was compared with group I(control). b P<0.001 indicates that Group III, IV, and V was compared with group II.

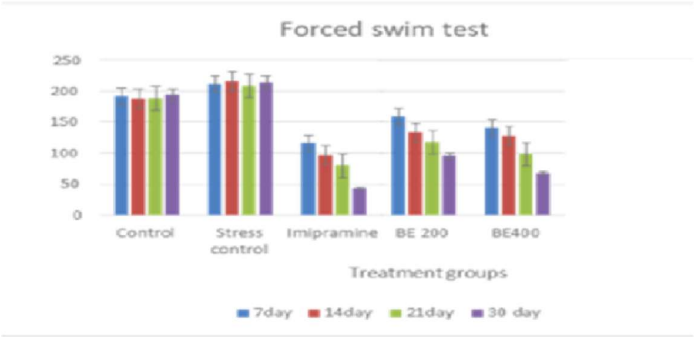


Fig 1: Effect of *Boerhavia erecta* L extracts on Forced Swim Test in mice

Effect of EEBE [Ethanolic Extract of Boerhavia erecta] on forced swim test was studied in mice and the results were presented in table 3. The animals were subjected to forced swim test for 5 minutes at various time intervals and immobility time in seconds were observed. Imipramine, 0.5mg/kg, i.p., was used as a standard antidepressant. Imipramine significantly (P<0.001) reduced the immobility time compared to stress control. Both the doses of EEBE (200& 400 mg/kg) showed antidepressant activity (P<0.001) in terms of a decrease in the immobility time period comparison to stress control. Similarly, on 7th, 14th, 21st and 30th day of observations EEBE 200 mg/kg showed 158.34±1.64, 132.32±1.34, 116.83±1.42 and 95.17±0.87seconds of immobility time respectively and EEBE 400 mg/kg showed 140.16±1.71,127.18±1.52, 97.83±0.95 and 67.16±0.65 seconds of immobility time respectively. The effect produced by both the extracts at 200 & 400mg/kg, were comparable as that of the standard drug Imipramine.

Tail Suspension Test

Table 6: Effect of *Boerhavia erecta* L extracts on Tail Suspension Test in mice

Groups	Dose	Tail suspension test Immobility time (Sec)			
		7 Day	14 Day	21 Day	30 Day
Control	1 ml	82.33±0.99	89.33±0.76	84.33±0.56	86.83±0.94
Stress control	1 ml	95.50±0.76[a]	101.16±2.32[a]	103.33±1.62[a]	106.17±0.98[a]
Imipramine	0.5mg/kg	70.17±0.91[b]	64.67±0.71[b]	56.17±0.66[b]	53.83±0.79[b]
EEBE	200mg/kg	88.33±0.66[b]	76.17±0.95[b]	65.83±0.83[b]	56.50±0.99[b]
EEBE	400mg/kg	80.66±0.71[b]	70.83±0.70[b]	59.66±0.71[b]	50.16±0.94[b]

Values are expressed as mean± SEM of 6 animals. Data were analysed by One-way ANOVA followed by Tukey's multiple comparison tests. a P<0.001, indicates that Group II (negative control) was compared with group I(control). b P<0.001 indicates that Group III, IV and V was compared with group II.

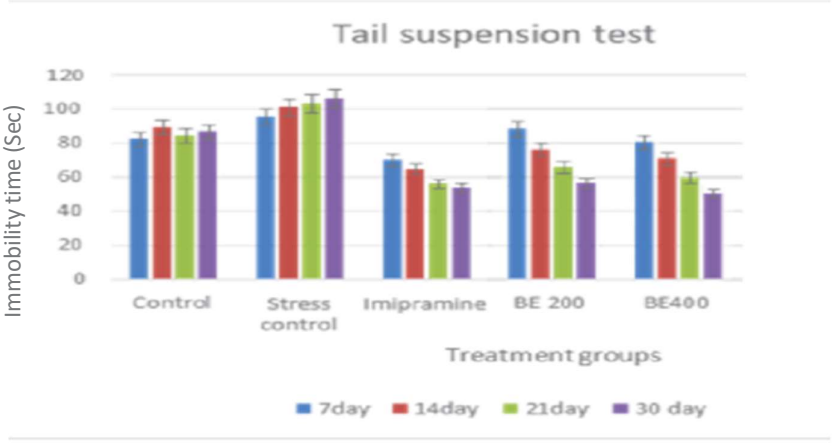


Fig 2: Effect of *Boerhavia erecta* L extracts on Tail Suspension Test in mice

Effect of EEBE on tail suspension test was studied in mice and the results were presented in table 14. The animals were subjected to suspend in air by fixing the tail for 5 minutes. At various time intervals, the immobility time in seconds were observed.Imipramine, 0.5mg/kg, i.p., was used as a standard antidepressant. Imipramine significantly (P<0.001) reduced the immobility time compared to stress control. The dose of EEBE (200& 400 mg/kg) showed significant (P<0.001) decrease in immobilization time, which is an indication of antidepressant effect comparison to stress control. Similarly, on 7th, 14th, 21st and 30th day of observations EEBE 200 mg/kg showed88.33±0.66, 76.17±0.95, 65.83±0.83 and 56.50±0.99seconds of immobility time respectively and EEBE 400 mg/kg showed 80.66±0.71,70.83±0.70, 59.66±0.71 and 50.16±0.94 seconds of immobility time respectively. The effect standard drug Imipramine.

Elevated Plus Maze Test

Table 7: Effect of *Berberis tinctoria* Lesch and *Boerhavia erecta* L extracts on Elevated Plus Maze Test in mice (7th and 14th Day)

Groups	Dose	Elevated plus maze test							
		7 Day				14 Day			
		Number of entries		Time spent (Sec)		Number of entries		Time spent (Sec)	
		Open Arm	Closed arm	Open arm	closed arm	Open Arm	closed arm	Open arm	closed arm
Control	1 ml	1.83±0.30	8.17±0.60	35.83±0.60	192.33±4.14	2.17±0.17	8.33±0.56	49.67±0.88	179.17±2.90
Stress	1 ml	1.67±0.33	10.33±0.4	22.50±0.76	301.33±2.3	1.83±0.31	10.17±0.6	33.83±0.87[a]	311.17±3.3

control		[a]	9[a]	[a]	0[a]	[a]	0[a]		0[a]
Imipramine	0.5mg/kg	3.50±0.42[b]	6.67±0.33[b]	78.17±0.94[b]	191.67±2.67[b]	5.33±0.49[b]	4.83±0.60[b]	146.17±1.05[b]	124.17±2.71[b]
EEBE	200mg/kg	2.33±0.21[b]	8.17±0.65[b]	35.67±0.67[b]	211.17±1.87[b]	2.33±0.21[b]	7.33±0.65[b]	61.67±0.84[b]	188.67±2.62[b]
EEBE	400mg/kg	1.66±0.42[b]	6.83±0.75[b]	60.66±0.98[b]	301.33±2.30[b]	3.67±0.33[b]	6.33±0.49[b]	89.33±0.84[b]	161.67±3.56[b]

Values are expressed as mean± SEM of 6 animals. Data were analysed by One-way ANOVA followed by Tukey's multiple comparison tests. a P<0.001, indicates that Group II (negative control) was compared with group I(control). b P<0.001 indicates that Group III, IV and V was compared with group II.

Table 8: Effect of *Berberis tinctoria* Lesch and *Boerhavia erecta L* extracts on Elevated

Groups	Dose	Elevated plus maze test							
		21 Day				30 Day			
		Number of entries		Time spent (Sec)		Number of entries		Time spent (Sec)	
		Open Arm	closed arm	Open arm	closed arm	Open Arm	closed arm	Open Arm	closed arm
Control	1 ml	1.67±0.33	7.50±0.56	41.17±0.60	181.33±2.74	2.33±0.21	8.17±0.60	45.17±0.83	184.5±2.36
Stress control	1 ml	2.17±0.30[a]	9.83±0.65[a]	38.17±0.60[a]	275.33±4.24[a]	2.16±0.30[a]	11.17±0.60[a]	40.17±0.79[a]	315.10±5.03[a]
Imipramine	0.5mg/kg	6.50±0.42[b]	3.17±0.47[b]	184.67±1.23[b]	85.67±0.88b[b]	9.66±0.49[b]	2.66±0.49[b]	211.0±1.95[b]	58.17±0.95[b]
EEBE	200mg/kg	3.17±0.65[b]	6.50±0.43[b]	93.67±0.76[b]	145.17±3.30[b]	4.16±0.60[b]	5.33±0.56[b]	123.33±1.02[b]	91.17±0.83[b]
EEBE	400mg/kg	4.33±0.49[b]	5.33±0.55[b]	120.33±1.05[b]	102.33±1.60[b]	5.67±0.61[b]	4.66±0.61[b]	155.0±1.09[b]	99.0.±0.68[b]

Values are expressed as mean± SEM of 6 animals. Data were analysed by One-way ANOVA followed by Tukey's multiple comparison tests. a P<0.001, indicates that Group II (negative control) was compared with group I(control). b P<0.001 indicates that Group III, IV and V was compared with group II.

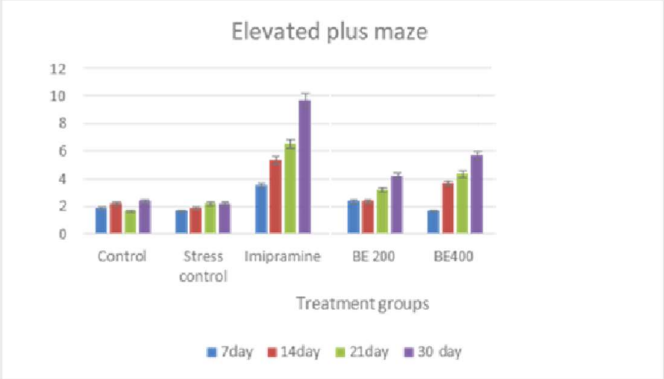


Fig 3: Effect of *Berberis tinctoria* Lesch and *Boerhavia erecta* L extracts on Elevated Plus Maze test in mice (Number of Open Arm Entries).

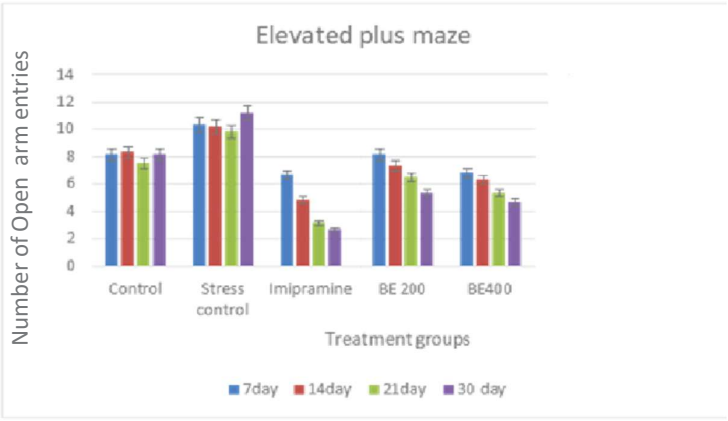


Fig 4: Effect of *Berberis tinctoria Lesch* and *Boerhavia erecta L* extracts on Elevated Plus Maze test in mice (Number of Closed Arm Entries)

Effect of EEBE on Elevated Plus Maze was studied in mice and the results were presented in table. At various time intervals i.e, 7th, 14th, 21st and 28th days number of entries in open arm and closed arm, time spent in open and closed arm of test drugs wereobOn 7th day observation, the reference control, Imipramine significantly (P<0.001) increased the open arm entries and reduced the number of entries in closed arm compared to stress control. Low dose of EEBE (200mg/kg), significantly (P<0.001) increased the open arm entries and reduced the number of closed arm entries. High dose of EEBE (400mg/kg), significantly (P<0.001) reduced entries in closed arm compared to stress control and has arm equipotent effect as that of stress control in the number of entries in open arm. In case of time spent in both the arms, Imipramine significantly (P<0.001) increased the time spent in open arm and decreased the time spent in closed arm compared to stress control. Low dose of EEBE (200mg/kg), moderately increased the time spent in open arm and reduced the time spent in closed arm. High dose of EEBE (400mg/kg), significantly (P<0.001) increased the time spent in open arm and reduced the time spent in closed.On 14th day of observation, the reference control, Imipramine significantly (P<0.001) increased the open arm entries to reduced the number of entries in closed arm to 4.83±0.60 compared to stress control. Low dose of EEBE (200mg/kg), significantly (P<0.001) increased the open arm entries and reduced the number of closed arm entries. High dose of EEBE (400mg/kg), significantly (P<0.001) enhanced the number of entries in open arm and decrease the number of entries in closed arm compared to stress control and has equipotent effect as that of stress control in the number of entries in open arm. In case of time spent in both the arms, Imipramine significantly (P<0.001) increased the time spent in open arm and decreased the time spent in closed arm compared to stress control. Low dose of EEBE (200mg/kg), moderately increased the time spent in open arm and reduced the time spent in closed arm. High dose of EEBE (400mg/kg), significantly (P<0.001) increased the time spent in open arm and reduced the time spent in closed arm. The effects of both the extracts on time spent in open and closed were moderate as compare to reference control Imipramine.

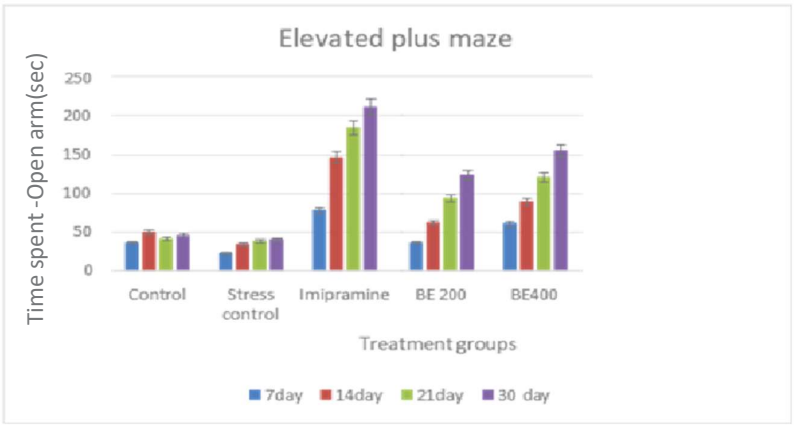


Fig 5: Effect of *Berberis tinctoria* Lesch and *Boerhavia erecta* L extract on Elevated Plus Maze test in mice

(Time Spent in Open Arm)

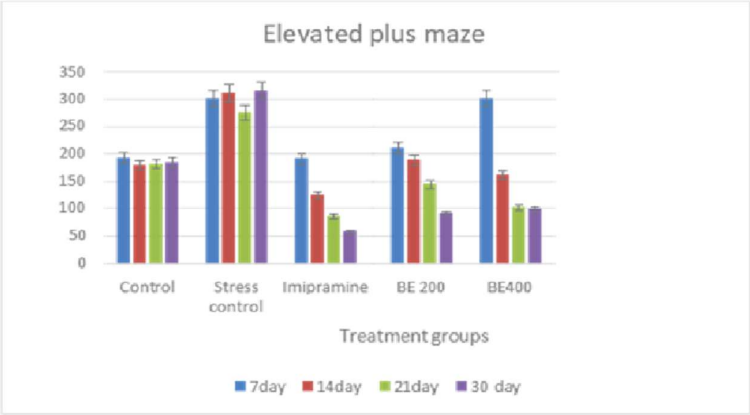


Fig 6: Effect of *Berberis tinctoria Lesch* and *Boerhavia erecta L* extracts on Elevated Plus Maze test in mice (Time Spent in Closed Arm)

On 21st and 30th day of observations, the reference control, Imipramine significantly (P<0.001) increased the open arm entries and reduced the number of entries in closed arm to compared to stress control. Low dose of EEBE (200mg/kg), significantly (P<0.001) increased the open arm entries and reduced the number of closed arm entries. High dose of EEBE (400mg/kg), significantly (P<0.001) enhanced the number of entries in open arm and decrease the number of entries in closed arm compared to stress control and has equipotent effect as that of stress control in the number of entries in open arm. In case of time spent in both the arms, Imipramine significantly (P<0.001) increased the time spent in open arm and decreased the time spent in closed arm compared to stress control. Low dose of EEBE (200mg/kg), moderately increased the time spent in open arm and reduced the time spent in closed arm. High dose of EEBE (400mg/kg), significantly (P<0.001) increased the time spent in open arm and reduced the time spent in closed arm. The effect produced on 21st and 30th day by both the extracts were similar as that of 14th day observation.

DISCUSSION

Boerhavia erecta L are the plant collected from Nilgiris and Thuthukudi respectively, to assess the antidepressant and anxiolytic activity in mice. The plants were authentified by scientist from Madava chetty, Assistant professor, Department of botany.The plants were undergone successive extraction using five different solvents according the polarity nature. For both the plants the following extracts were used ie Petroleum Ether, Chloroform, Acetone, Ethanol and Water. After the successive extraction the various herbal extracts were investigated for phytochemical investigation for both qualitative and later quantitative analysis.

The phytochemical screening has highlighted the presence of Carbohydrate, Alkaloids, Flavonoids, Phenol, Saponins, Tannins and Cardiac Glycosides among various extracts of presence of Carbohydrate, Alkaloids, Flavonoids, Phenol and Saponins among the extract of Boerhavia erecta L whole plant. The quantitative analysis has reported the presence of total flavonoid, alkaloid and phenolic contents in the extract of whole plant Boerhavia erecta L.

The potential uses of phytochemicals from many medicinal plants in pharmaceutical and medical fields are also shown, particularly for health promotion. Examples include their antioxidant, antibacterial, anti-cancer, cardioprotective, immune system-boosting, and antiinflammatory activities1.

When comparing the various extracts of both herbs the ethanolic extracts of Boerhavia erecta L. having higher percentage of alkaloidal, flavonoids and phenolic content. From the above two investigations the conclusion was ethanolic fraction of Boerhavia erecta L. having more anti-oxidant activity in scavenging various free radicals due to the presence of flavonoids and phenolic compounds. IC 50 values also give better justification for the antioxidant activity of ethanolic extraction of Boerhavia erecta L. Lower the IC 50 value greater the antioxidant activity. The various extracts ethanolic extraction of Boerhavia erecta L having less IC 50 values when compared with other extracts and the standrads. Both human therapy and an organism's natural defence depend heavily on alkaloids.

SUMMARY AND CONCLUSION.

Boerhavia erect L was the plant collected for assessing the antidepressant activity by using behavioral models. Five solvents such as Pet. Ether, chloroform, acetone, ethanol and water was used in this study to assess the antidepressant activity of Boerhavia erecta. L Based on the phytochemical screening and finally ethanolic fraction of Boerhavia Erecta L were selected to purse detailed experimental procedures.

The results reveals that both the ethanolic fractions of Boerhavia erecta L having antidepressant activity in terms of behavioral changes as well as neurotransmitters in brain and hormonal levels in plasma. Histopathological detailing in liver and kidney of mice has reported less toxicity with organs, it gives more justification and support to the clinical usage of herbal extracts without much serious noxious effects that makes toxicity in human survival in health care segment.

Finally, the study can be concluded by stating that the ethanolic extracts of Boerhavia erecta L with stress induced mice both the drug having antidepressant activity.

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