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ANTICONVULSANT ACTIVITY OF AQUEOUS ROOT EXTRACT OF *COCOS NUCIFERA LINN.* IN MICE

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Abstract: The Present study was undertaken to investigate the Anticonvulsant activity of aqueous root extract of *Cocos nucifera* Linn. (arecaceae) on mechanically induced seizures in mice. The aqueous root extract of *Cocos nucifera* (ARECN) was studied for its anticonvulsant activity by using experimental paradigms like Maximal electroshock-induced seizures (MES). ARECN exhibited protection against tonic convulsions induced by MES in swiss albino mice. It was found that the extract (50 & 100 mg/kg, p.o), significantly prolonged the onset of tonic seizures and reduced the duration of incidence of seizures in MES induced seizure models. These findings suggest that aqueous root extract of *Cocos nucifera (L.)* produce its anticonvulsant activity by enhancing GABA inhibitory neurotransmission, since it delayed the latency of tonic seizures and duration of seizures produced by PTZ and PIC.

Keywords: *Cocos nucifera*, Anticonvulsant activity, MES.

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INTRODUCTION

Epilepsy[1,2] is a chronic neurological condition characterized by the recurrent, unprovoked seizures. An **epileptic seizure**, occasionally referred to as a **fit**, is defined as a transient symptom of "abnormal excessive or synchronous neuronal activity in the brain". It can manifest as an alteration in mental state, tonic or clonic movements, convulsions, and various other psychic symptoms. Sometimes it is not accompanied by convulsions but a full body "slump", where the person simply will lose control of their body and slump to the ground. Epilepsy may be idiopathic[4], some other more common causes of epilepsy include Hereditary or genetic factors, stroke or transient ischemic attack (TIA), illnesses that cause the brain to deteriorate, dementia, such as Alzheimer's disease, Traumatic brain injury, Problems that are present from before birth (congenital brain defects), metabolic diseases such as phenylketonuria and kidney failure or liver failure.

India is regarded as the treasure trove of herbs in the world.[5] Herbs demonstrate great versatility for the treatment of a broad variety of health needs. Medicinal plants are of great value in the field of treatment and cure of diseases. It has now been universally accepted that the herbal medicines are far safer than that of synthetic medicines for curing of many of complex diseases. There are many number of plants viz *Achillea millefolium*, *Acorus calamus*, *Adiantum lunulatum*, *Anemopsis californica*, *Canscora decussata*, *Cocculus hirsutus*, *Convolvulus arvensis*, *Elaeocarpus sphaericus*, *Panax quinquefolium*, *and Xanthorhiza simplicissima*,cocos nucifera *etc* having anticonvulsant activity.[6]

Cocos nucifera L. is a large palm, growing up to 30 m (98 ft) tall, with pinnate leaves 4–6 m (13–20 ft) long, and pinnae 60–90 cm long; old leaves break away cleanly, leaving he trunk smooth.[7]

MATERIALS AND METHODS:

Animals:

Albino mice (18-25gm) of either sex weighing between 18-25gm were used in this study. All the animals were acclimatized in the quarantine room for 7 days and housed in groups of five under standard husbandry conditions like room temperature 23 ± 2ºC, relative humidity 30-70% and light/ dark cycle of 12 hours.[45]All the animals were fed with synthetic standard diet (National Institute for Nutrition, Hubsiguda, Hyderabad) and water will be supplied *ad libitum* under strict hygienic conditions. The Institutional Animal Ethical Committee approved the protocol of this study (1235/C/08/ CPCSEA).

Drugs and Chemicals:

Phenytoin (25mg/kg, p.o), aqueous root extract of *cocos nucifera (ARECN) and distilled water.*

Preparation of the extract and isolation of the active principle:

The roots of the plant *cocos nucifera (L.)* were shade dried and crushed to coarse powder. Then the powdered material was subjected to maceration.[46] The obtained extract was dried under vacuum using rotary evaporator and stored in an air tight container at room temperature.

Methdology

Animals were divided into 4 groups of 5 animals each for the MESIS model. After overnight fasting, group I received distilled water 10ml/kg p.o served as the control, Group II received Phenytoin 25mg/kg, p.o as standard, Groups III received low dose of aqueous root extract of *cocos nucifera* (50mg/kg orally) and Group IV received high dose of aqueous root extract of *cocos nucifera* i.e 100mg/kg p.o, all of which were administered orally 60 minutes prior to the test in this acute study.[8,9]

RESULTS

Preliminary Phytochemical Screening

The aqueous root extract of *cocos nucifera (L.)* was subjected to Preliminary Phytochemical tests and the results were tabulated. The results showed the presence of carbohydrates, flavonoids, saponins, tannins and sugars.

Table No. 1: Test procedures for phytochemical screening of ARECN

COMPOUNDS	TESTS/REAGENTS	COLOUR OBSERVED
Alkaloids	Meyer's test (TS + Meyer's reagent) Hager's test (TS + Hager's reagent)	Cream colour ppt Yellow colour ppt
Carbohydrates	Molisch test (TS + α-napthol + Con H_2SO_4) Fehling's test (TS + Fehling A&B + heat)	Violet color ring Brick red colour
Proteins	Biuret test (TS + biuret reagent)	Violet colour

Steroids	Libermann-Burchard test (TS+aceticanhydride+Con H_2SO_4)	Brown colour ring with green colour on upper layer
Saponins	Foam test (TS + shake well)	Froath formation
Tanins	Ferric chloride reagent (TS + $FeCl_3$)	Blue/green colour
Flavones	TS + 10% NaOH	Yellow colour
Cardiac glycosides	Baljet's test (TS + picric acid)	Orange colour

Assessment of Pharmacological Activity

Maximal Electro Shock-Induced Seizure Model

The Basile Electroconvulsive Device is designed for inducing convulsions in research animals. Consistent reproducible current levels are produced by feedback circuitry that adjust for variance in impedance of the contact from animal to animal.[48] The impedance to the animal can be pre-measured and displayed, and a warning signal flashes if the impedance is too great to deliver the desired current level. The Electroconvulsive Device is supplied with auricular (ear lobe) electrodes.

Table No. 2: Preliminary Phytochemical tests

S.No.	PHYTOCHEMICAL TESTS	INFERENCE
1	Test for Alkaloids	**-ve**
2	Test for Flavones	**+ve**
3	Test for Steroids	**-ve**
4	Test for Gums and mucilage	**-ve**
5	Test for Glycosides	**-ve**
6	Test for Phenols	**-ve**
7	Test for Terpenes	**-ve**
8	Test for Saponins	**+ve**

9	**Test for carbohydrates**	**+ve**

+ve: indicates the presence of compounds

Table No. 3: Effect of ARECN in MES induced seizure model in mice

S.NO	TREATMENT	ON SET OF TONIC CONVULSIONS (Sec)	DURATION OF SEIZURES (Sec)	% PROTECTION
	Control	413±36.48	357±49.1	**0 %**
2	Phenytoin (10 mg/kg, i.p)	1611±30.01**	9.6±1.5**	**100 %**
3	ARECN (50mg/kg , p.o)	930.4 ± 42.02**	22.8±1.39 **	**80 %**
4	**ARECN (100mg/kg, p.o)**	**1087.6±126.87****	**11.8 ±1.15****	**100 %**

n=5 in each group, Significance at ***P* < 0.01 Vs control

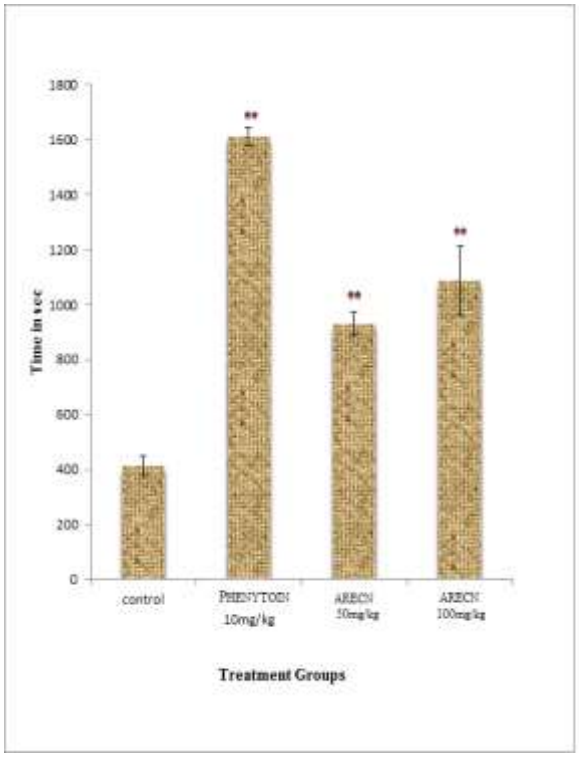

Fig No. 1: Effect of ARECN on Onset of Tonic convulsions in MES induced seizure model in mice.

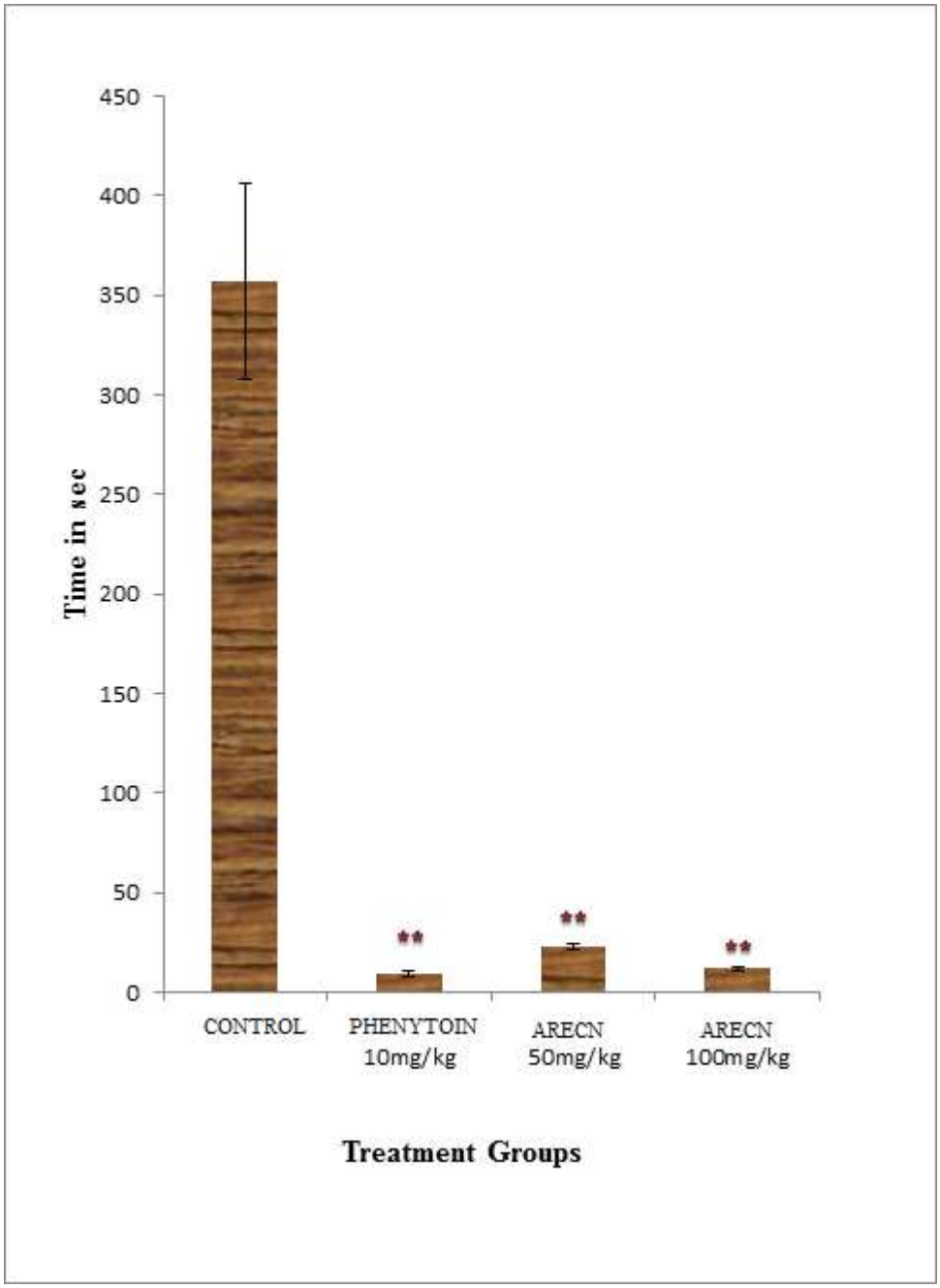

Fig No. 2 : Effect of ARECN on Duration of seizures in MES induced seizure model in mice

DISSCUSSION

The present work was subjected to investigation for the evaluation of the Anticonvulsant activity of aqueous root extract of *Cocos nucifera* L. in mice. The extract was primarily subjected to phytochemical investigation. The effect of ARECN was investigated for its putative anticonvulsant activity by using various experimentally induced seizure models in mice viz.

Maximal Electroshock induced seizures model in mice.In MES model, the antiepileptic drugs that block MES induced tonic extension act by blocking seizure spread, either by inhibiting voltage dependant Na+ channels or by blocking glutaminergic excitation mediated by the N-methyl- D-aspartate (NMDA) receptor. The parameters observed in this model are onset of tonic convulsions and duration of seizures.

In this MES model Phenytoin and ARECN (50&100mg/kg, p.o) had significantly delayed the onset of tonic convulsions and reduced the duration of seizures. Inhibition of MES test predicts activity against generalized tonic-clonic and cortical focal seizures. The antagonism of ARECN against MES induced seizures suggests that the root extract of *cocos nucifera L.* might have affect on the voltage dependant Na+ channels or by blocking glutaminergic excitation mediated by the N-methyl- D-aspartate (NMDA) receptors to exert its anticonvulsant effect.

CONCLUSION

In the present study, ARECN was evaluated by using MES induced seizure models. In the present study, ARECN was evaluated by using MES induced seizure models. From the above findings, the present investigation suggests that the aqueous root extract of *Cocos nucifera L.* may possess anticonvulsant activity against MES induced seizures by affecting the voltage dependant Na+ channels or by blocking glutaminergic excitation mediated by the N-methyl- D-aspartate (NMDA) receptors. Therefore lend pharmacological credence to the traditional use of this plant in the treatment of epilepsy. However, an extensive Pharmacological study of this plant is required for complete understanding of the Anticonvulsant activity of aqueous root extract of *Cocos nucifera L*. The confirmation of Phytochemical screening gave positive results for tannins, flavanoids, saponins and carbohydrates which may be the active constituent responsible for the anticonvulsant activity of *cocos nucifera* L.

Further investigation should be carried out to isolate and identify the chemical constituent which is responsible for its Anticonvulsant activity.

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