International Journal of
Emerging Research in Management &Technology
ISSN: 2278-9359 (Volume-6, Issue-5)

Research Article | **May 2017**

Special Issue of International Conference on Emerging Trends in Science & Engineering (ICETSE–2017)
Conference Held by IEAE India, at Coorg Institute of Technology, Ponnampet, Karnataka, India

Antiepileptic Activities of Ethanolic Extract of Stem Bark of Bauhinia Purpurea

[1]Shamala.T, [2]A.M Krupanidhi, [2]Shanmukhappa.S, [3]B.E Basavarajappa, [3]Akshara.
[1]Jain Institute of Technology, Davanagere. India
[2]Bapuji Institute of Engineering and Technology, India
[3]Bapuji Pharmacy College, Davangere. India

Abstract: Epilepsy is a neurological disorder characterized by unprovoked; recurring seizures that disrupt the nervous system and can cause mental and physical dysfunction. The ethanol extract of the stembark of plant Bauhinia purpurea (L) was evaluated for its antiepileptic activity in Swiss Albino Mice at the dose of 50mg/kg and 100mg/kg respectively.Antiepileptic activity was assessed by using Maximal Electroshock induced Seizures [MES] and Pentylenetetrazole (PTZ) method. Both extracts showed reduction in the duration of all the phases of epilepsy such as Flexion, extensor, convulsion, stupor phases. The results are promising for further investigation for efficient anticonvulsant activity.

Keywords: Bauhinia purpurea(L), Maximal Electric shock, Pentylenetetrazole, epilepsy convulsion

I. INTRODUCTION

Seizure is a characteristic feature in epilepsy and is associated with disordered and rhythmic high frequency discharge of impulses by a group of neurons in the brain[1].Around 0.5-1% of the world's population is affected with epilepsy and 30,000 people develop epilepsy every year [2, 3].According to National Institute of Neurological Disorders and Stroke (NINDS) about half of all the seizures have no known cause but may result from either brain damage or diseases. As per many researches, the cell membrane surrounding the neuron, which is crucial in generating electrical or nerve impulses, plays an important role in epilepsy[2].As present several antiepileptic drugs (AEDs) are available to treat epilepsy. By using these antiepileptic drugs, it may leads to many side effects like chronic toxicity, teratogenicityeffects[3].Plants may serve as the alternative sources for the development of new anti-convulsing agents due to their biological activities. Several plants used for the treatment of epilepsy in different system of traditional medicine have shown anti-epileptic activity when tested on animal models with fewer side effects [4].Based on ethno-pharmacological information of the plant*Bauhiniapurpurea (L)*was selected for investigation in the present study. The study may help in the development of cheap, effective and safe antiepileptic drugs.

Bauhinia purpurea(F: Caesalpinaceae) is an normal herb to broad evergreen shrub, widely distributed in India [5].The plant is presently being used for ailments such as sores, wounds, diarrhea, dropsy, pain, rheumatism,convulsions,delirium, septicemia[6]. The presence of bioactive compounds indicates the medicinal value of the plants [7]. It is reported that the medicinal value is due to the presence of some chemical substance that produces a physiological action on the Human body and therefore researchers always try to isolate these chemical substances from plants. Hence the present study is focused on the evaluation ofneuropharmacological activities of ethanolic extract of Bauhinia purpurea (L) plant in animal models.

II. MATERIALS AND METHODS

A. Plant material

Fresh dried stem barks were procured from young matured plants in local areas ofDavanageredistrict, Karnataka, India.The plant was authenticated (Voucher specimen:150/B.P)byDr.Shivakumar.P.M taxonomist of botany department of DRM Science college,KuvempuUniversity,Davanagere,India,Dried stem bark were powdered to get a coarse powder.

B. Preparation of extract

The Coarse powdered material was subjected to Soxhlet extraction with various solvents like petroleum ether (60-80^{0}C), chloroform, ethanol (95%) and distilled water[8][9].The ethanolic extract were dried and preserved in a desiccators for further screening. Further crude ethanolic extract was subjected for animal testing.

C. Phytochemical screening

Phytochemical investigation on leaf extracts of *Bauhinia purpurea*was carried out For the presence of alkaloids, carbohydrates, glycosides, steroids, flavonoids (Quercetin, quercetol, catechol, kaempferoletc)coumarins, saponins, fatty acids, tannins, protein, amino acids, gum, mucilage, terpenoids, anthroquinones and phenols were estimated[10-22]. The results are indicated in table I.

D. Animals

Swiss Albino Mice of either sex were used for the study. The animals were kept at 27º±2ºC, Relative humidity 44-56% and light and dark cycles of 10 and 14 hr, respectively, for 1 week before and during the experiments. Animals were provided with water *ad libitum* and standard diet and the food was withdrawn 18-24 hr before the start of the experiment.

E. Acute Toxicity Study

Acute toxicity study was performed as per CPCSEA guide lineson Swiss albino mouse and the animal were kept fasting for18hr providing water and *ad.libitum*, after which the extracts were administered orally and observed the mortality of animals.

F. Statistical Significance

The results of the study were expressed as mean ± SEM, n = 6.Statistical analysis was done by using one way analysis variance (ANOVA) followed by student's test.

III. EXPERIMENT

A. Maximal Electroshock induced Seizures method

The seizure was induced by maximal electroshock in Swiss Albino Mice with the help of electro convulsometer by passing current of 45 mA for 0.2 second using ear clip electrodes. The animals were divided into six groups each containing 6 animals (n = 6). The test samples were given 1 hr prior to induction of convulsions.

Group I (Control): Received normal saline (1 ml/kg body weight).

Group II (Standard): Received diazepam (4mg/kg body weight).

Group III Received Ethanol extract of *Bauhinia purpurea*(EEBP) (50 mg/kg body weight).

Group IV Received Ethanol extract of *Bauhinia purpurea* (EEBP) (100 mg/kg body weight).

The results are indicated in tableII.

B. PTZ-induced test for Anticonvulsion activity

Pentylenetetrazole is a tetrazol derivative with consistent effect of convulsions in test animals like mice, rats etc.The present test is used for screening of drugs which are effective in petitmal type of convulsions or absence seizures. Animals were weighed and divided into four groups each comprising of six animals. One group is used for studying the effect of PTZ alone and the other for studying the protective effect of fraction of Bauhinia purpurea drug.

Group I (Control): Received normal saline (1 ml/kg body weight).

Group II (Standard): Received Pentylenetetrazole(4mg/kg body weight).

Group III Received Ethanol extract of *Bauhinia purpurea*(EEBP) (50 mg/kg body weight).

Group IV Received Ethanol extract of *Bauhinia purpurea* (EEBP) (100 mg/kg body weight). The results are indicated in tableIII.

IV. RESULTS AND DISCUSSION

A. Phytochemical constituents

Tabel 1: Showing phytochemical constituents

Bioactive components	Name of the extract								
	Petroleum ether		chloroform		ethyl acetate		ethanol		water
	Leaf	stem	Leaf	stem	Leaf	stem	Leaf	stem	Leaf stem
Alkaloids	+	-	-	-	+	-	+	+	- -
Flavonoids	+	+	-	+	+	-	+	+	- -
steroids	+	+	+	+	+	-	-	-	- -
Terpenoids	-	-	+	+	-	+	+	+	+ -

+ denotes: presence; - denotes: absence

B. Acute Toxicity Study

During acute toxicity studies, ethanolic extract at (1000 mg/kg body weight) neither produced any abnormal effect - nor moribund stages no death was observed.

Table 2: Anticonvulsant activity of Bauhinia purpurea by MES-Method

Groups	**AverageResponse (in Sec) ± SEM**			
	Tonic Flexion	Tonic Extensor	Clonic Convulsions	Stupor
1.Control	5.00±0.00	6.67±1.05	4.17±2.01	9.17±2.39
2.Standard	0.50±0.22	0.67±0.21	0.50±0.34	0.50±0.22
3.BP(50mg/kg.,p.o)	0.0±0.0	0.67±0.42	1.33±0.84	1.33±0.61
4.BP(100mg/kg.,p.o)	0.0±0.0	0.0±0.0	0.33±0.21	0.33±0.21

One way ANOVA followed by Tukey test, P<00.1HS

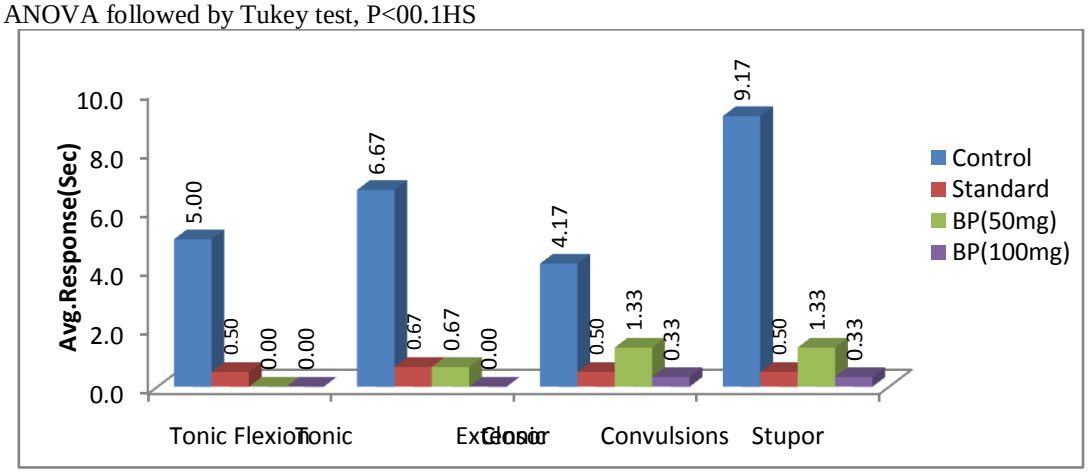

Fig:2: Maximal Electric Shock Method

Table 3.Anticonvulsant activity of *Bauhinia purpurea* by PTZ Induced-Method

Groups	**Average Response (in Sec) ± SEM**			
	Tonic Flexion	Tonic Extensor	Clonic Convulsions	Stupor
1.Control	20.83±1.54	26.67±1.67	7.50±1.12	10.83±1.54
2.Standard	0.50±0.34	0.83±0.31	0.33±0.21	0.33±0.21
3.BP(50mg/kg.,p.o)	5.33±0.56	6.33±0.81	2.50±0.67	2.67±0.56
4.BP(100mg/kg.,p.o)	1.00±0.82	1.50±0.76	0.33±0.33	0.0±0.0

One way ANOVA followed by Tukey test, P<00.1HS

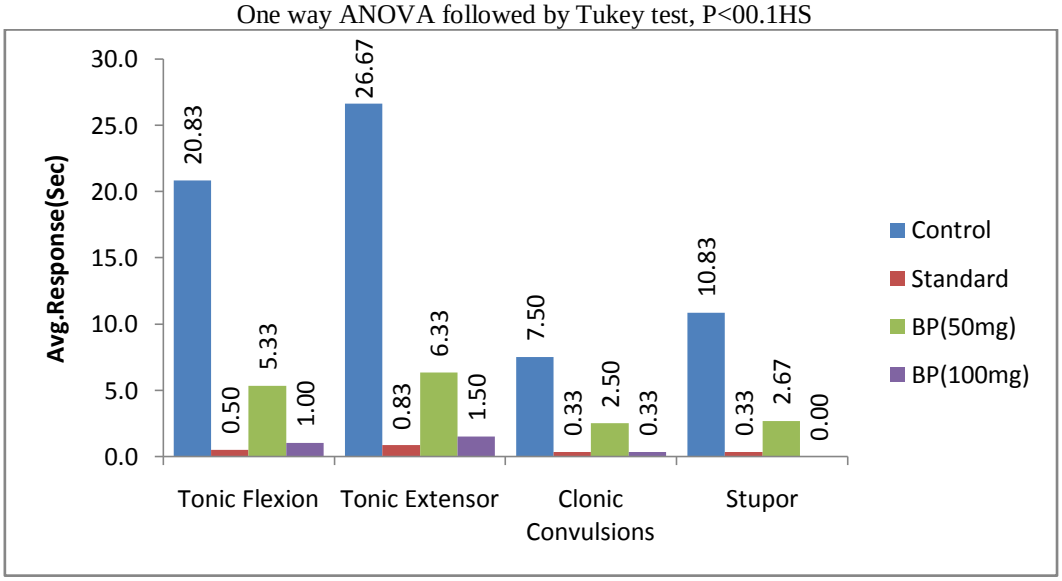

Fig 2: Anticonvulsant activity of Bauhinia purpurea by PTZ Induced-Method

V. DISCUSSION

Epilepsy is a neurological disorder that affects a wide range of people throughout the world. It is the second most common chronic neurological condition seen by neurologists. Incidence of epilepsy in developed countries is

approximately 50 per 100,000 while that of developing country is 100 per 100,000 populations. India is home to about 10 million people with epilepsy (prevalence of about 1%).[23] The number of epilepsy specialists and neurologists being very small in India, most people with epilepsy are being diagnosed and treated by non-specialists at both primary and secondary care levels. It is a disorder characterized by recurrent seizures of cerebral origin, presenting with episodes of sensory, motor or autonomic phenomenon with or without loss of consciousness [24]. Several different types of human epilepsies have been characterized based on the classification of International League against Epilepsy (ILAE). According to this classification, epilepsy has been divided into partial epilepsy (simple and complex), generalized symptomatic epilepsy and unclassified epilepsy. Imbalances between the excitatory and inhibitory neurotransmitters are responsible for seizures. At neuronal level, seizures activity often occurs when glutamic acid excitatory neuro-transmitters over rides gamma amino butyric acid (GABA) mediated inhibition [25]. In the assessment of antiepileptic study, several models have been developed. Many drugs that increase the brain contents of GABA [26] have exhibited the antiepileptic against seizures induced by MES induced [27] and by PTZ Induced-Method[28].
As per table II and Table III, the drug i.eethanolic extract of stem bark of *Bauhinia purpurea*(L) exhibits significant Anticonvulsant activity at different doses against Maximal electroshock induced convulsion and by PTZ Induced-Methodon test animals [29].
The test compound has significantly abolished the various convulsion phase.

VI. CONCLUSION

It can be concluded from the study that the anticonvulsant effects of the ethanol extract of *Bauhinia purpurea*(L) may be via non-specific mechanisms[30]. However, extensive studies are needed to evaluate the precise mechanism(s), active principles, and the safety profile of the plant as a medicinal remedy for convulsive disorders.

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