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Anticonvulsant Activity of Methanolic Extract Of *Prosopis Cineraria (Linn) Druce* Stem Barks

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Abstract: Anticonvulsant activity of the methanolic extract of *Prosopis Cineraria (Linn)* Druce stem barks was studied against maximal electro shock (MES) and Pentylenetetrazole (PTZ) induced convulsions in mice. The extract suppressed hind limb tonic extensions (HLTE) induced by MES and also exhibited Protector Effect in PTZ-Induced Seizures. In conclusion, the methanolic extract of *Prosopis Cineraria (Linn) Druce* stem barks has anti convulsant effect in both models which shows depressant action in the central nervous system.
Key words: *Prosopis Cineraria*, anticonvulsant activity, maximal electro shock, Pentylenetetrazole.

INTRODUCTION

Medicinal plants are the important source for the new chemical substances with potential therapeutic effects. Several plants used for the treatment of epilepsy in the system of traditional medicine and many such plants are yet to be scientifically investigated[1].

Epilepsy is a common neurological disorder characterized by paroxymal dysrhythmia, seizure, with or without body convulsion and sensory or psychiatric phenomena[2]. There are many mechanisms by which seizures can develop in either normal or pathologic brains. Three common mechanisms include, 1) Diminition of inhibitory mechanism (especially synaptic inhibition due to GABA) 2) Enhancement of the excitatory synaptic mechanism (especially those mediated by NMDA). 3) Enhancement of endogenous neuronal burst firing (usually by enhancing voltage dependent calcium currents). Different forms of human epilepsy may be caused by any one or combination of the above mechanisms[3,4]. Despite the introduction of many new antiepileptic drugs (AEDs) but a significant percentage of patients with epilepsy continue to experience seizures. Hence, there continues to be an unmet clinical need for more effective and less toxic anti-epileptic drugs[5].

Prosopis Cineraria (Mimosaceae) is a small to moderate sized tree found in the regions of Arabia and various parts of India such as Rajasthan, Gujarat, Haryana, Uttar Pradesh and Tamilnadu. This plant is used in pregnancy as a safeguard against miscarriage. The smoke of the leaves is good for eye troubles. The bark is used as a remedy for rheumatism, cough, common cold, asthma and scorpion stings[6,7]. A new piperidine alkaloid spicigerin, prosogerin E along with gallic acid, pautelin, luteolin and rutin were reported [8]. Prosogerin A and B were isolated from flowers[9].

MATERIAL AND METHODS

Plant material

The stem bark of *Prosopis cineraria* was collected from Cuddalore district of Tamilnadu was identified and authenticated by Dr. M. Raghuram, Assistant Professor, Acharya Nagarjuna University, Guntur, Andhra Pradesh. The bark was air dried to a constant weight and made into moderately coarse powder.

METHOD

Extraction

The moderately coarse powder of the stem bark of this plant was subjected to successive solvent extraction by Soxhlet extraction with petroleum ether, chloroform, methanol and water to get different extracts.

Preliminary Phytochemical studies

The different extracts were then subjected to qualitative phytochemical screening for the identification of the phytoconstituents[10, 11]. The different extract shows the presence of alkaloids, phytosterols, tannins, flavanoids, carbohydrates, proteins and amino acids. However the methanolic extract showed the positive test for flavanoids and phytosterols. So, the anticonvulsant activity of methanolic extract of the plant in different dose levels like 200mg/kg and 400mg/kg were studied.

Experiment Animals

The Institutional Animal Ethics Committee, (IAEC) approved the use of animals for the present study conducted at KMCH College of pharmacy, Coimbatore as per the requirements. Swiss albino mice weighing 18-25 g of either sex were used for the study. They were individually housed and were allowed free access to standard pellet diet and water *ad libitum*.

Anticonvulsant activity[12-15]:

a) MES Method:

The anticonvulsant activity of extracts was evaluated for maximum electroshock induced seizure (MES) in mice. The electrical shock applied (150 mA for 0.2 s) through corneal electrodes to wistar albino mice produced convulsion and those showing response were divided into four groups of eight animals each. The first group of animals was administered normal saline (5ml/kg) orally which served as negative control. II group of animals were treated with phenytoin sodium (25 mg/kg, i.p.) which served as positive control. III and IV groups of animals were treated with methanolic extracts at different dose level. Drug pretreatment was given 30 min prior to the electric shock and animal were observed for hind limb tonic extension (HLTE) in seconds.

b) PTZ Method[16]:

PTZ at the dose of 80 mg/kg (minimal dose needed to induce convulsions) was injected i.p. to induce clonic-tonic convulsions in mice. The test animals (n=6) received 200mg/kg, 400 mg/kg of methanolic extract orally as a suspension prepared in normal saline and standard group received phenytoin (25 mg/kg) injected i.p. PTZ was injected i.p. 60 min after the administration of drug. Occurrence of HLTE and duration of seizures were noted. If no HLTE occurred during the time limit, the animals were considered protected.

Table 1: Anticonvulsant activity of *Prosopis Cineraria* Linn Methanolic extracts by MES method

Treatment	Dose	Number of animals convulsed/used	Animals Protected (%)	Duration of HLTE (sec) Mean ± SEM
Control	Normal saline (5 ml/kg)	8/8	0	14.125
Methanolic Extract	200 mg/kg	3/8	62.5	8
Methanolic Extract	400 mg/kg	4/8	50	7.625
Phenytoin	25 mg/kg	0/8	100	0

HLTE – Hind Limb Tonic Extension
SEM – Standard Error Mean

Table 2: Anti Convulsant Activity of *Prosopis Cineraria Linn* Methanolic extracts By PTZ Method

S. NO	GROUP	Dose (mg/kg)	Onset Time (Sec)	Duration of HLTE (Sec)
1	Control	Normal saline (5mg/kg)	50.81 ± 0.1904	37.28 ± 0.5030
2	Methanolic Extract	200	53.80± 0.2582b	35.16± 0.3939a
3	Methanolic Extract	400	56.41± 0.1939b	32.63± 0.6228b
4	Phenytoin	25	00 ± 00b	00 ± 00b

values are expressed as mean ± SEM (n=6), [a]P<0.01 , [b]P<0.001 as compared to control

RESULTS AND DISCUSSION

As shown in table 1, methanolic extract of *Prosopis Cineraria* at doses of 200 and 400 mg/kg and Phenytoin (25 mg/kg) have shown significant reduction ($p<0.001$) in duration of convulsions. The methanolic extract has good anticonvulsant activity.

It was found from the above observations that methanolic extract of *Prosopis Cineraria* has shown anticonvulsant activity against seizures induced by MES and PTZ in a dose dependent manner. It was effective against MES induced seizures, since inhibition of the MES test predicts activity against generalized tonic-clonic and cortical focal seizures.

PTZ is a most frequently used substance as well as an acute experimental model in the preliminary screening to test potential anticonvulsant drugs. PTZ induces convulsion by antagonizing the ã-aminobutyric acid $(GABA)_A$ receptor chloride (Cl)-channel complex to attenuate GABA-dependent inhibition. Drugs protecting against tonic-clonic seizures induced by PTZ are considered useful in controlling myoclonic and absence seizures in humans.

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