

Research Article



Pharmacological Evaluation of *Sesbania grandiflora* linn in Alcohol Withdrawal Syndrome in Rats.

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ABSTRACT

The aim of present study is to evaluate alcohol withdrawal symptoms with leaf extract of *Sesbania grandiflora* Linn. The alcohol withdrawal syndrome is a group of symptoms observed in persons who stop consumption of alcohol. Milder forms of the syndrome include tremulousness, seizures, and mental confusion. In chronic alcoholism associated with delirium tremens, involves, hallucinations, and affect the autonomic nervous system over activity. The induced alcohol dependence in mice by the administration of oral dose of ethanol (2g/Kg) 10% v/v once a daily for seven days alcohol withdrawal syndrome are evaluated by of both locomotor activity using actophotometer and anti depression activity with forced swim test. Evaluation of locomotor activity of *Sesbania grandiflora* Linn extract (100 and 200 mg/kg) and imipramine (15mg/kg) were studied by observing its effect on actophotometer. This exhibited slight increase in locomotor activity when compared with the positive control animals that received ethanol. For antidepressant activity the extract (200 mg/kg) was found to be effective and it exhibited activity similar to that of the standard drug of imipramine.

Keywords: *Sesbania grandiflora* Linn, Locomotor activity, Antidepressant activity.

INTRODUCTION

Alcohol withdrawal is the when a person suddenly stops drinking after a chronic consumption of alcohol use. Alcohol has a slowing effect on the central nervous system and over time, the brain adjusts its own chemistry to compensate for the effect of the alcohol. The alcohol withdrawal affects the autonomic nervous system leads to hyperactivity, seizures, mental confusion with Anxiety and followed by depression¹. Depressive symptoms observed in patients who are intoxicated or undergoing alcohol detoxification. As many as 17% of alcoholics are at the risk for death by suicide^{2,3}.

Alcohol dependence patients were seen often by physicians, occurring in 10% to 20% of primary care and hospitalized patients. The social, economical, psychological and physical problems associated with alcoholism may lead to the development of depressive disorders. This finding may be attributable to the release of behavioral changes and associated with alcohol intoxication or with the depressive feeling state. Anxiety and depression and mental confusion also thought to the most important negative impact of revert to the alcohol use. The CNS depressant like barbiturates and alcohol reduce the motor activity in other words, the locomotor activity can be an index of wakefulness of mental activity⁴.

The aims of detoxification or treatments are to give safe withdrawal from alcohol and enable the patient to become alcohol free. Prepare the patient for ongoing treatment for their dependence on alcohol. *Sesbania grandiflora* Linn (Family: Fabaceae) is an indigenous medicine in India, It is also known as "Agati Sesban" or

"humming bird tree" in English. *sesbania grandiflora* Linn is a small tree that grows up to 8-15 m tall and 25-30 cm in diameter⁵⁻⁷. Plants have been used for food substance human because of its health benefits Ethno botanical study suggests its use in headache, swellings, anemia, bronchitis, pains, liver disorders and tumors. Traditionally, its fruits are used for anemia, bronchitis, fever and tumors. Experimentally, it exhibits significant antioxidant effect against alcohol and polyunsaturated fatty acid-induced oxidative stress models in experimental animals⁸⁻⁹.

MATERIALS AND METHODS

Plant material

Fresh leaves collected from gingeer villupuram dist tamil nadu and authenticated by Dr. A. Balasubramanian. ABS botanical garden yercaud specimen number AUT/PUS/078 the herbarium was submitted to department of pharmacognosy for further reference.

Extraction

The fresh leaves are shade dried, with help of dry mechanical grinder, size separation done by passing sieve number 60 and separated coarse powder. The powdered leaves were packed soxhlet apparatus extracted by using continuous hot percolation method. Extraction defatted with petroleum ether (60°C- 80°C). And extracted with methanol, the extracts were evaporated to dryness and perform phytochemical tests¹⁰.

Animals

Female Swiss albino mice weighing 20-25g were used for toxicity study. Albino Wistar rats of male sex weighing



200-250g were used for pharmacological study. They were housed in standard environment condition are maintain and fed with standard rodent diet with water and ad libitum.

Ethical clearance for the animal study was obtained from Institutional Animal Ethical Committee (09MP03AUG2009) of CPCSEA (887/ac/CPCSEA).

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Chemicals

Drugs and Chemicals Imipramine hydrochloride (Nicholas Piramal India Ltd) and Ethanol (95%v/v) were procured from Merck Ltd (India), Mumbai.

All drugs were dissolved in distilled water and administered either intraperitoneally (i.p.) or orally (p.o.). Distilled water was used as the vehicle.

Toxicity Study

An acute oral toxicity study was performed under guidelines of OECD 423. By Acute toxic class method female Swiss albino mice of about weighing 20-25gms were used for the study. Acute toxic class method is a stepwise procedure per step three animals each based on mortality or morbidity status of the animals. Average 2-4 steps may be necessary to allow judgement on the acute toxicity of the substance. Three animals were used for each step. The animals were placed individually and observed for any sign of toxicity, morbidity or mortality during the first 24hrs, with special given attention during the first 4 hours and daily for total of 14 days¹¹.

Experimental Design

Alcohol withdrawal syndrome Evaluated by locomotor activity and CNS depressant activity methods. The induced alcohol dependence in mice by the administration of oral dose of ethanol (2g/Kg) 10% v/v once a daily for seven days¹². The animals were then withdrawn from alcohol. The spontaneous locomotor activity of each rat was measured individually for 10 min using an actophotometer. Overnight fasting normal rats were divided into five groups each groups having six animals (n=6).

Group I: Received as normal control received water as vehicle.

Group II: Received as positive control received 10% v/v alcohol only.

Group III: Received Imipramine (15mg kg⁻¹ p.o.)

Group IV: a Received as 100 mg kg/1 methanolic extract of *Sesbania grandiflora* Linn.

Group V: Received as 200 mg kg/1 methanolic extract of *Sesbania grandiflora* Linn.

Forced swim test (FST)

The development depression when the rats are placed in an inescapable glass cylinder filled with water at

maintains 25°C reflects the cessation of persistent escape-directed behavior. The cylindrical container (diameter 10 cm, height 25 cm) was filled to a 19-cm depth. Duration of immobility during the 6-min test animals was scored¹³. Each rat was determined to be immobile when it ceased struggling and remained floating motionless in the water, making only those movements of animals were necessary to keep its head above water¹⁴.

RESULTS

The phytochemical screening of the methanolic extract of *Sesbania grandiflora* Linn revealed that presence of phytosteroids, tannins, flavonoids, carbohydrates, saponins, and amino acids tabulated table number 1. Evaluation of locomotor activity of *Sesbania grandiflora* Linn extract (100 and 200 mg/kg) and imipramine (15mg/kg) were studied by observing its effect on actophotometer.

This exhibited slight increase in locomotor activity when compared with the positive control animals that received ethanol. But the results were not much significant statistically. The (100 mg/kg only, p.o.) and imipramine-treated group exhibited statistically significant $**P < 0.01$, with control were considered as significance increase in locomotor activity, when compared with the positive control group animals that received the ethanol.

Table 1: Phytochemical Screenings of Methanolic Extract of *Sesbania grandiflora* Linn.

S. No	Biomarkers	Testing methods	Results
1	Flavonoids	Shinoda test	+
2	Tannins	Lead acetate test,	+
3	Carbohydrates	Molisch's test. Fehling's test.	+
4	Alkaloids	Dragendorff's reagent Mayer's reagent	-
5	Amino acids	Ninhydrine test	+
6	Phytosteroids	Salkowski reaction	+
7	Saponine	Foam test	+

+ indicating presence

- indicating Absence

Table 2: Effect of Methanolic Extract of *Sesbania grandiflora* Linn Animals in Locomotors Activity

S. No	Groups	Dose	Locomotors activity Mean \pm SEM
1	Normal Group	Distilled Water	333 \pm 1.690
2	Positive control group (Ethanol)	(2Mg/kg)	86.2 \pm 1.96
3	Standard group (Imipramine)	15mg/kg	320 \pm 1.38***
4	MESG	100 mg/kg	281 \pm 1.02**
5	MESG	200mg/kg	306 \pm 2.06**



The data were expressed as mean standard error mean (SEM). The significance of differences among the groups was assessed using one way analysis of variance (ANOVA). n = 6 test was followed by Dunnett's 't'-test, **P < 0.01, vs control were considered as significance.

Antidepressant Activity Forced swim test (FST)

The antidepressant effects of *Sesbaniya graniflora* Linn (100 and 200 mg/kg) and imipramine were studied by

observing the changes in the duration of immobility by Forced swim test (FST). In FST, *Sesbaniya graniflora* Linn extract 100 and 200 mg/kg, p.o. produced significant reduction in the immobility period when compared with that of positive control group animals that received only ethanol.

The extract (200 mg/kg) was found to be effective and it exhibited activity similar to that of the standard drug of imipramine (P < 0.001).

Table 2: Effect of ethanolic extract of *Sesbania grandiflora* Linn on animals in Forced swim test (FST)

S. No	Groups	Dose	Antidepressant activity Mean \pm SEM
1	Normal group	Distilled Water	133.55 \pm 9.38
2	Positive group. (Ethanol)	(2Mg/kg)	145.55 \pm 9.39
3	Standard group. (Imipramine)	15mg/kg	58.63 \pm 10.46***
4	MESG	100 mg/kg	75.22 \pm 8.19**
5	MESG	200mg/kg	60.84 \pm 5.82***

The data were expressed as mean standard error mean (SEM). The significance of differences among the groups was assessed using one way analysis of variance (ANOVA). n = 5 test was followed by Dunnett's 't'-test**P < 0.01, vs control were considered as significance.

DISCUSSION

Chronic and excessive ethanol consumption followed by withdrawal results in the development of abstinence syndrome. The most common and prominent feature of alcohol withdrawal is anxiety, which is also considered to the most important negative motivation to revert to alcohol use. These signs and symptoms of alcohol withdrawal have been attributed to the perturbation of central neurotransmitters and ion channel activity. Locomotors activity and muscle coordination are an index of alertness. Increase in motor activity is an indication of CNS antidepressant property. At a higher dose (200 mg/kg), the extract exhibits a stimulating effect. The antidepressant action of the extract at the higher dose (i.e. 200mg/kg) may be attributed to the presence of some constituents at an optimal concentration to reduce sedation and depression. Thus the methanolic extract showed positive result in the treatment of alcohol withdrawal syndrome in the case of locomotors activity.

CONCLUSION

Since ancient times, people have been using plants in various ways as a source of medicine. From the above preclinical study, we can conclude that methanolic extract of *Sesbania grandiflora* Linn show a significant antidepressant activity in alcohol withdrawal syndrome models of depression. We believe that *Sesbania grandiflora* Linn has the potential to be used as an

adjuvant in the treatment of depression and other mood disorders.

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