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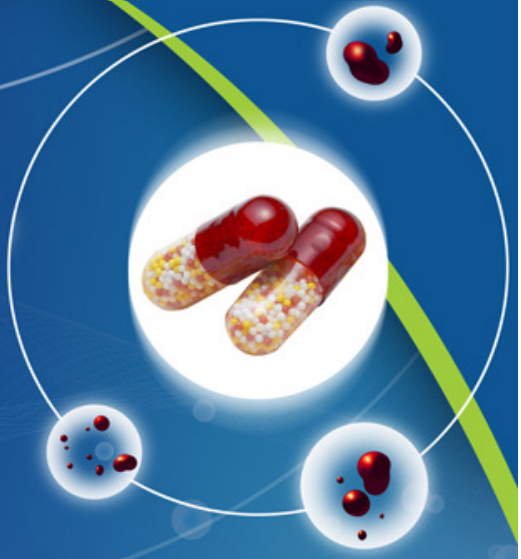

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Research Article

ANTI-CONVULSANT ACTIVITY OF ETHANOLIC EXTRACT OF OF*ALTERNANTHERA SESSILIS* ON PHENYTOIN INDUCED MEMORY IMPAIRMENT IN RATS

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ABSTRACT

Alternantherasessilis grows widely in the areas tropical regions, mainly found in tropical America, Africa and Asia. It contains many active constituents like flavonoids, steroids, saponins, glycosides, terpinoids, carbohydrates, phenols and tannins. It is reported to have anti-inflammatory, hepatoprotective, hematinic, anti-ulcer, antioxidant, antidiabetic activities.[1]The present study was aimed at evaluating the ethanolic extract ofAlternantherasessilislinn, at doses of 200 and 400mg/kg for Anti-convulsant activity. Anticonvulsant activity of the ethanolic extract of the Alternantherasessilis (ASE 200 and 400mg/kg) was evaluated by Electric shock induced convulsions in Group I,II,III, IV,V,VI,VII and VII animals Group I was taken as control (saline),Group II was taken as Standard Phenytoin (25mg/kg b.w.),Group III& IV received the high and low doses of Ethanolic extract (200& 400 mg/kg b.w.), Group V was treated with piracetam(200 mg/kg b.w.),Group VI & VII treated with Phenytoin and in combinations of high and low doses of Ethanolic extract (200 & 400 mg/kg b.w.) and Group VIII was treated with phenytoin and piracetam in combination. Anticonvulsant activity was evaluated by the time spent by the animal in different stages of convulsions (tonic flexion, tonic extensor, clonic convulsions, stupor, recovery or death).Ethanolic extract of Alternantherasessilis at both the doses produced significant anticonvulsant activity when evaluated by determining time spent by animal in different stages of convulsions. Interpretation of the results was done after subjecting the data obtained from various studies to statistical analysis which included one way ANOVA followed by post test (Tukey's). The results suggest that the whole plant of Alternantherasessilis possess memory enhancing activities.

Key words: *AlternantherasessilisLinn.,;electricshockandanti-convulsant activity.*

INTRODUCTION

In the early twentieth century herbal medicine was the prime healthcare system. Due to increasing use of allopathic system of medicine, herbal medicine gradually lost its popularity among people as it produced fast therapeutic actions. Epilepsy is a disorder of the CNS characterized by paroxysmal cerebral dysrhythmia, manifesting as brief seizures or disturbance of consciousness, with or without characteristic body movements, sensory or psychiatric phenomena. Antiepileptic drugs are used prophylactically to prevent epileptic attack. These drugs are prescribed for prolonged period of time. They act by various mechanisms but are basically CNS depressants. Phenytoin is a hydantion derivative and is one of the most commonly used anti-epileptic drug. It is used by all age group epileptic patients. One of the side effects of this drug is memory impairment[2]. When used in children, it affects their learning skills. Many plants are found to improve learning and memory. By concomitant administration of such plants with phenytoin, this problem can be overcome. Review of literature was taken up in this regard and Alternanthera sessilis was

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thought to be useful in treating memory impairment caused by phenytoin. *Alternanthera sessilis,* (Family: Amaranthaceae, is a popular leafy vegetable and is used in traditional medicine in India, Srilanka, China, Taiwan. In Madagascar, the plant is much used as a galactogogue[3]. In some parts of Bihar, the plant is used for treating hazy vision, night blindness, diarrhea, dysentery and post natal complaints. The roots are used for treating inflamed wounds[4]. Whole plant is used for treating urogenital infections of women. Leaf is used for treating cystitis. Herb is reported to contain β-sitosterol, stigma sterol, campesterol, α-spinasterol, oleanolic acid, rhamnoside, 24-methylene-cycloartenol etc., Taking into consideration the folklore uses (cholinergic and intellect promoting activities), and the active constituents present and reported activities; the present study aims at evaluation of ethanolic extract of*Alternanthera sessilis* for anticonvulsant activity.

MATERIALS AND METHODS

Animals:

Albino Wistar rats were purchased from M/s Venkateshawara Traders, Bangalore-560 010and were maintained under standard animal house conditions in animal house of KLE University'sCollege of Pharmacy, Bangalore. Experimental protocol was approved by Institutional animal ethics committee (IAEC) of KLE University's College of Pharmacy, Bangalore.Animals were acclimatised to laboratory conditions for one week before starting experiment and had free access to water and standard rat feed.

Plant material:

Plant extraction: The authenticated whole plant was dried in shade and powdered coarsely. Extraction was done according to standard procedure. The coarse powder of the whole plant was Soxhlet extracted successively with petroleum ether, chloroform and 90% ethanol. Extract was concentrated under reduced pressure. Percentage yield of ethanolic extract was 7.35%.

Acute toxicity study: [5]

Acute toxicity studies for ethanolic were conducted as per OECD guidelines 425 to determine the safe dose using female albino Wistar rats weighing 150-200g. No sign and symptoms of toxicity were observed during the observations which was done continuously for the first 4h and then observed up to 24h for mortality. The extracts were safe up to a dose of 2000mg/kg b.w.

Preliminary phytochemical screening:[6]

The ethanolic of *Alternanthera sessilis* Linn. were subjected to preliminary phytochemical screening.

EXPERIMENTAL DESIGN:

Anticonvulsant activity in albino Wistar rats:

Albino male Wistar rats of weight (150-200gm) were procured and randomly divided into various groups of 6 animals each.

Group I: Control

Group II: Standard Phenytoin (25mg/kg b.w.)

Group III: Ethanolic extract dose I (200 mg/kg b.w.)

Group IV: Ethanolic extract dose II (400 mg/kg b.w)

Group V: Piracetam (200 mg/kg b.w.)

Group VI: Phenytoin and ethanolic extract dose I (200 mg/kg b.w.)

Group VII: Phenytoin and ethanolic extract dose II (400 mg/kg b.w.)

Group VIII: Phenytoin and piracetam.

The animals of various groups were treated respectively with saline to group I and drugs for 14 days, Phenytoin was administered to animals of group II, VI, VII and VIII on all days along with respective drugs.

Assessment of anticonvulsant activity

Anticonvulsant activity by MES method and evaluate protection against different stages of convulsions:[7]

Tonic and clonic convulsions was induced by giving MES (150mA, 15 Hz for 0.2s) using electroconvulsometer via crocodial ear electrodes. On day14, 1 hour after the last dose,

different stages of convulsions namely tonic flexion, tonic extensor, clonic convulsions, stupor, recovery or death was noted and time spent by animal in each phase of convulsions were recorded using electroconvulsometer.

Stages of convulsions:

The five different stages of convulsions are

Tonic flexion: (involves flexor muscles): It refers to continuous muscular contraction and during contraction the animal bends.

Tonic extensor: (involves extensor muscles):It refers to continuous muscular contraction but the animal does not bend. Animal usually extends stretches (straightness).

Clonic convulsions: (involves both flexor and extensor muscles): In this phase, intermittent muscular contraction and relaxation are observed.

Stupor (statue like): In this phase, partial loss of consciousness is observed.

Recovery or death:During this phase, animal response recovers from the electric shock highly irritable.

Statistical analysis:Statistical analysis was performed by one way ANOVA followed by post test Tukey.

RESULT AND DISCUSSION

Anticonvulsant activity:

Tonic and clonic convulsions was induced by giving MES (150mA, 15 Hz for 0.2s) using electroconvulsometer via crocodile ear electrodes. On day 14, 1 hour after the last dose, different stages of convulsions tonic flexion, tonic extensor, clonic convulsions, stupor, recovery or death was noted and time spent by animal in each phase of convulsions was recorded.

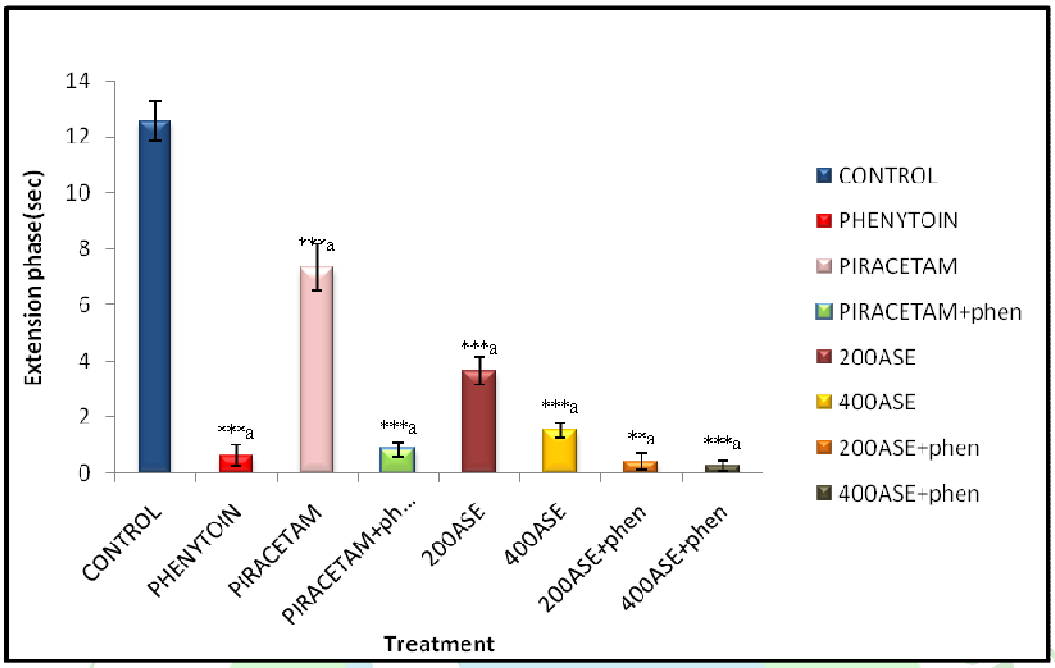
Extension stage:Significant (*p<0.001)* reduction in time of extension phase of convulsions was observed in animals treated with phenytoin, ethanolic extract at both dose (200 & 400 mg/kg b.wt) and piracetam when compared control group. This indicated that the treatment afforded protection against convulsions.

Anticonvulsant activity of combination of piracetam, 200 and 400 mg/kg b.w. of ASE with phenytoin was also studied. It has been found that combination of ethanolic extract 200 & 400 mg/kg b.wt doses with phenytoin produced better protection against extensor phase as compared to administration of phenytoin alone (0.41±0.28, 0.26±0.19 & 0.63±0.38 respectively).(Table 1 &Fig 1).

Table 1: Effect of Ethanolic extract of *Alternantherasessilis* on convulsions in MES induced seizures:

Treatment	Dose (per kg b.w)	Extension phase(sec)
Control	10ml	12.58±0.72
Piracetam	200mg	7.33±0.83^{***a}
ASE	200mg	3.64±0.48^{***a}
ASE	400 mg	1.53±0.24^{***a}
Phenytoin	25mg	0.63±0.38^{***a}
Piracetam +Phenytoin	200mg + 25mg	0.82±0.02^{***a}
ASE + Phenytoin	200mg + 25 mg	0.41±0.28^{**a}
ASE + Phenytoin	400mg + 25 mg	0.26±0.19***

n=6, values are mean±SEM, where ASE indicates ethanolic extract of *Alternantherasessilis*. *** indicates $p<0.001$,**indicates $p<0.01$ 'a' indicates comparision with control.



n=6, values are mean±SEM, where ASE indicates ethanolic extract of *Alternantherasessilis*.
*** indicates $p<0.001$,**indicates $p<0.01$ 'a' indicates comparision with normal.

Fig 1: Effect of ethanolic extract of Alternantherasessilis on convulsions in MES induced model

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