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ORIGINAL ARTICLE

Central Nervous System Related Studies on *Soymida febrifuga* (Roxb.) A Juss.

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ABSTRACT
Traditional medicines are a key component of primary health care as they are efficacious, consistent, and sustainable, one among them which has gained prime interest is Soymida febrifuga , belonging to family Meliaceae is a versatile herbal plant. In the present research bark of S. febrifuga was Soxhlet extracted using solvents like ethanol, Petroleum ether, chloroform and distilled water based on the polarity. Further, these extracts were examined for their potential to influence CNS by evaluating the related activities such as sedative hypnotic, locomotors, anticonvulsant, local anesthetic activities. The alcoholic extract was further subjected to toxicity test to standardize the safe dose. The results revealed the locomotors and anticonvulsant capability of the extracts. Suggesting that, they may be able to act as CNS depressant and monitor seizures plausibly making them a viable alternative for CNS related disorders.
Key words: Soymida febrifuga , sedative hypnotic activities, locomotors activities, Anticonvulsant activities, local anaesthetic activities

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INTRODUCTION

Central nervous system diseases are a global burden with escalating rates of mortality and morbidity in the world. Since the modern medications are thought to have unfavorable side effects, there is an urgent need to examine newer, more dependable ways to curb the circumstance. Natural alternative, especially plants have stirred up substantial attention as they are resourceful, conventional and are corroborated by the indigenous medicinal method. Although, plants have long been used for their pharmacological implements but their involvement in the area of neuropharmacological practices have generated far less publicity [1].

Soymida febrifuga (Roxb.) A Juss. also known as *Swietenia febrifuga* Roxb belongs to family Meliaceae. They are commonly distributed in forests of Deccan from Kurnool, Mysore and hills of Chinglepet and hilly districts of North West and central India. They are a large tree of 20 mt height; greyish green leaves, leaf rachis 25 cm long, leaf lets 8-10, ovate or obovate, obtuse at apex, coriaceous; panicle equalling the leaves; calyx lobes ovate; sparsely pubescent; petals obovate, slightly fimbriate; ovary glabrous; capsule obovoid; seeds oblong, flattened. Based on the population decline, habitat destruction and other factors, it is categorized under the threat status as Lower Risk [2]. In Ayurvedic system the powdered bark is given to cure fever, tridosha, diarrhoea, dysentery [3]. Bhavamishra (1550) in his treatise mentioned the use of *S. febrifuga* for tridosha, wound healing and for fractures. Further the various pharmacological activities includes; anti-oxidant [4], anti-diabetic [5], anti-microbial [6], anti-inflammatory [7] hepatoprotective activity [8], anti-cancerous [9].

Taken together, the present study investigates the pharmacological evaluation of *S. febrifuga* on the central nervous system by assessing its properties such as sedative hypnotic, locomotors, anticonvulsant, local anaesthetic activities. Further, is acute toxicity was evaluated to determine the safe dose.

MATERIAL AND METHODS

Plant material

Plant was collected from wild and the identity was confirmed with the help of flora and the voucher specimen deposited at the Herbarium of Gulbarga University Gulbarga. Three collected specimen were dried in the Tray drier and made into a herbarium with all details of collection entered on the label of Herbarium sheet and deposited in Herbarium of Gulbarga University, Gulbarga with Voucher specimen no.HGUG-574.

Extraction of plant sample

Crude drug was extracted in Soxhlet extractor using solvents like ethanol, Petroleum ether, chloroform and distilled water based on the polarity. Extraction process was continued till the extract decolorized. The extract was evaporated to dryness in a vacuum desiccator. Dry powder was dissolved in distilled water and gum acacia is used as an inert carrier material.

Experimental animal

Totally 24 mice of either sex weighing between 25-30 g were selected and divided into 6 groups of 4 animals each. First 4 groups were treated with various extracts of plants, at 0 min after administering the drugs, retested individual mouse to record the activity. The difference in the activity before and after administration of the drug was noted. Further, rabbits selected and were divided into 2 groups of 5 animals each where one group was treated with the drug and the other behaved as control. The research complied with Ethics Committee on Animal Experiment.

Pharmacological studies

- **Acute Toxocity:**

Twenty five albino mice were divided into 5 groups of 5 animals each. These animals were fasted for 24 hrs prior to the experiment. Animals of group I-V received 400, 800, 1200, 1600 and 2000 mg/kg of the ethanolic extract respectively. The animals were observed at regular intervals for 24 hrs to see the acute effect of the crude drugs and reading after 60 min. of administration was recorded [10].

- **Sedative hypnotic activity**

The group I-IV of mice 200 mg/kg b.w. of drugs were administered, V group is supplied with vehicle control gum acacia and the VI group is administered with pentobarbital. The righting reflex (sleeping on its back) was observed and the recovery was also noted [11].

- **Locomotor activity**

Group I-IV was treated with Petroleum ether, chloroform, ethanol (95%) and distilled water extracts respectively. Group V was treated with control (Gum acacia) and Group VI with standard chlorpromazine HCl. Each mouse was individually placed in the activity cage for 10 min and the basal activity as well as the activity after administration of drug was tabulated [12].

- **Anticonvulsant activity**

MES seizures were induced by electro convulsometer (Techno made-60 mA, 0.2 Sec) and phenyton Na was used as a Standard and dose of 200 mg/kg of various extracts was administered. Presence or absences of reduction in extensor tonic convulsive activity in the hind limb (HLTE) during the seizures were observed [12].

- **Local anaesthetic activity:**

The drug (10 mg/ml) was administered into the conjunctiva of the eye and studied the corneal reflex to the pointed object and observations were made at the interval of 10 minutes. Only water extracts were used for this test, the organic solvent extracts were not tested since they may cause damage to cornea [13].

RESULT AND DISSCUSION

- **Acute Toxocity:**

Safety and adverse effect of drug were assessed using acute toxicity studies. In the present study alcoholic extracts of the whole plant of different concentrations ranging between 400 to 2000 mg/kg body weight were found non-toxic and safe. It is evident by the survival of all the animals tested over a period of 24 hrs. However, the cage side observations revealed the CNS depressant activity on the animals as they were lethargic in behavior, the leg movement was normal but no observable effect on autonomous nervous

- **Sedative hypnotic activity:**

When righting reflex study was made the animals did not respond positively and the animals were normal and active indicating the absence of sedative hypnotic activity on the animals.

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- **Locomotor activity:**

The various extracts of *S. febrifuga* have shown the significant reduction in locomotor activity when ethanolic (63.09%) and distilled water extracts (54.60%) were given to mice as compared to the reduction in locomotor activity by the standard drug (51.37%). The chloroform extract (44.44%) showed moderate reduction in the activity of mice as compared to very less locomotor activity of petroleum ether extract (Table 1).

Table-1: Locomotor activity of various extracts of *S. febrifuga*

Sl. No.	Drug tested	Dose mg/kg (oral)	Avg. of Locomotor activity in 10 min.		% change in activity
1.	Petroleum ether extract	200	324	240	25.9
2.	Chloroform extract	200	324	180	44.44
3.	Alcoholic extract	200	336	124	63.09
4.	Distilled water extract	200	326	148	54.60
5.	Vehicle control (Gum acacia)	5 ml	412	402	2.427
6.	Standard chlorpromazine HCl	100 mg	436	212	51.376

- **Anticonvulsant activity:**

Among the 4 different extracts of *S. febrifuga* the mild protection against MES induced seizures is observed in ethanolic (95%) and distilled water extracts with the recovery period of 51 and 56 sec respectively. Whereas, very less protection was observed in petroleum ether extract with the recovery period of 80.5 seconds and in chloroform extract the activity is almost negligible or absent with 98 sec as compared to the recovery period of standard phenytoin Na with 35 seconds (Table 2).

Table 2: Showing anticonvulsant activity of *S. febrifuga*

Sl. No.	Drug tested	Dose mg/kg	Avg. time recorded in sec. in various phases of convulsion and recovery			Died/ Total
			Flexion	Extensor	Recovery	
1.	Petroleum Ether extract	200	2.4	9.0	80.5	0/4
2.	Chloroform extract	200	2.6	9.8	98.0	0/4
3.	Alcoholic extract	200	2.4	6.4	51.0	0/4
4.	Distilled water extract	200	2.4	6.2	56.0	0/4
5.	Control (Gum Acacia)	5 ml	2.6	10.4	126.0	4/4
6.	Standard phenyton Na	100 mg	2.0	3.5	35.0	0/4

- **Local anaesthetic activity:**

The rabbit's right eye was subjected to distilled water extract of *S. febrifuga*, the untreated left eye served as a negative control, and blinking of the eye when a cotton swab was placed near the cornea demonstrated a positive response, implying that the drug in study had local anaesthetic activity. When compared to the standard medication Procaine, the sample showed a negative result (table 3).

Table-3: Local anesthetic activity of *S. febrifuga*

Sl. No.	Drugs tested	Dose mg/ml	Local anaesthetic activity after		
			10 min	20 min	30 min
2.	Distilled Water extract	10	-ve	-ve	-ve
3.	Standard Procaine	1% w/v	+ve	+ve	+ve

Aboriginal medicinal plants and plant-derived medicines are promising alternative medicine sources that are widely used to treat a variety of health problems. Among them, *S. febrifuga* have exhibited wide range of therapeutic properties [14]. In the present study effects of various extracts of *S. febrifuga* have been evaluated for their potential to persuade the central nervous system. The acute toxicity studies revealed that the drug is safe up to 2000 mg/kg body weight. The drug exhibited negative relation to sedative hypnotic and local anaesthetic activity on the animals. The drug operated as an anticonvulsant agent suggesting that they could suppress seizures which could act as an effective alternate therapy in management of epilepsy. Further the locomotor activity infers that they have an influence on the CNS acting as a CNS depressant.

CONCLUSION

The growing numbers of psychiatric and neurologic disorders have propelled us in finding an effective and a safer alternative. Plants have always been perceived as bio-reservoirs with potential medicinal value. In the present study neuropharmacological profile of *S. febrifuga,* revealed them as a potent anticonvulsant agent and as a CNS depressant. Further, insights about the precise phytoconstituent responsible for this action will provide us with better understanding.

CONFLICT OF INTEREST

The authors declare that they have no conflict of interest.

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