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ANTIPYRETIC AND ANTIEPILEPTIC ACTIVITY STUDIES ON THE ROOTS OF *HEMIDESMUS INDICUS* (L.) R. BR. VAR. *PUBESCENS* (WT. & ARN.) HOOK. F.

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ABSTRACT

Objective: The objective of this study was to investigate and evaluate the antipyretic and antiepileptic activity of aqueous and alcoholic extracts of the roots of *Hemidesmus indicus* (L.) R. Br. var. *pubescens* (Wt. & Arn.) Hook. f. **Methods:** The air dried roots of the plant was powdered exhaustively and extracted with 95% v/v ethanol in a soxhlet apparatus by continuous hot extraction method and macerated with chloroform water for 24h. The yeast induced pyrexia in albino rats was used to screen the antipyretic activity. The maximal electroshock induced convulsion and Pentylenetetrazole induced convulsion on Swiss albino mice was performed to screen the antiepileptic activity. **Results:** In the Yeast induced pyrexia model aqueous and alcohol extracts at a dose of 400mg/kg showed significant lowering of body temperature which was comparable with standard drug. In MES induced convulsion method and PTZ induced convulsion method aqueous and alcohol extracts at a dose of 600mg/kg showed a significant antiepileptic effect which was comparable with phenytoin (25mg/kg, ip) and diazepam (4mg/kg, ip) respectively. **Conclusion:** Both extracts exhibited significant antipyretic action and antiepileptic activity against the models tested on par with standard drug. The results of pharmacological tests performed in the present study suggest that aqueous and alcoholic extracts of *Hemidesmus indicus* (L.) R. Br. var. *pubescens* (Wight. & Arn.) Hook. f. possesses potent antipyretic and antiepileptic effect.

KEYWORDS: *Hemidesmus indicus* (L.) R. Br. var. *pubescens* (Wight. & Arn.) Hook. f., Antipyretic activity, Antiepileptic activity, MES, PTZ.

INTRODUCTION

Throughout human history people have relied on natural products and plants in particular, to promote and maintain good health and to fight sickness, pain and disease. The past 200 years have witnessed not only an acceleration in the rate of extinction of plant and animal species, but also the erosion of traditional knowledge related to the medicinal properties and uses of plants and other natural products.[1] Medicinal plants used for the therapy of pyrexia and epilepsy in the traditional system of medicine have shown to possess promising antipyretic and anticonvulsant activity in animal models. Therefore antipyretic and anticonvulsant screening can be an invaluable source for identifying new antipyretic and antiepileptic drugs.[2]

Fever is defined as an increased body temperature above the normal (98.6 F or 37°C).[3] Mild or short-term elevations in body temperature are common with minor infections. High fevers, at a temperature of 103 F and above signals a potentially dangerous infection.[4] Fever is not a disease but is a symptom of a disease or infection. Fever helps the body to fight against infections by strengthening the defense system of body. Bacteria and viruses cannot withstand higher temperatures and they have unfavorable survival during fever.[5] Fever may reflect infection or result from conditions like tissue damage, inflammation, graft rejection and malignancy, which enhance the formation of cytokines, interleukins such as IL-1β, IL-6, interferons and TNF-α. The cytokines increase the synthesis of PGE_2 in circumventicular organs adjacent to the preoptic hypothalamic area, which in turn, increases cyclic AMP and triggers the hypothalamus to elevate the body temperature by promoting an increase in heat generation and a decrease in heat loss.[6] Although the body surface temperature is ordinarily measured in clinical practice, it is the body core temperature, which is physiologically important. If the core temperature rises by more than a few degrees in man, mental changes occur. The functions of enzymes are adversely affected at high temperature and hyperpyrexia results into fatality. Antipyretic drugs generally act by resetting the thermostatic mechanism to the normal level and thereby bring down the temperature.[7]

Epilepsy is a condition, which causes seizures to occur. It is a major neurological disorder that affects approximately 5% of the world population. The word epilepsy originates from the Greek, meaning “to seize”, and is used to characterize a self-sustained, spontaneously

recurring seizure disorder. A seizure is defined as the clinical manifestation of excessive or hyper synchronous activity of neurons within the cerebral cortex. Epilepsy is treated by long term administration of antiepileptic drugs which are generally associated with side effects, dose-related, chronic toxicity, teratogenic effects and approximately 30% of the patients do not respond to current antiepileptic drug therapy. Hence traditional systems of medicine are popular in developing countries and upto 80% of the population relies on traditional medicines or folk remedies for the treatment of epilepsy. GABA is the major inhibitory neurotransmitter in the brain while glutamic acid is an excitatory neurotransmitter in the brain. The inhibition of GABA and the enhancement of the action of glutamic acid have been shown to be the underlying factors in epilepsy. Epilepsy is classified as grandmal epilepsy and petitmal epilepsy. In mice convulsions are induced by electric shock and pentylene tetrazole, the former resembles grandmal type of epilepsy and later the petitmal type.[8]

Hemidesmus indicus (L.) R. Br. var. *pubescens* (Wight. & Arn.) Hook. f.[9,10,11] belonging to family Periplocaceae.[12] is a slender twining herb, restricted to Greater part of India, from upper gangetic plain eastwards to Assam and throughout central, western and Southern India. It is used for the treatment of vata and pitta, fever, dyspepsia, anorexia, diarrhoea, epilepsy, bronchitis, leprosy, leucoderma, skin diseases and helmenthiasis in Traditional System of Medicine.[13,14,15,16,17]

MATERIALS AND METHODS

Plant materials

The roots of *Hemidesmus indicus* (L.) R. Br. var. *pubescens* (Wight. & Arn.) Hook. f. was collected from Paramankurichi, Thuthukudi district of Tamil Nadu and authenticated by Dr. S.N. Yoganarasimhan Taxonomist and Research co-ordinator of M.S.Ramaiah College of Pharmacy, Bangalore. A voucher specimen (041) was kept in herbarium at the P.G. Department of Pharmacognosy, MSRCP Bangalore, for further reference. After authentication, the roots of *Hemidesmus indicus* (L.) R. Br. var. *pubescens* (Wight. & Arn.) Hook. f. were washed with running tab water and then dried in shade/oven dried for 15 days, after which these roots were chopped and ground. Finally extraction was carried out by the following procedure.

Preparation of extracts

Alcohol extract

About 50g of the dried powdered roots of *Hemidesmus indicus* (L.) R. Br. var. *pubescens* (Wight. & Arn.) Hook. f. was exhaustively extracted with 500 ml of 95% v/v ethanol in a soxhlet apparatus by continuous hot extraction method. The ethanol extract was concentrated and evaporated to dryness. The ethanol extract was dissolved in distilled water and was used for animal administration.

Aqueous extract

About 50g of the dried powdered roots of *Hemidesmus indicus* (L.) R. Br. var. *pubescens* (Wight. & Arn.) Hook. f. was subjected for extraction process by maceration with chloroform water for 24h. The extract was filtered and concentration to dryness. The aqueous extract was dissolved in distilled water and used for animal administration.

Drugs and chemicals

The following drugs and chemicals were used with their sources:

Paracetamole (Micro labs, India), Pentylenetetrazole (Cigma, USA), Phenytoin (Pfizer, India), Diazepam (Ranbaxy, India).

Preliminary Phytochemical analysis

Extracts were subjected to preliminary phytochemical and qualitative tests.

Pharmacological investigation

Animals

The albino Wistar rats (170-200g) of either sex were used for acute toxicity study and screening of antipyretic activity. Swiss albino mice (18-30g) of either sex were used for antiepileptic activity. The animals were inbred and maintained in the animal house of M. S. Ramaiah College of Pharmacy. Animal house was well maintained under standard hygienic conditions, at a temperature (22 ± 2^0C), room humidity (60 ± 10%) with 12 h day and night cycle, with food and water *ad libitum*. Animals were housed in groups of 4 per cage. Cleaning and sanitation was done on alternate days. Paddy husk was provided as bedding material. The cages were maintained clean. The pharmacological studies were approved by Institutional Animal Ethical Committee (No. 220/abc/CPCSEA) of M.S.Ramaiah College of Pharmacy.

1. Acute toxicity study.[18,19]

Acute toxicity study of roots of *Hemidesmus indicus* (L.) R. Br. var. *pubescens* (Wight. & Arn.) Hook. f. was performed as per OECD guidelines (423). The limit test is primarily used in situations where the experimenter has prior information indicating that the material to be tested is likely to be non toxic i.e. having toxicity only above regulatory limit doses. Thus, the OECD guidelines allow testing single dose of 2000 mg/kg for acute toxicity study. However an additional lower dose of 300 mg/kg was also tested.

2. Antipyretic activity

The albino Wistar rats (170-200g) of either sex were used. Hyper pyrexia (fever) was induced by subcutaneously injecting 20% w/v brewer's yeast in suspension (10ml/kg), in between the shoulder blades. The site of the injection was massaged in order to spread the suspension beneath the skin. Basal rectal temperature was measured before the injection of yeast, by inserting digital clinical thermometer to a depth of 2 cm into the rectum. The rise in rectal temperature was recorded 19 h after yeast injection.

Inclusion Criteria

The rats, whose rectal temperature was increased up to 0.5^0C 19^{th} after yeast injection were included in the study. They are called as febrile rats.

The febrile rats were divided into six groups each containing 6 animals. The vehicle, standard and test drugs were administered after 19 h of yeast injection. Group-1 was considered as vehicle control (distilled water, p.o.), group-2 served as reference standard and treated with Paracetamol (150mg/kg body weight, i.p.), group-3 and group-4 treated with aqueous extracts at the doses of 200 and 400mg/kg body weight, p.o., group-5 and group-6 treated with alcoholic extracts at the doses of 200 and 400mg/kg body weight, p.o. The different groups of febrile rats were orally administered with the respective drugs and rectal temperature was recorded at 30, 60, 120, 180, 240 and 300 minutes post treatment. Decrease in rectal temperature after treatment indicates antipyretic effect. The difference in body temperature was recorded.[20,21,22,23,24]

3. Anti-epileptic activity

Anti-epileptic activity of the drug extracts was explored on experimental animal models of convulsion. The ability of the drug to prevent/reduce the severity of convulsions was

assessed. The animals were observed for the onset of convulsion, severity of convulsions followed by recovery or death.

A. Maximal electroshock (MES) induced convulsion model.

Thirty min after Phenytoin administration and 1 hr after the administration of vehicle, aqueous and alcoholic extract of *Hemidesmus indicus* (L.) R. Br. var. *pubescens* (Wight. & Arn.) Hook. f., maximal electro-shock seizures were induced by electroconvulsiometer. 150 mA current for 0.2 sec was delivered through ear electrodes on the pinna of ear. The mice were divided into six groups. Each group comprised of 6 mice. Group-1 received distilled water and served as control group. Group-2 received Phenytoin (25 mg/kg body weight, i.p.), served as standard group. Group-3 and Group-4 received aqueous extracts of *Hemidesmus indicus* (L.) R. Br. var. *pubescens* (Wight. & Arn.) Hook. f. at the doses of 300 and 600mg/kg respectively Group-5 and Group-6 received alcoholic extracts of *Hemidesmus indicus* (L.) R. Br. var. *pubescens* (Wight. & Arn.) Hook. f. at the doses of 300 and 600mg/kg respectively. The animals were then individually observed immediately for 30 min to 1 hr of various parameters such as tonic flexion, hind limb extension, clonic convulsions and stupor. The time taken for recovery or death after electro-convulsive shock was recorded.

A. Pentylenetetrazole (PTZ) induced convulsion method.

Pentylenetetrazole induced convulsion represents petitmal type of epilepsy in human. Parameters studied were latency of convulsions and severity of convulsions as indicated by various parameters such as straub's tail, jerky movement of whole body, tonic clonic convulsions and time taken for complete recovery or death. The mice were divided into six groups. Each group comprised of 6 mice. Group-1 received distilled water orally and served as control group, group-2 received Diazepam (4mg/kg body weight, i.p.) and served as positive control+ PTZ (70 mg/kg body weight, i.p.), group-3 and group-4 treated with aqueous extracts at the doses of 300 and 600mg/kg body weight respectively, p.o.+ PTZ (70 mg/kg body weight, i.p.), group-5 and group-6 treated with alcoholic extracts at the doses of 300 and 600mg/kg body weight respectively, p.o. + PTZ (70 mg/kg body weight, i.p.). PTZ was injected intraperitoneally 30 min after diazepam administration and 1 hr after vehicle and extract administration. The animals were then individually observed for 30 min to 1 hr. The myoclonic jerks and incidence of seizures were recorded along with the time taken for recovery or death.[25,26,27,28,29,30,31,32,33]

Statistical analysis

The data was expressed as Mean ± S.E.M and was analysed by one way analysis of variance (ANOVA) followed by Tukey-Kramer multiple comparison test. * $p< 0.05$ was considered as significant, ** $p< 0.01$ was considered as very significant and *** $p< 0.001$ was considered as extremely significant as compared to the control.

RESULTS

Preliminary phytochemical analysis

Preliminary phytochemical analysis revealed the presence of alkaloids, carbohydrates, phytosterols, phenolic compounds and tannins, volatile oil, gums and mucilage.

1. Acute toxicity studies

Acute toxicity study of 300mg/kg and 2000mg/kg of aqueous and alcoholic extracts of roots of *Hemidesmus indicus* (L.) R. Br. var. *pubescens* (Wt. & Arn.) Hook. f. was carried out on Wistar albino rats as per OECD-423 guideline. The extracts at the dose of 2000mg/kg showed a marked sedation and no other toxic symptoms or death was observed in any of the animals with either extracts throughout the study.

2. Anti-pyretic activity

Yeast induced pyrexia model was employed to study the antipyretic activity. The reduction in pyrexia after 30 min, 60 min, 120 min, 180 min, 240 min and 300 min of drug administration was recorded. The aqueous and alcohol extracts at a dose of 200mg/kg and aqueous extract at the dose of 400mg/kg showed a significant ($p<0.05$) reduction in body temperature from 30 minutes of administration up to 4 hrs and exhibited a very significant ($p<0.01$) reduction in body temperature at the 5^{th} hr. The alcohol extract at the dose of 400mg/kg exhibited very significant ($p<0.01$) lowering of body temperature from 30 min of administration up to 4 hrs and showed an extremely significant ($p<0.001$) reduction in body temperature at the 5^{th} hr in a dose dependent fashion. The antipyretic effect of the drugs started as early as 30 min and the effect was maintained for 5^{th}h. The effect of both the doses of aqueous and alcoholic extract possessed a significant antipyretic effect which was comparable with standard drug paracetamol.

Table 1: - Anti-pyretic activity of the roots extracts of *Hemidesmus indicus* (L.) R. Br. var. *pubescens* (Wt. & Arn.) Hook. f. on yeast induced pyrexia in rats.

Treatment	Control	Standard Paracetamol (150mg/kg)	Alcohol extract (200mg/kg)	Alcohol extract (400mg/kg)	Aqueous extract (200mg/kg)	Aqueous extract (400mg/kg)
Basal rectal temp. (^{0}f).	99.55±0.099	99.82 ± 0.13	99.86 ± 0.13	99.62 ± 0.16	100.0 ± 0.063	99.88 ± 0.087
Rectal temp. at 19 h of yeast administration (^{0}f).	101.2 ± 0.058	100.83 ± 0.088	100.85 ± 0.05	100.83 ± 0.067	100.92 ± 0.040	100.85 ± 0.056
Rectal temp. at 30 min.(^{0}f).	101.10 ± 0.058	100.62 ± 0.079***	100.8 ± 0.05*	100.75 ± 0.056**	100.83 ± 0.049*	100.78 ± 0.048*
Rectal temp. at 60 min.(^{0}f).	101.01 ± 0.031	100.52 ± 0.079***	100.75 ± 0.062*	100.68 ± 0.070**	100.77 ± 0.033*	100.70 ± 0.037*
Rectal temp.at 120min. (^{0}f).	100.92 ± 0.031	100.47 ± 0.061***	100.70 ± 0.058*	100.65 ± 0.056**	100.70 ± 0.045*	100.68 ± 0.040*
Rectal temp. at180 min.(^{0}f).	100.83 ± 0.033	100.42 ± 0.040***	100.65 ± 0.043*	100.60 ± 0.037**	100.67 ± 0.033*	100.65 ±0.043*
Rectal temp. at240 min.(^{0}f).	100.68 ± 0.017	100.38 ± 0.031***	100.53 ± 0.021*	100.50 ± 0.038**	100.53 ± 0.042*	100.51 ±0.04*
Rectal temp. at300min.(^{0}f).	100.47 ± 0.021	100.08 ± 0.031***	100.3 ± 0.026**	100.27 ± 0.021***	100.30 ± 0.037**	100.3 ± 0.025**

n= 6 animals in each group. Values expressed as Mean ± SEM

* p< 0.05, ** p< 0.01, *** p< 0.001 Vs control.

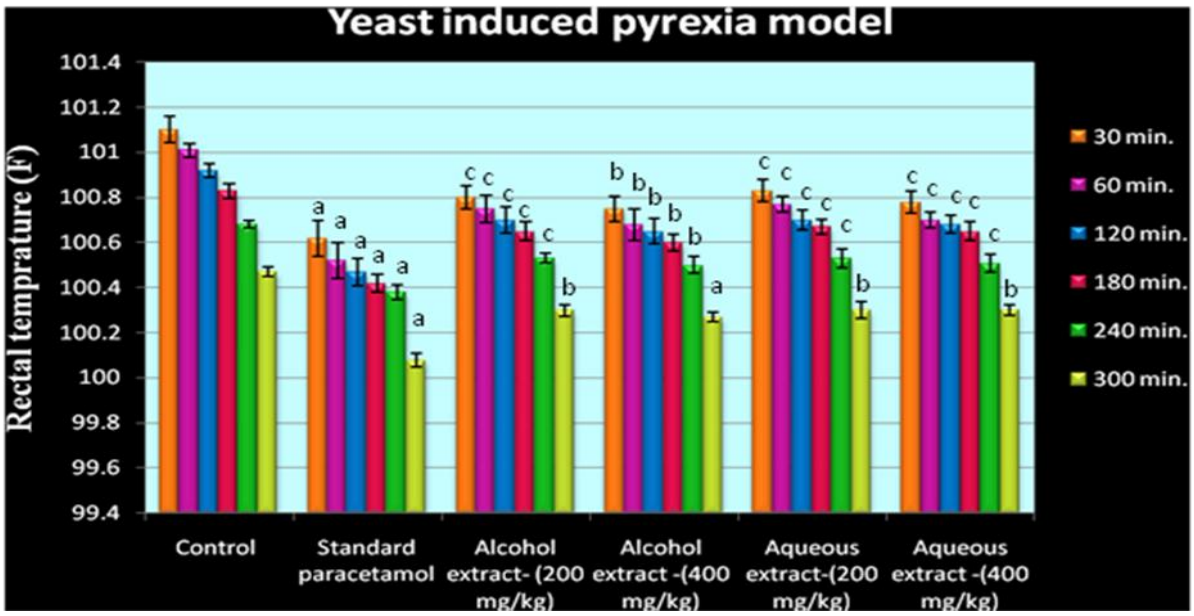

Fig 1: Histogram showing rectal temperature of different group in yeast induced pyrexia model

a= *, b= **, c= ***

3. Anti-epileptic activity

A. MES induced convulsion method

In MES induced convulsion method, aqueous and alcohol extracts of roots of *Hemidesmus indicus* (L.) R. Br. var. *pubescens* (Wt. & Arn.) Hook. f. at dose of 300 and 600mg/kg reduced the duration of extensor phase ($p<0.01$ and $p<0.001$) in a dose dependent fashion when compared with control group. The effect was comparable with that of the standard drug phenytoin. Aqueous extract at the dose of 300 mg/kg very significantly ($p<0.01$) reduced the stupor phase where as 600mg/kg aqueous and 300 and 600mg/kg of alcohol extract exhibited an extremely significant ($p<0.001$) reduction in stupor phase on par with standard drug phenytoin. Aqueous and alcohol extract at a dose of 300mg/kg showed a very significant ($p<0.01$)decrease in time for recovery and possessed a dose dependent effect, where at a higher dose of 600mg/kg both the extracts possessed an extremely significant ($p<0.001$) reduction in time for recovery on par with the standard drug Phenytoin. All the animals of standard and extract group survived after maximal electroshock where as vehicle treated control group showed a lethality of two animals (2/6).

Table 2:- Anti-epileptic activity of aqueous and alcoholic extracts of roots of *Hemidesmus indicus* (L.) R. Br. var. *pubescens* (Wt. & Arn.) Hook. f. on MES induced convulsion in mice.

Groups-Treatment (mg/kg)	Extensor phase (in sec.)	Stupor phase (in sec.)	Time taken for recovery (in sec.)	Lethality
Control	17 ± 1.592	42.25 ± 2.955	310 ± 59.161	2/6
Standard–Phenytoin (25mg/kg)	0.0 ± 0.0***	21.67 ± 1.054***	154.67 ± 16.81***	0/6
Aqueous extract (300mg/kg)	11.67 ± 1.054**	29.4 ± 2.695**	164 ± 9.798**	0/6
Aqueous extract (600mg/kg)	5.33 ± 0.0.80***	24.67 ±0.95***	150 ± 13.416***	0/6
Alcohol extract (300mg/kg)	10.83 ± 0.98**	27 ± 1.225***	160 ± 10.488**	0/6
Alcohol extract (600mg/kg)	5.167 ± 0.477***	23.5 ± 2.029***	148 ± 14.004***	0/6

n= 6 animals in each group. Values expressed as Mean ± SEM

* p< 0.05, ** p< 0.01, *** p< 0.001 Vs control.

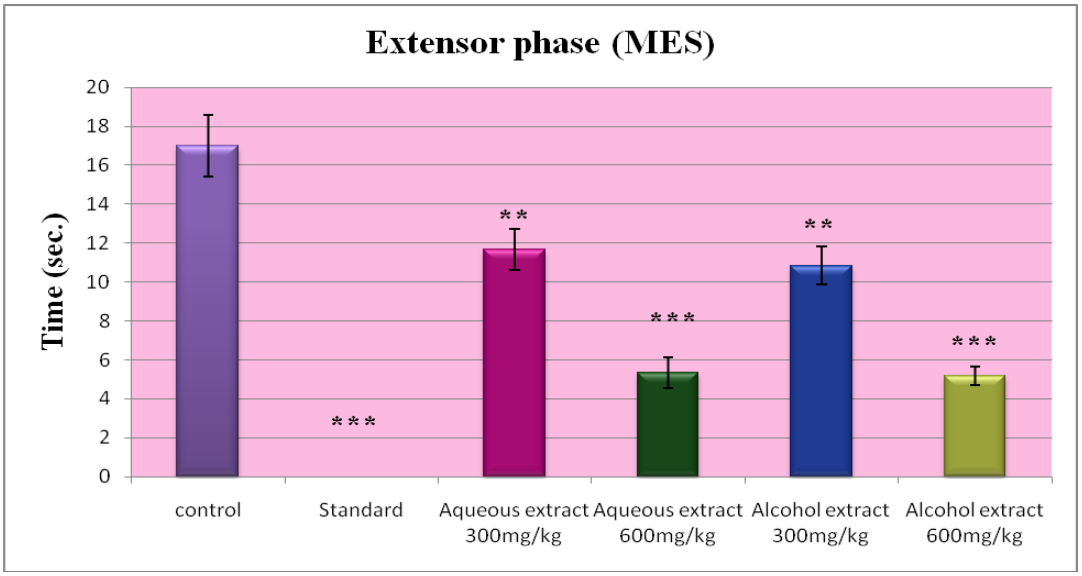

Fig. 2.a. Duration of Extensor Phase (MES induced convulsions)

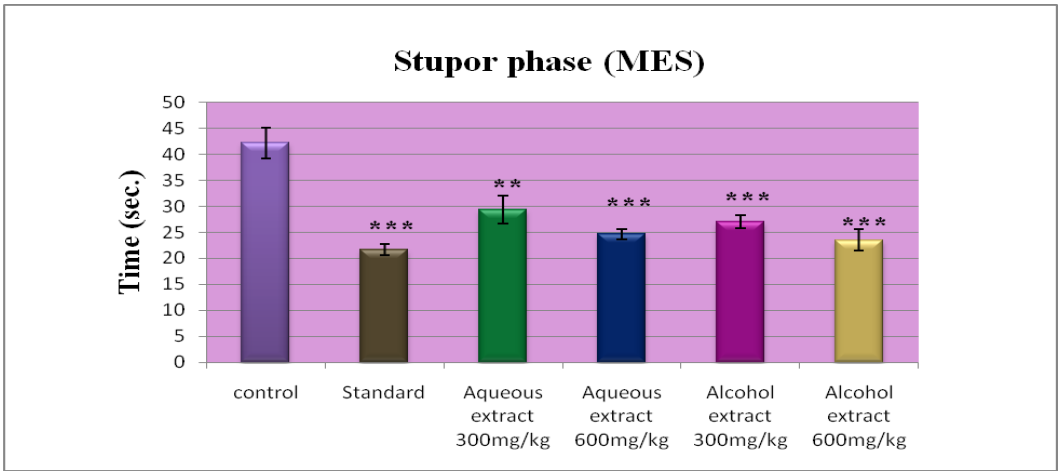

Fig. 2.b. Stupor Phase (MES induced convulsions)

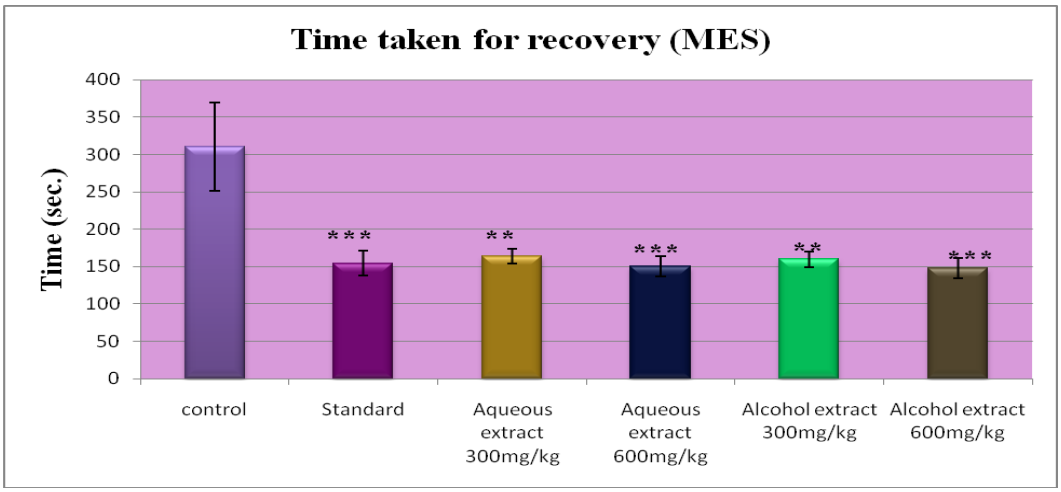

Fig. 2.c. Time taken for recovery (MES induced convulsions)

B. PTZ induced convulsion method

Aqueous extracts of roots of *Hemidesmus indicus* (L.) R. Br. var. *pubescens* (Wt. & Arn.) Hook. f. at a dose of 300mg/kg possessed a significant ($p<0.05$)) reduction in the duration of straub's tail, aqueous extract at the dose of 600mg/kg and 300mg/kg of alcohol extract produced a very significant ($p<0.01$) reduction of the same. Alcohol extract at the dose of 600mg/kg exhibited an extremely significant ($p<0.001$) reduction in duration of straub's tail, comparable with standard drug diazepam. Aqueous and alcohol extract at the dose of 300mg/kg significantly ($p<0.05$) prolonged the onset of convulsion where as 600mg/kg of alcohol extract showed an extremely significant ($p<0.01$) prolongation of onset of action while the standard diazepam did not show any convulsions. Aqueous extracts at the dose of 300mg/kg and 600mg/kg showed a very significant ($p<0.01$) reduction in time for recovery whereas both the doses of alcohol extract (300 & 600mg/kg) showed an extremely significant ($p<0.01$) reduction in time for recovery when compared with the control.

Table 3:- Anti-epileptic activity of aqueous and alcoholic extracts of roots of *Hemidesmus indicus* (L.) R. Br. var. *pubescens* (Wt. & Arn.) Hook. f. on PTZ induced convulsion in mice.

Groups-Treatment	Straub's tail (in sec.)	Onset of convulsion (in sec.)	Time taken for recovery (in sec.)	Lethality
Control PTZ (70mg/kg)	39 ± 9.158	103 ± 28.0	1332 ± 128.25	0/6
Standard– Diazepam (4mg/kg) + PTZ (70mg/kg)	1.83 ± 0.60***	0.0 ± 0.0***	0.0 ± 0.0***	0/6
Aqueous extract (300mg/kg) + PTZ (70mg/kg)	18.16 ± 2.6*	176.6 ± 8.635*	946 ± 74.81**	0/6
Aqueous extract (600mg/kg) + PTZ (70mg/kg)	14.83 ± 1.45**	191.0 ±23.096**	874 ± 68.09**	0/6
Alcohol extract (300mg/kg) + PTZ (70mg/kg)	15.0 ± 1.095**	174.0 ± 8.234*	765.0 ± 30.74***	0/6
Alcohol extract (600mg/kg) + PTZ (70mg/kg)	13.167 ± 0.91***	206.33 ± 9.240***	680 ± 39.33***	0/6

n= 6 animals in each group. Values expressed as Mean ± SEM

* p< 0.05, ** p< 0.01, *** p< 0.001 Vs control.

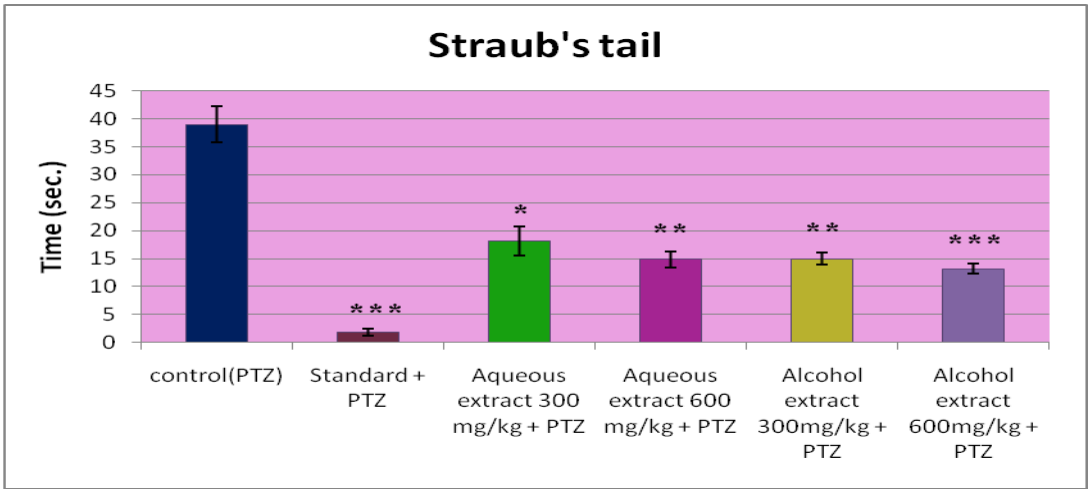

Fig. 3.a. Straub's tail (PTZ induced convulsions)

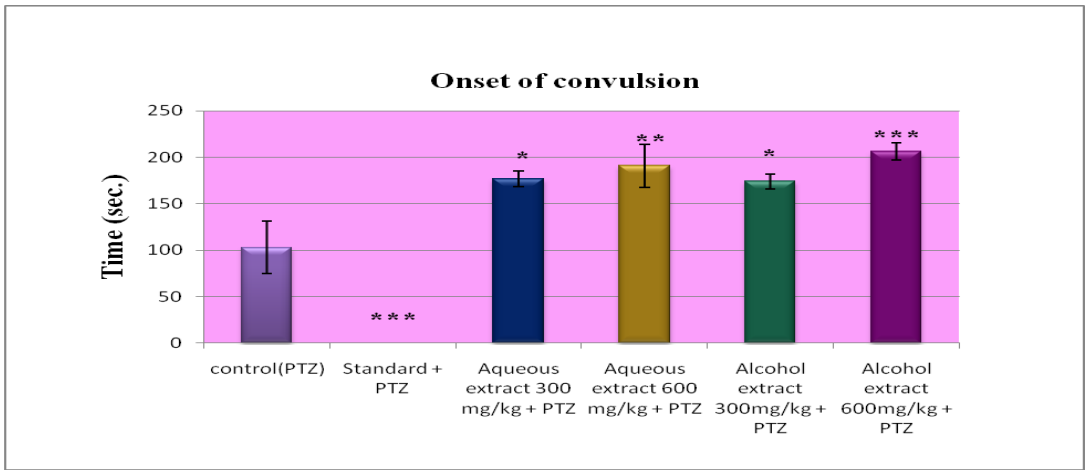

Fig. 3.b. Onset of convulsion (PTZ induced convulsions)

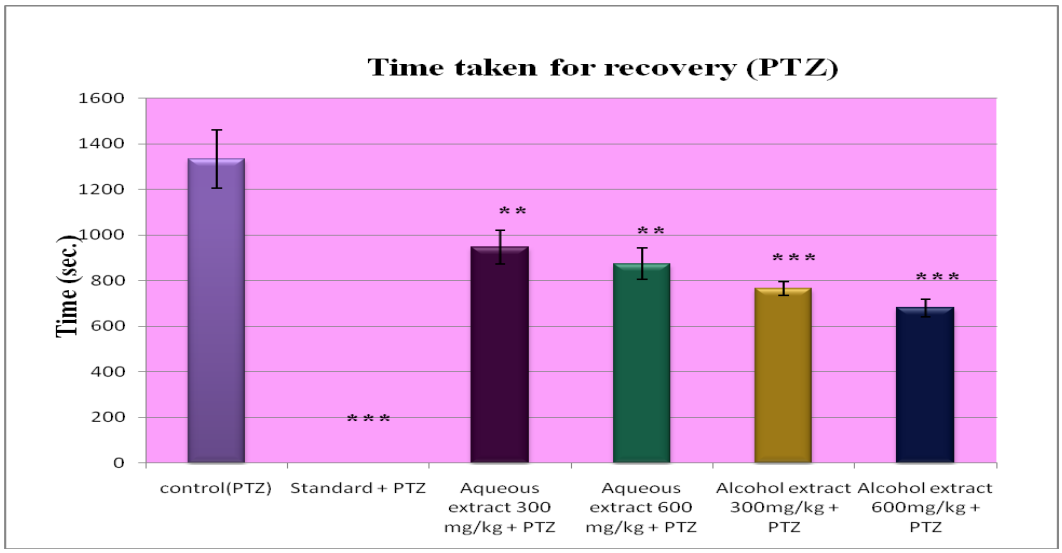

Fig. 3.c. Time taken for recovery (PTZ induced convulsions)

DISCUSSION

Acute toxicity studies help to evaluate the drug's acute toxic effect and to determine minimum lethal dose. The aqueous and alcoholic extracts of *Hemidesmus indicus* (L.) R. Br. var. *pubescens* (W. & A.) Hook. f. were safe up to a dose of 2000 mg/kg and was considered non toxic.

Antipyretic activity

The aqueous and alcoholic extracts at a dose of 200 and aqueous extract at a dose of 400 mg/kg exhibited significant antipyretic activity within 30 min. of drug administration which was comparable with standard drug paracetamol, where as alcohol extract at the dose of 400 mg/kg showed an extremely significant ($p<0.001$) antipyretic activity. The alcoholic and aqueous extracts at a dose of 200mg/kg exhibited ($p<0.01$) reduction in body temperature at the 5^{th} h in a dose dependent fashion.

Antiepileptic activity

In MES induced convulsions the alcohol extract and aqueous extract reduced the duration of extensor phase, stupor and recovery time in a dose dependant fashion and the results were comparable with standard drug phenytoin. Similarly both extracts exhibited a significant reduction in the duration of straub's tail, delayed the onset of convulsions and reduced the recovery time in PTZ induced convulsions in a dose dependant manner.

Phytoconstituents like alkaloids, carbohydrates, terpenoids, triterpenic steroids, triterpenoidal saponins, sterols, β-sitosterol, phenolic compound and tannins are reported to be responsible for antipyretic and antiepileptic properties possessed by *Dicliptera verticillata.*[21] *Wattakaka volubilis.*[23] *Ipomoea Aquatica.*[26] *Carissa carandas.*[27] *Glycyrrhiza glabra.*[28] and *Morinda citrifolia.*[30] In the present investigation, preliminary phytochemical analysis revealed the presence of alkaloid, carbohydrates, phytosterols, phenolic compounds and tannins, volatile oil, gums and mucilage, which may be responsible for both antipyretic and antiepileptic activities. The present study was an attempt to explore the antipyretic and anti epileptic activity of *Hemidesmus indicus* (L.) R. Br. var. *pubescens* (W. & A.) Hook. f. The alcohol and aqueous extracts of the roots of *Hemidesmus indicus* (L.) R. Br. var. *pubescens* (W. & A.) Hook. f. showed a significant antipyretic activity and exhibited a significant protection against seizures induced by maximal electro shock and pentylenetetrazole.

CONCLUSION

Since *Hemidesmus indicus* (L.) R. Br. var. *pubescens* (Wight. & Arn.) Hook. f. exhibits antipyretic and antiepileptic activities similar to that of *Hemidesmus indicus* (L.) R. Br. var. *indicus* which is the accepted botanical source of the drug Sariva in Ayurveda, *Hemidesmus indicus* (L.) R. Br. var. *pubescens* (Wight. & Arn.) Hook. f. may be used as a good substitute for *Hemidesmus indicus* (L.) R. Br. var. *indicus* as far as the antipyretic and antiepileptic activity are concerned.

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