

# Psychopharmacological studies on the stem of *Saccharum spontaneum*

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**ABSTRACT & INTRODUCTION:** *Saccharum spontaneum* Linn. ; Synonyms , Ahlek, loa, wild cane, wild sugar cane, Family: Poaceae. This occurs throughout India along the sides of the river and tropics of old world, it is widely distributed in Andhra Pradesh, Vellore district in Tamilnadu. It grows as waste land weed. It is considered as valuable medicinal herb in traditional systems of medicine in India. It is popular folk medicine. The rural people in Vellore district of Tamilnadu and Andhra Pradesh are used fresh juice of the stem of *Saccharum spontaneum* plant to the treatment of mental illness and mental disturbances by the vaidhiyars. For this all reasons we take a plant to bring out an official manner by the through investigation on this plant such as pharmacognostical, phytochemical and psychopharmacological studies the stem of *Saccharum spontaneum* Linn. The whole plant according to siddha the whole plant used to diseases of vatam and pittam, vomiting, mental diseases, abdominal disorders, dyspnoea, anaemia, and obesity. The root according to ayurveda roots are sweet, astringent, emollient, refrigerant, diuretic, lithotriptic, purgative, tonic, aphrodisiac and useful in treatment of dyspepsia, burning sensation, piles, sexual weakness, gynecological troubles, respiratory troubles etc. The stems (culm) are useful in vitiated conditions of pitta and vata burning sensation strongly, renal and vesicol calculi dyspepsia, haemorrhoids, menorrhagia dysentery, agalactia phthisis and general debility. Leaves are employed for broom (cathartic and diuretics). It possess strong Allelochemicals and Allelopathic properties. Hence it may an absolute necessity to create a profile in regards to create a profile in regards to their identification and then Standardisation which may lead to further scientific investigations<sup>1,2,3,4,5,6,7,8,9,10</sup>. This paper encompassess some of the pharmacognostical investigations carried out on the leaves of one of the species namely *Saccharum spontaneum*. The assignment such as macroscopy, anatomical studies, micro measurements and preliminary phyto chemical screening were performed since the species was not noted for its pharmacognosy and bioactivity in the past. The perusal of literature also revealed that no pharmacological, phytochemical and limited pharmacognostical work had been on the plant of *Saccharum spontaneum* Linn. But the rural people in Vellore district of Tamilnadu and Andhra Pradesh are used fresh juice of the stem of *Saccharum spontaneum* plant to the treatment of mental illness and mental disturbances by the vaidhiyars. For this all reasons we take a plant to bring out an official manner by the through investigation on this plant such as pharmacognostical, phytochemical and psychopharmacological studies the stem of *Saccharum spontaneum* Linn.

## MATERIALS AND METHODS

### Plant materials

The plant *Saccharum spontaneum* is widely found throughout India. They found along the sides of the river. For our project work the plant *Saccharum spontaneum* was collected from Ponnai which is about 35 km away from Vellore. The plant was identified by Dr.P.Jayaraman Ph.D., a director of plant Anatomy Research Centre who authenticated the plant the available literature. The fresh plant material stem was collected and cut into small fragments and shade dried. Then dried plant material was powdered by using mixture grinder, and sieved by using sieve No 60. Then the final uniform powder was used for the extraction of active constituents of the plant.

### Preliminary phyto chemical screening<sup>11,12,13,14</sup>

The preliminary phytochemical screening investigations show the presence of quinines, alkaloids, tannins, carbohydrates, protein, coumarin, phenol, steroid and glycosides.

### Central nervous system depressant activity<sup>15,16,17</sup>

#### Procedure

The study was carried out in rats (200-250gm) in 4 groups. Turn on the equipment Actophotometer (check and make sure that all the photocell are working for accurate recording) and place individually each rat in the activity cage for 10 min. Note the basal activity score of all the animals. In this experiment the rats were divided into 4 groups (n=6). Group I was the control, which received 0.5ml of saline. Group 2,3 and 4 receive plant extract in doses 1gm/kg body weight of chloroform, ethanol and aqueous extract respectively. These were administered orally and after 30 mins re-test each rat for activity scores for 10 mins. Note the difference in the activity before and after administration of plant extracts. Calculated percent change in motor activity by following formula=

$$\frac{\text{Before treatment} - \text{after treatment}}{\text{Before treatment}}$$

Before treatment

### Anti psychotic activity by amnesic effect (Loss of Memory)<sup>18,19</sup>

#### Procedure

Male wistar rats weighing 150 gm were used, the training and testing of rat was conducted in the Pole-climbing apparatus, which has as floor that acts as a source of shock. In the centre of the roof there is a wooden pole.

The animals were trained as follows,

1. Press the buzzer
2. Shock of 20 v was delivered to the floor grid

3. The animal was trained to climb the pole to avoid shock.
4. This was repeated until the animals learned to climb the pole soon after hearing the buzzer even without receiving the shock (learned memory). Such rats which climb the pole within 3 secs after pressing the buzzer were chosen for this study.

### Treatment protocol

They were divided into 4 groups each with six animals. Group I trained rats. Group 2 received trained rats and ethanol extract (1g/kg), Group 3 trained rats and Aqueous extract (1g/kg), Group 4 received trained rats and chlorpromazine (3mg/kg) treated rats.

The same procedure was repeated after treatment with chlorpromazine and extracts. The basal reaction time to reach the pole was noted.

## RESULTS AND DISCUSSION

Reduction in the motor activity indicates C.N.S. depressant property of the drug. The locomotor activity of normal rat animal shows the C.N.S. depressant activity (6.53%). The ethanol extract shows the 10 times (62.0%) more activity than the control. Where as other extract like Aqueous extract (21.9%) shows the 4 times more activity and chloroform extract shows the 2 times (10.0%) more C.N.S. depressant activity than the control. The Ethanol and Aqueous extract of *Saccharum spontaneum* must have a significant C.N.S. depressant activity than chloroform and aqueous extracts when compared to control. (Table 1)

The results showed basal reaction time is delays which indicates antipsychotic activity. The aqueous extract of *Saccharum spontaneum* delays the latency to climb the pole ( $5 \pm 0.96$ ) as compare to the control group of rats ( $3 \pm 0.57$ ). The ethanol extract of *Saccharum spontaneum* delays the latency to climb the pole ( $4 \pm 0.76$ ) which compared to the control groups of rats ( $3 \pm 0.57$ ). The above extracts shows the antipsychotic activity but is less when compared with standard drug of chlorpromazine. (Table 2).

## CONCLUSION

The psycho pharmacological study of the ethanol extract has significant CNS depressant activity and aqueous extract has mild antipsychotic activity. It derives that alkaloids, tannins, steroids and glycosides are present in the extract which may possibly responsible for the psychopharmacological action. Further studies to confirm the antipsychotic activity with varying dose level and with varying acute models will suggest the mode of action.

**TABLE 1: C.N.S DEPRESSANT ACTIVITY  
EVALUATION OF LOCOMOTOR ACTIVITY OF RAT USING ACTO PHOTOMETER**

OBSERVATIONS		TREATMENT	DOSE gm/Kg	LOCOMOTOR ACTIVITY (SCORES) IN 10MIN		
S.No	Body Weight			Before Treatment	After Treatment	% Change in Activity
Group I	200-250gm	Control	0.5ml Saline	260 ± 1.13	243 ± 1.69	6.53(↓)
Group II	200-250 gm	CHCl <sub>3</sub> Extract	1gm/Kg	218 ± 0.97	196 ± 1.89	10.0(↓)
Group III	200-250 gm	Ethanol Extract	1gm/Kg	268 ± 1.93	103 ± 2.94	62.0(↓)
Group IV	200-250 gm	Aqueous Extract	1gm/Kg	302 ± 0.97	236 ± 1.97	21.9(↓)

Note: ↓=C.N.S Depressant Activity.

**TABLE 2: ANTYPHYCHOTIC ACTIVITY BY AMNESIC EFFECT STUDY**

S.No	Treatment	Dose/Kg	Basal Reaction Time(Sec)	
			Before Treatment	After Treatment
1	Group I Control	0.5 ml Saline	3 ± 0.71	3.0 ± 0.57
2	Group II Ethanol Extract	1gm/Kg	2.0 ± 0.68	4.0 ± 0.76
3	Group III Aqueous Extract	1gm/Kg	2.0 ± 0.56	5.0 ± 0.96
4	Group IV Chlorpromazine	3 mg/Kg	3.0 ± 0.48	15 ± 3.0

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