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Anticonvulsant Effect of Leaf and Bark of Erythrina Variegata Linn and Butea Monosperma (LAM) Taub in different Experimental Convulsion Model in Rats

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ABSTRACT

Epilepsy is a chronic disorder characterized by the occurrence of epileptic seizures, with or without characteristic body movements (convulsion)affecting about 50 million people worldwide. Synthetic drugs for the treatment of epilepsy are associated with severe side effects and addiction liabilities upon long term uses. Thus, researchers around the globe are searching for natural resources. Erythrina variegata and Butea monosperma is a traditional medicinal plant used to treat a seizure. The present studies reveal that the anticonvulsant activity by Erythrina variegate & Butea monosperma of bark & leaf PTZ and MES induced convulsions in wistar rats using Erythrina variegata & Butea monosperma of bark & leaf ethanolic extracts extracted successively. However, the anticonvulsant activity of this plant has not been studied in depth.
In Pentylene tetrazole (PTZ) an maximal electro shock seizure(MES) models test parameters like latncy, onset of tonic convulsions, clonic convulsions and percent protection were observed in the different test groups. Inconclusion, we showed that the ethanolic extract of Erythrina variegata and Butea monosperma has anticonvulsant effect in the both models, suggesting their possible depressant action in the central nervous system. EEBM and EEEV gave significant protection (P<0.001) against PTZ & MES induce convulsion.

Keywords: Ebola haemorrhagic fever, EBOV, WHO, NHP, EVD

INTRODUCTION [1-4]

Epilepsy is a neurological disorder that affects a wide range of people throughout the world. It is a disorder of brain characterizes by unpredictable and periodic occurrence of a transient alteration of behavior due to the disordered, synchronous and rhythmic firing of populations of brain neurons**.** It has been observed that the presently available antiepileptic drugs are do not provide cure nor prevent relapse and they are often associated with serious side‑effects, including teratogenicity, chronic toxicity and adverse effects on cognition and behavior and unable to control seizures effectively in as many as 25% of the patients. The clinical effectiveness, minimal side effect profile and relatively low costs of herbal drugs are the reason for their various applications in traditional medicine. However, only limited efforts have been made to evaluate the potentials of such plants for their use in modern medicine or to scientifically justify their traditional use in the treatment of CNS disorders including epilepsy.

Many drugs that increase the brain contents of GABA have exhibited anticonvulsant activity against seizures induced by maximum electroshock (MES), pentylenetetrazol (PTZ) and lithium-pilocarpine (Li-Pilo). The MES is probably the best-validated method for assessment of anti-epileptic drugs in generalized tonic-clonic seizures. The PTZ induced seizures are similar to the symptoms observed in the absence seizures and drugs useful in treatment of absence

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seizures suppress PTZ induced seizures. The status epilepticus induced by lithium pilocarpine increases brain contents of acetylcholinz. The reproducibility of the responses to this treatment makes this a very useful model to investigate various facets of seizures.

The objective of the present study was to investigate anticonvulsant activity of ethanolic extract of *Erythrina vareigata (EVEE) and Butea monosperma (BMEE)* against the seizures induced by MES, PTZ.

MATERIAL & METHODS

Animals

Healthy adult albino Wistar Rat strain weighing 180-250g were used for this study. The animals were obtained from animal house, Dr.D.Y.Patil Medical College, Pune, India. On arrival, the animals were placed randomly and allocated to treatment groups in polypropylene cages with paddy husk as bedding. Animals were housed at temperature of 24±2 ºC and relative humidity of 30-70%.A12:12 light: day cycle was followed. All the animals were allowed to free access to water and fed with standard commercial pelleted rat chaw (M/S Hindustan Lever Ltd. Mumbai). All the experimental procedures and protocols used in this study were reviewed by the Institutional Animal Ethics committee (and were in accordance with the guidelines of the CPCSEA. Approval was obtained from the CPCSEA/IACE for animal studies in this project by proposal no:VIPER/IAEC/UG/2013-14

The plant material:

Plant materialbark & leaf of *Erythrina variegata & Butea monosperma* respectively were collected from different areas of Alephata, Junnar and it was identified and confirmed by Dr. Mrs. Savita Rahangdale B.J.college Ale.The authenticated samples were used for the Preparation of extract. They were put in shed drying then crushed to produce powdered material.

Preparation of extract

Dried powdered Bark & leaf of *erythrina variegata and Butea monosperma* were extracted by using ethanol in soxhlet apparatus. The total extract obtained was dried at 60 °C on steam bath Followed by a vacuum oven (50 °C) to obtain dried extracts. The extractive Value was calculated as % w/w yield was found to be 5.92% & 6.34%.

PHYTOCHEMICAL EVALUATION [5-6]

The ethanolic extract obtained above was subjected to qualitative analytical test for the detection of various chemical constituents viz. steroids, terpenods, flavanoides, carbohydrates, proteins, tannins, glycosides saponins.

PHARMACOLOGICAL EVALUATION [7-11]

1.PTZ to study the anticonvulsant activity

Animals in Group I served as control were, treated with vehicle (4 % acacia) orally. Group II served as standard received diazepam (5 mg/kg i.p.). Group III and Group IV received *EVC* at the dose levels of 250 mg/kg and 250 mg/kg i.p. respectively. Group V and Group VI received *BME at* the dose levels of 250 mg/kg and 500 mg/kg i.p., respectively. One hour after administration of vehicle, standard drug, *EVEE* and *BMEE* to the respective groups, the animals were treated with PTZ (Pentylene tetrazole, 80 mg/kg) subcutaneously. Each animal was placed in to individual polypropylene cage and were observed initially for 30 min and later up to 24 hrs. The following parameters were recorded during test session of initial 30 min and up to 24 hrs: Latency (onset of clonus) onset of tonic convulsion and status of animal after 30 min, status of animal after 24 hrs and percentage protection.

2. MES Induced convulsion in rat

MES seizures were induced by electro-convulsiometer. Maximal seizures were elicited by 60 Hz alternating current of 150 mA intensity for 0.2 sec using corneal electrodes. A drop of electrolyte solution 0.9% sodium chloride with lignocaine was applied to the corneal electrodes, which ensures better contact and the mortality rate to zero. This current intensity elicited complete tonic extension of the hind limbs in control rats. For recording various parameters, rats were placed in a clear

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rectangular polypropylene cage with an open top, Permitting full view of the animal motor responses to seizure he pilot study of various phases of convulsion like tonic flexion, extension stupor and mortality due to convulsions were observed.

RESULTS

1.Phytochemical evaluation-

Phytochemical evaluation of *Erythrina variegate* & *Butea monosperma* bark &leaf showed the presence of steroides, terpenoids, flavanoides, carbohydrates, proteins, tannins, glycosides saponins.

2.PTZ induced convulsion model

Table No. 1- Effect of *EVEE* &*BMEE* on PTZ induced convulsion model

Gr.	Treatment	Latency onset of clonic convulsion sec/min	Onset of tonic convulsion sec/min	Status of animal after 30 min		Status of animal after 24 hrs	
				No of alive animal	% protection	No of alive animal	% protection
I	Control 4% acacia	51.16±0.60	544.33±1.22	0	0	0	0
II	Diazepam(25mg/kg)	No colonus	No tonic	All	100	All	100
III	*EVEE*(250mg/kg)	210.83±0.94	374.01±0.76	4	67	4	67
IV	*EVEE*(500mg/kg)	236.50±0.68	356.21±2.67	5	84	5	84
V	*BMEE*(250mg/kg)	144.20±1.12	175.83±0.47	3	50	2	34
VI	*BMEE*(500mg/kg)	191.41±0.92	416.52±1.22	4	67	3	50

Values expressed are mean SEM from rats.p < 0.001*** as compared to control group.

Graph No. 1: Effect of *EVEE* &*BMEE* on PTZ induced convulsion model indicating onset of clonic & tonic convulsion

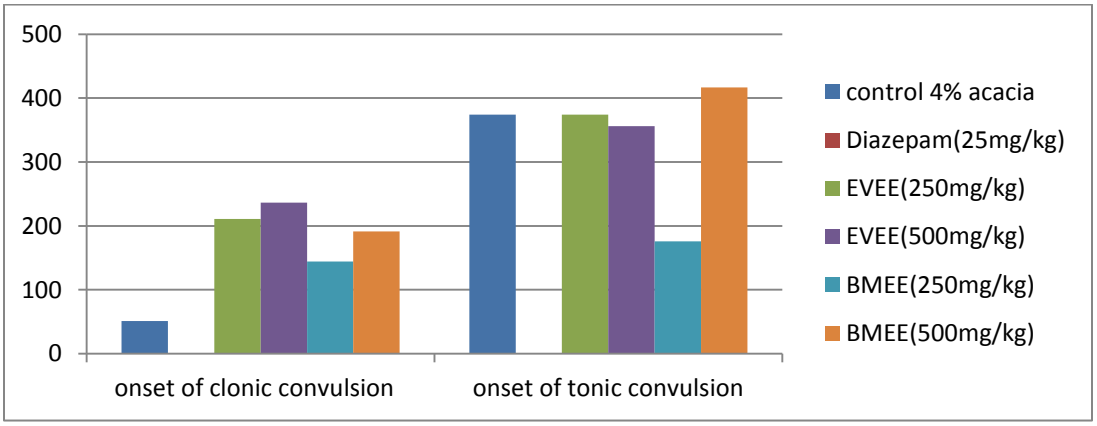

Table No.2- Effect of *EVEE*&*BMEE* on MES induced convulsion in rats

Group	Treatment	Flexion	Extension	Colnous	Stupor	Recovery
I	Control 4% acacia	9.62±0.17	15.21±0.17	17.05±0.20	8.62±0.19	210.33±2.65
II	Diazepam (25mg/kg)	4.50±0.09[a]***	00	9.42±0.09[a]***	2.42±0.10[a]***	120.50±1.26
III	*EVEE*(250mg/kg)	3.50±0.08[b]***	1.53±0.06[b]***	5.25±0.03[b]***	24.14±1.24[b]***	176.12±1.97
IV	*EVEE*(500mg/kg)	2.15±0.07[b]***	1.15±0.04[b]***	4.71±0.06[b]***	18.70±0.42[b]***	136.20±0.63
V	*BMEE*(250mg/kg)	3.91±0.09[b]***	1.98±0.11[b]***	5.68±0.08[b]***	24.33±0.84[b]***	181.24±1.97
VI	*BMEE*(500mg/kg)	2.31±0.06[b]***	1.27±0.07[b]***	5.41±0.16[b]***	21.50±0.61[b]***	143.11±1.67

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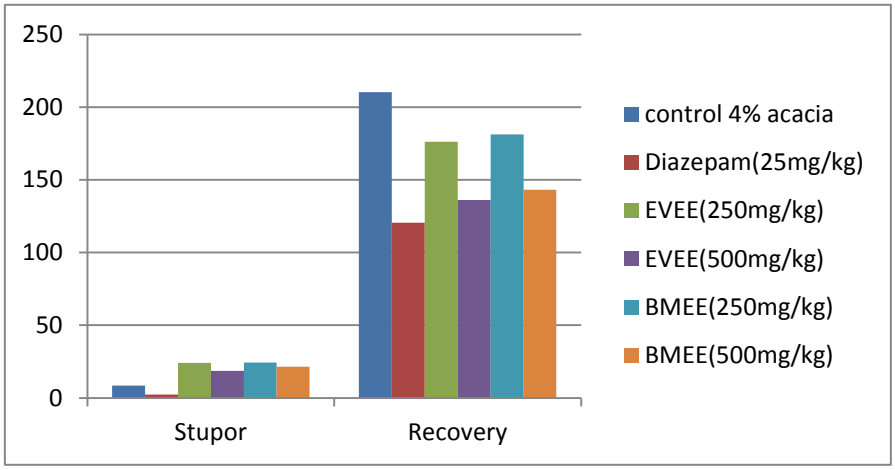
Values represent mean of six observations.
Comparisons between: a-group I vs. group II, b- group II vs. group III, IV, V & VI.
Statistical significant test for comparison done by ANOVA.



Graph No 2: Effect of *EVEE* & *BMEE* on MES induced convulsion model indicating Stupor & Recovery

DISCUSSION

In Pentylene tetrazole induced seizure test parameters like latency, onset of tonic convulsion, clonic convulsions and percent protection were observed in the test groups ($p<0.001$), showing strong antiepileptic effect.

The death rate was 100% in Group I. 25 mg/kg of Diazepam, prevents tonic and clonic convulsion and offered 100% protection.250mg/kg and 500mg/kg of EEEV and EEBM exhibited a significant anticonvulsant effect by increasing onset of clonic convulsion and by decreasing onset of tonic convulsion.

After 30 min of interval 67 % and 84 % of animals survived with a dose of 250mg/kg and 500mg/kg of EEEV. While 50 % survived with the dose of 250 mg/kg and 67% survived with 500mg/kg of BMEE.

After 24 hrs, the % protection of animals was, 67% and 84% for 250mg/kg and 500mg/kg of EVEE respectively. 34 % and 50% protection after 24 hrs in 250mg/kg and 500mg/kg in BMEE survived (p value is $p<0.001$ as compare to control). Here, EEEV shows potent anticonvulsant activity compare to EEBM. These results further indicate that strong protective effect of test drug against a known epileptic agent in Maximum Electroshock induced seizure. test, shown anticonvulsant activity by increasing the onset of clonic convulsion time and by decreasing the time of extensor of test groups reduced to significant level as compare to control group($p<0.0001$ and 0.001 as compare to control). This result indicates the strong protective effect of 500mg/kg EVEE and 500mg/kg of BMEE against known epileptic agents.

There are some evidences of anticonvulsant effect of his fatty acids and some flavonoids . Therefore it seems that anti seizure effect of *Erythrina variegata Linn* bark and leaf may be to part of linoleic acid and flovonoid compounds present in extracts. Thus the result of both doses of EVEE, demonstrate a very striking and potent antiepileptic activity, it may be useful in both types of epileptic conditions like Grand mal and petit mal epilepsy. It demonstrated specified nature of pharmacological effect of *erythrina variegate Linn* bark and leaf.

SUMMARY AND CONCLUSION

The Anticonvulsant activity ethanol extract of Erythrina variegatea and Butea monosperma bark & leaf was evaluated on rats by using two anticonvulsant models such as MES induced convulsion in rat &PTZ- induced convulsion in mice. The Pharmacological studies involving phytochemical estimation suggests presence of carbohydrates,

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glycosides and tannins in Erythrina variegata and Butea monosperma bark & leaf specimen.

Erythrina variegate and Butea monosperma is a traditional medicinal plant used to treat a seizure. However, the anticonvulsant activity of this plant has not been studied in depth. We therefore sought to evaluate the anticonvulsant activity of ethanolic extract of Erythrina variegata and Butea monosperma bark & leaf on albino Wistar rats. In order to verify traditional use of this plant, Pentylene tetrazole (PTZ) and the maximal electroshock seizure (MES) models were used for assessing the anticonvulsant effects of the ethanolic extract of bark & leaf. In Pentylene tetrazole (PTZ) and maximal electroshock seizure (MES) models test parameters like latency, onset of tonic convulsions, clonic convulsions and percent protection were observed in the different test groups. In conclusion, we showed that the ethanolic extract of bark & leaf of Erythrina variegate and Butea monosperma has anticonvulsant effect in the both models, suggesting their possible depressant action in the central nervous system.

↓ REFERENCES

1. Rang HP, Dale MM, Rittet JM, Moore PK. Pharmacology. 5th ed. New Delhi: Churchill Livingstone; 2005. p. 550-554.
2. Tripathi KD. Essentials of Medical Pharmacology. 6th ed. New Delhi, India: Jaypee Brothers Medical Publishers (P) Ltd.; 2008; 401-405.
3. Arzimanoglou A, Hirsch E, Nehlig A, Castelnau P, Gressens P, Pereira de Vasconcelos A; Epilepsy and neuroprotection: An illustrated review; Epileptic Disord; 2002; 4(3); 173-182.
4. Prafulla P. Adkar, Pranita P. Jadhav, Shirishkumar D. Ambavade, Tushar T. Shelke, Vaidhun H. Bhaskar; Protective effect of leaf extract of Pandanus odoratissimus Linn on experimental model of epilepsy; Int J Nutr Pharmacol Neurol Dis; 2014; 4(2); 81-87
5. P. Pal and S. Bose; Phytopharmacological and Phytochemical Review of Butea monosperma; International Journal of Research in Pharmaceutical and Biomedical Sciences; 2011; 2(3); 1374-1388.
6. Silambujanaki P, Chitra V, Suman Kumari, Sankari M, Raju D, BalaTejo Chandra CH; Anti-convulsant activity of methanolic extract of Butea monosperma leaves, Research Journal of Pharmaceutical, Biological and Chemical Sciences, 2010; 1(2); 431-435.
7. Chinchawade A. B, Deshmukh D.B, Gaikwad D. D, Grampurohit N.D; Anticonvulsant Activity of Chloroform Extract of Bark & Root of Erythrina variegata L; International Journal of Pharmaceutical and Clinical Research 2013; 5(1); 23-25.
8. Khayatnouri Mirhadi, Anticonvulsant Effect of Celecoxib in Mice Induced by PTZ; Middle-East Journal of Scientific Research; 2012; 11(3); 272-278.
9. Semra Koyunoglu, Okan Arihan, Yildirim Sara, RüstüOnur, Sedef Kur, Ihsan Çalis; Paeoniflorin Diminishes Maximal Electroshock and PTZ – induced Convulsions in Mice; Hacettepe University Journal of the Faculty of Pharmacy; 2012; 32(1); 17-30.
10. Vaibhav Bhosle; Anticonvulsant and antioxidant activity of aqueous leaves extract of Desmodiumtriflorum in mice against pentylenetetrazole and maximal electroshock induced convulsion; Revista Brasileira de Farmacognosia (Brazilian Journal of Pharmacognosy); 2013; 23(4); 692-698.
11. Wolfgang Löscher; Critical review of current animal models of seizures and epilepsy used in the discovery and development of new antiepileptic drugs; Seizure; 2011; 20(5); 359–368.