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Attenuation of depression by *Bauhinia purpurea* linn. leaves ethanolic extract in swiss albino mice

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Abstract

Introduction: Depression is a characterised by low mood and lack of activity that can implicit on person's thoughts, behaviour, feelings, and sense of well-being.

Objectives: To evaluate antidepressant activity of Ethanolic extract of *Bauhinia Purpurea* in Swiss Albino mice.

Materials and Method: Sixty Swiss Albino mice of either sex weighing 20-25gm were divided into five groups, Group I received vehicle (1% Gum acacia suspension - 3ml/kg P.O), Group II received standard drug Imipramine (10mg/kg orally 1 hour before the experiment). Group III, IV, V received the test drug in the dose of 100 mg/kg, 250mg/kg, and 500mg/kg respectively. Experiment was done by Forced swim test (FST) and Tail suspension test (TST) and duration of mobility and immobility were considered during the last 4 minutes in the 6 minutes test.

Statistical analysis: Dunnett's test. $P < 0.05$ was considered as significant.

Results: Administration of ethanolic extract of *Bauhinia Purpurea* at the dose of 500mg/kg produced significant decrease in immobility time in both the models with a P value of < 0.05.

Conclusion: Administration of ethanolic extract of *Bauhinia Purpurea* at the dose of 500mg/kg has produced statistically significant decrease in immobility time in both the models.

Introduction

Mood disorders are described as derangement in regulation of mood and behaviour .They are classified into depressive disorders, bipolar disorders and depression with medical illness or alcohol and substance abuse.(1)

The most common symptoms associated with depression are depressed mood, low self-esteem, loss of interest, change in weight and appetite, insomnia, fatigue, inability to concentrate, repeated thoughts of suicide. Depression can be diagnosed when 5 or more such symptoms exist.(1) Therefore it is difficult to create models in animals for this disorder. There is a strong relation between depression and stressful life. There is increase in rate of depressive symptoms in people with stressful life compared to general population.

There is also a small genetic component contributing to depression, as there is rise in risk of 40-70% in patients with family history of depression compared to general population which is around 15%.(2,3)

The early drugs used to treat depression are monoamine oxidase inhibitors and tricyclic antidepressants, but they are known to cause numerous adverse effects. The emergence of SSRIs made a breakthrough in treating depression;(4) but majority of patients did not respond to the drug and there was a time lag of 4-6 weeks for the drug to show any improvement in clinical symptoms.

Due to significant adverse effects associated with synthetic drugs there is a need for alternative treatment of this disease using medicinal plants or plant based formulations.

Bauhinia purpurea commonly known as purple orchid tree is a medium sized deciduous tree, sparsly grown in India. Various phytoconstituents such as flavanoids, saponins, tannins and phytosterols were present during phytochemical analysis of extracts of *Bahunia purpurea.* leaves.(5) These phytoconstituents also possess neuroprotective effects.(6)

The other medicinal properties of the plant are its anti-inflammatory, anti-nociceptive, anticonvulsant, antihelminthic, hepatoprotective and nephroprotective activities.(7-9) The crude methanolic extract of whole plant of *Bauhinia purpurea (L)* is a potential source of natural antioxidant.(10)

Since Bauhinia purpurea has antioxidant propery and studies regarding neuroprotective role of the plant is lacking, the present study was done to evaluate antidepressant activity of ethanolic extract of *Bauhinia purpurea* Linn. leaves in mice.

Materials and Method

This study was approved by Institutional Animal Ethics Committee (Reg. No. 1075/AC/07/CPCSEA) of A.J Institute of Medical Sciences & Research Centre, Mangalore, Karnataka and the IAEC with clearance number IAEC/04/2014/CPCSEA dated 03/11/2014. Adult Swiss Albino mice of either sex weighing 20-25gms inbred in the central animal house of A.J Institute of Medical Sciences were used for the study. The mice were housed in clean polypropylene cages in a controlled environment with a 12 hr light and dark cycle. They were fed with commercial pellets and provided water *ad libitum*. The mice were thus acclimatized for one week.

Drugs and Chemicals: Leaves were procured from the campus of A.J Institute of Medical Sciences & Research Centre, Mangalore and was authenticated by Dr. Krishnakumar. G, Chairman, Department of Applied Botany, Mangalore University, Karnataka, India. Ethanolic extract of the product was prepared using Soxhlet method. Imipramine was obtained from Torrent Pharmaceuticals.

Procedure: Sixty Swiss albino mice of either sex weighing 20-25gm were divided into five groups containing 30 animals for each screening. Group I received vehicle (1% Gum acacia suspension - 3ml/kg, orally) and served as control. Group II received Imipramine (10mg/kg orally) which served as standard. Group III, IV, V received 100 mg/kg, 250mg/kg, and 500mg/kg ethanolic extract of *Bauhinia Purpurea* leaves orally. All the drugs were administered 1 hour before the experiment.

Forced Swim Test (FST): In forced swim test, mice are considered immobile when floating motionless or making only those movements necessary to keep its head above the water surface. Duration of immobility is recorded during the last 4 minutes in the 6 minutes test.[(11)]

Tail Suspension Test (TST): In tail suspension test, mice are considered immobile only when they hang passively and completely motionless for at least one minute in an 8 minute test and duration of immobility is calculated.[(11)]

Statistical Analysis: ANOVA followed by Dunnett's Multiple Comparison test was used for the analysis.*P <0.05 was considered statistically significant.

Results

Table 1: Forced Swim test

Groups	Drugs	Duration of Immobility (in sec)
I	Control (Gum Acacia 3ml/kg)	93.83±15.2
II	Imipramine 10mg/kg	25.5±2.6**
III	*Bauhinia purpurea* 100mg/kg	40.8±4.2*
IV	*Bauhinia purpurea* 250mg/kg	32.6±1.3*
V	*Bauhinia purpurea* 500mg/kg	36±2.5**

Observations are mean ±SEM. ANOVA followed by Dunnett's Multiple Comparison test.* p>0.05- Not significant, **p<0.05- Significant.

Table 2: Tail suspension test

Groups	Drugs	Duration of Immobility (in sec)
I	Control (Gum Acacia 3ml/kg)	206.8±13.6
II	Imipramine 10mg/kg	103.83±4.9**
III	*Bauhinia purpurea* 100mg/kg	139±12.7*
IV	*Bauhinia purpurea* 250mg/kg	137.3±23.1*
V	*Bauhinia purpurea* 500mg/kg	123±19.2**

Observations are mean ±SEM. ANOVA followed by Dunnett's Multiple Comparison test.* p>0.05- Not significant, **p<0.05- Significant

Discussion

The present study provides convincing evidence that Ethanolic extract of Bauhinia Purpurea leaves, when administered orally, produces an antidepressant-like effect and also elicits its action to a similar extent as Imipramine.

In this study we used Forced swim test and Tail suspension test to elicit depression. The immobility displayed by rodents when subjected to unavoidable stress is thought to reflect a state of despair or lowered mood, which are thought to reflect depressive disorders in humans.

Ethanolic extract of the leaves in all the three doses, were able to reduce immobility time in both the models. The effect of high dose of the extract (500 mg/kg) was comparable to standard drug imipramine with P value <0.05. The precise mechanisms by which *Bauhinia Purpurea* leaves extract produced antidepressant like effect are not completely understood.

Conclusion

Ethanolic extract of *Bauhinia Purpurea* leaves produces antidepressant like activity in Swiss Albino mice. However, further studies are needed to evaluate its antidepressant activity based on molecular mechanism.

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