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EVALUATION OF ANTICONVULSANT ACTIVITY OF *XEROMPHIS ULIGINOSA* RETZ ETHANOLIC FLOWER EXTRACT

G. Sandhyarani^{1*}, K. Praveen Kumar², Balaji B³

¹Vaageswari College of Pharmacy, Karimnager, Andhra Pradesh, India.

²Vaagdevi College of Pharmacy, Medicinal Chemistry Research Division, Hanamkonda, Warangal, Andhra Pradesh, India.

³Vaagdevi Institute of Pharmaceutical Sciences, Medicinal Chemistry Research Division, Bollikunta, Warangal, Andhra Pradesh, India.

ABSTRACT

To study the anticonvulsant activity of ethanolic extract of *Xeromphis uliginosa* in albino mice. Anticonvulsant activity for *Xeromphis uliginosa* was evaluated in albino mice of either sex at 3 different dose levels (200, 400 and 600 mg/kg p.o.) by MES assessed using albino mice against Maximum Electroshock Seizure (MES) test. The ethanolic extract of *Xeromphis uliginosa* reduced the duration of hind limb tonic extension (HLTE) in a dose dependent manner against MES model. The ethanolic extract of *Xeromphis uliginosa* inhibits MES-induced convulsions. The extract showed significant ($p < 0.001$) against both MES (maximal electroshock).

Keywords: Anticonvulsant, *Xeromphis uliginosa*, MES model.

INTRODUCTION

Xeromphis uliginosa (Retz.) Maheshwari is a small tree belonging to the family Rubiaceae rarely reaching the height of around 6m. Bark is reddish brown in colour and scaly appearance. Branches are thick, horizontal and numerous. Many of them are short and terminating in 1-2 pairs of strong sharp thorns of 1.3cm long. Fruits are 5-6.3cm long, ovoid, smooth, yellowish brown, crowned with the persistent calyx. Seeds numerous, compressed, smooth and closely packed in pulp. Flowering and Fruiting in the period of April – August.

Xeromphis uliginosa is widely used in Ayurveda, Siddha and Unani medicine [1]. In Ayurveda it is described as single drug for aborting accumulated phlegm, bile and internal toxic substances while in Unani it is considered as aphrodisiac, haematinic & good for heart and also used in biliousness, dysuria and strangury. Attempts to find out a common neurochemical basis

for human or experimental epilepsy have been disappointing. An imbalance between the excitatory and inhibitory neurotransmitters is responsible for seizures.

At neuronal level, seizure activity often occurs when glutamatergic excitatory neurotransmitters overrides gamma-aminobutyric acid (GABA) mediated inhibition. Several animal models of convulsions have been developed to evaluate anti-seizure activity. Many drugs that increase the brain contents of GABA have exhibited anticonvulsant activity against seizures induced by maximum electroshock (MES).

MATERIAL AND METHODS

Plant material

The fresh flowers was collected during the month of August 2013, from the Tirupati foot hills, The plant materials was identified and authenticated by Dr. Madhava chetty, Department of Botany, SV University.

Extraction of plant material

The shade dried and powdered flower of *X. uliginosa* was subjected to successive extraction using

Corresponding Author

G. Sandhyarani

E-mail: sandhyaguggilla9@gmail.com

ethanol in a soxhlet apparatus. The extract was concentrated under reduced pressure using rotatory evaporator at temperature not exceeding 40°C and then dried in vacuum oven. The extract was stored in desiccators at cool place.

Animals

Mice (20-30 gm) of either sex was used for the present study. The animals were housed in standard cages with free access of food (standard laboratory rodent’s chow) and water. The animal’s house temperature was maintained at 23 ± 3.0 °C with a 12-h light / dark cycle (light on from 6.00A.M. To 6.00P.M.). All the experimental procedures and protocols used in this study were reviewed by the Institutional Animal Ethics Committee (IAEC).

Acute Toxicity Study

An acute toxicity study relating to the determination of the LD50 value was performed with different doses of SAP M into different group of mice, each containing ten animals, as per the method discussed by Litchfield and Wilcoxon. The median lethal dose of the extract having anticonvulsant activity was determined by Administering 300, 2000, 5000mg/kg i.p. Dose and percent

mortality was observed 24 h later.

Maximal Electroshock-induced Seizure Model

The animals were divided into 5 groups of 5 numbers each swish albino mice and were administered as follows: Group I received vehicle, Group II received Phenytoin (25mg/kg, body weight, p.o., Group III, Group IV and Group V, received 200, 400 and 600mg/kg, body weight, p.o. respectively. Corneal electrodes were used for bilateral delivery of electrical stimulus. Electro convulsive shock (50mA for 0.2Sec.) was delivered through corneal electrode to induce Hind Limb Tonic Extensor (HLTE) phase in mice. The electrical stimulus was applied using a stimulator apparatus for five groups of five mice each. The current was applied after 30 min. of administration of ethanolic extract, control and standard. The incidence and duration of HLTE was noted.

Statistical analysis

The results of the duration of seizures in electrically induced seizures were analyzed using the paired Student’s t-test, while the proportion of animals that exhibited tonic seizures in electrically induced seizures was analyzed using Chi-squared test. A p value of <0.05 was considered as statistically significant.

Table: 1 Effect of *Xeromphis uliginosa* extract on MES induced seizures in mice

S. No.	Treatment	Duration of HLTE	Mortality (%)	Recovery (%)
1	Vehicle	14.72±0.35	80	20
2	Phenytoin	3.52±0.09	0	100***
3	XUE-200	12.14±0.71	0	70.93**
4	XUE-400	11.36±0.10	33	66.77***
5	XUE-600	7.45±0.57	0	100

Values are mean ±SEM mice were pretreated with vehicle and *Xeromphis uliginosa* extracts oral 60 min. before the electroconvulsive shock. **=P<0.01, ***=P<0.001, ns= 0.05 (n= 5).

RESULTS AND DISCUSSION

Toxicity assessment

In mice, oral administration of the ethanolic extract at a dose of 500 to 2000 mg/kg did not produce any overt changes in behavior or symptoms of toxicity. The animals showed sign of depression characterized by a decrease in spontaneous activity. The extract was found to be safe up to a dose 2g/kg in mice.

MES-induced seizures

Male albino mice pretreated with the ethanolic extract have been significantly protected from convulsions induced by electroshock 30 min. Post dosing. The percentage inhibition achieved at the doses 200, 400, and 600mg/kg were 100% (p<0.01), 60% (p<0.01) and 100% (p<0.001) respectively. Extract at above the doses, dose dependently prolonged the onset of convulsions in the treated group compared to vehicle treated control group (Table 1). Data from this study show that *X. uliginosa*

significantly increases the onset time and decreases the duration of seizures by electroconvulsive shock.

The ethanolic extract of flowers of *X. uliginosa*, when administered p.o. showed a significant and dose dependent anticonvulsant activity against MES test. MES may be exerting their convulsant effects by inhibiting the activity of gamma amino butyric acid (GABA) at GABA receptors. Gamma amino butyric acid is the major inhibitory neurotransmitter which is implicated in epilepsy. The enhancement and inhibition of the neurotransmission of GABA will attenuate and enhance convulsion, respectively.

Phenytoin standard antiepileptic drugs have been shown to exert their antiepileptic effects by enhancing GABA-mediated inhibition in the brain.10 It is possible that both standard drugs antagonize MES convulsions in this study by enhancing GABA neurotransmission. Since the ethanolic extract of *X. uliginosa* delayed the occurrence of MES convulsions, it is probable that it

may be interfering with gabaergic mechanism(s) to exert their anticonvulsant effect. The study showed that ethanolic extract from roots of *X. uliginosa* can inhibit voltage dependent Na⁺ channels as phenytoin in MES induced tonic seizures.

The ethanolic extract of *X. uliginosa* inhibits MES induced convulsions. 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. The present study demonstrates the potential effectiveness of saponin isolated from the flower of *X. uliginosa*, which supports the claim by traditional medicine practitioners as an analgesic and anticonvulsant remedy.

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