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Research Article

PSYCHOPHARMACOLOGICAL PROFILES OF *PERGULARIA DAEMIA (FORSK.) CHIOV*

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ABSTRACT

This study investigates about the preliminary phytochemical screening and psychopharmacological profile of the plant *Pergularia daemia (forsk.) Chiov*. Crude petroleum ether extract of *Pergularia daemia forsk. Chiov* (PDPE) was evaluated for different psychopharmacological profiles with various animal models in mice. The extract showed a significant decrease in exploratory behavioral pattern by the head dip and Y-maze test. It also showed a significant reduction in skeletal muscle relaxant activity by rotarod, 30 ° inclined screen and traction tests. The extract showed a remarkable potentiation of pentobarbitone induced sleeping time in mice. In the acute toxicity study the extract was found to be safe up to 1500mg/kg b.w. These results suggested that the petroleum ether extract showed significant decrease in CNS activity.

Keywords: *Pergularia daemia (forsk.) Chiov,* Asclepiadaceae, PDPE, Psychopharmacological activities.

INTRODUCTION

Pergularia daemia (forsk.) Chiov (Asclepiadaceae), commonly known as utaran (Hindi), Dustapuchettu (Telugu), Uttamarani (Sanskrit) is a slender, hispid, fetid smelling laticiferous twiner found in the plains throughout the hot parts of India. The plant *Pergularia daemia (forsk.) Chiov* is useful in the diseases of convulsion, Asthma and Poisoning. The root of *Pergularia daemia (forsk.) Chiov* is useful in mental disorder, leprosy and piles. Plant *Pergularia daemia (forsk.) Chiov* possesses Stomachic, Laxative and Diuretic Properties, useful in cough, biliousness and sore eyes. The juice of the leaves is given in asthma and applied to rheumatic swellings in combination with lime or ginger; it is also used in the preparation of medicinal oil given in rheumatism, amenorrhea, and dysmenorrhoea. Based on its traditional practices, therapeutic potentials such as analgesic, antibacterial, antioxidant, anti-inflammatory, antisecretory, antidiabetic, antifertility, cytotoxic, hepatoprotective and wound healing have been screened. Pergularia daemia was used by tribes in Madurai district of tamilnadu, India for the treatment of head ache. To substantiate this claim, effects of petroleum ether extract of the plant on various psychopharmacological profiles on the basis of potentiation of pentobarbitone sleep, general behavioral patterns, exploratory behavior and muscle relaxant activity on different experimental animal models were undertaken.

MATERIALS AND METHODS

Plant materials

The plant is widely found throughout India. For our project work the plant *Pergularia daemia (forsk.) Chiov* was collected from Papavinasanam hills near Tirupathi, chittoor (dist), Andhra Pradesh, India. The taxonomical identification of the plant was done by Sri Venkateswara University, Tirupathi, A.P. and a voucher specimen (2024) was preserved in our laboratory for future reference. 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 40. Then the final uniform powder is used for extraction using petroleum ether.

Preliminary phyto chemical screening

Extraction is done using petroleum ether using soxhlet apparatus. The preliminary phytochemical screening investigations show the presence of steroids, glycosides, saponins, tannins and alkaloids.

Plant extracts

Powdered plant materials were extracted using petroleum ether (60^0-80^0) in a soxhlet apparatus. The extraction was done until the extractive become colorless. The solvent was completely removed from marc in cases before the next extraction was carried out. The petroleum ether extract was then concentrated, dried under reduced pressure and a brown coloured residue was obtained (Yield 8.4% w/w with respect to the dry starting material). The crude petroleum extract was administered intraperitoneally at doses of 200 and 400mg/kg to the groups of animals under study. Diazepam at dose (10mg/kg) and Chlorpromazine (5 mg/kg) were used as standard for the activity. All the test materials (extracts) and standards were dissolved in tween 80 (2%v/v) for administration.

Animal

Swiss albino mice of either sex weighing between 30-40 gms were used. All the animals were acclimatized to the laboratory conditions for a week before experimental sessions. They were fed with standard animal feed and water *ad libitum*

Toxicity study

An acute toxicity study relating to the determination of the LD_{50} value was performed with different doses of the extract in albino mice as per the method described in Ghosh (1984).

GENERAL BEHAVIOURAL TESTS

The experiments on behavioral profile were performed by the method of Dixit and Varma (1976) and Mukherjee et al (1996). Adult Swiss albino mice were divided in to four groups of each containing 10 animals. The first two groups were administered with the petroleum ether extract of *pergularia daemia*, at different doses (200 and 400 mg/kg), the second group was treated with Chlorpromazine (5mg/kg, i.p) which served as standard, and the third group was treated with 2 % v/v aqueous Tween 80 (0.1 mL/10g) solution which served as a control group. The effects were observed at 30 minutes intervals in the first hour and at hourly intervals for next 4h for the following parameters (Mandal et al. 2001)

i) **Spontaneous activity alertness and awareness:**

These were evaluated by placing a mouse in a bell jar. It showed normal behavior.

ii) **Sound response:**

Mice normally utter no sound, so that vocalization may point to a noxious stimulus.

iii) **Touch response:**

It was noted when the animal was touched with a forceps (or) pencil at various parts (i.e.) on the side of the neck on the abdomen and on the groin it showed immediate response.

iv) **Pain response:**

This was graded by a small artery clamp attached to the base of the tail.

Potentiation of sodium pentobarbitone sleep

Adult albino mice were divided into three groups of ten. The extract (PEPD) at doses of 200 and 400 mg/kg and Tween80 2%/v (0.1 mL/10g), was injected intraperitoneally and 30 min later, with sodium pentobarbitone (40 mg/kg, body wt, i.p.). The sleeping time was noted by recording the interval between the loss and regaining of the righting reflex (Dandiya and Collimbine, 1959).

Exploratory behavior

(i) Head dip test

The animals (Adult swiss albino mice) were divided in to four groups (n=10) for the test. The mice were first administered injections (i.p) of either control vehicle 2% v/v aqueous Tween 80(0.1 mL/10g body wt.), diazepam (10 mg/kg body wt) or PEPD (200and 400 mg/kg body wt). Thirty minutes after injection, the mice were placed individually on a wooden board with 16 evenly spaced holes. The number of times they dipped their heads in to the holes during 3 minutes was counted. (Mandal etal., 2001).

(ii) Y-maze test

Adult albino mice were placed individually in a symmetrical Y-shaped runway (33*38*13 cm) for 3 minutes. The number of times a rat entered in arm of the maze with all four feet was counted as a single entry (Rushton et al., 1961). Experiments were conducted in groups of ten animals each for 30 minutes after the intra peritoneal injection of 2% v/v aqueous Tween 80 (0.1 mL/10g), PEPD (200 and 400 mg/kg body wt.) or diazepam (10 mg/kg body wt.).

Muscle relaxant activity

Rotarod test: Untreated mice were placed on a horizontal wooden rod (32 mm diameter) rotating at a speed of 5 rpm. Animals remaining on the rod for 3 minutes or more in three successive trials were selected for the experiment and were divided in to 4 groups of 10 animals each. The first two groups were administered with 2 % v/v aqueous Tween 80 (0.1 mL/10g) and diazepam (10mg/kg). The other 2 group were administered with different doses of PEPD (400 and 600 mg/kg). Then the animals were placed on the rod. The time taken for the mice to fall from the rotating rod was noted (Mandal et al., 2001).

Traction test

Forepaw of a mouse was placed on a small twisted wire rigidly supported above with a bench top. Normal mice grasped the wire with forepaws and when allowed to hang free, placed at least one hind foot on the wire within 5 sec. Inability to put up at least one hind foot constituted fail to traction (Rudzik et al.,). The test was performed in animals after injection of 2 % aqueous Tween 80 (0.1 mL/10g), PEPD (200 and 400 mg/kg) and diazepam (10 mg/kg) and the response were recorded.

30° inclined screen test

Male mice 15 minutes after intraperitoneal injection of either 2 % v/v aqueous Tween 80 (0.1 mL/10g) or PEPD (200 and 400 mg/kg) or diazepam (10mg/kg) were left on the screen for at least 4 h to observe whether the paralysant effect was severe enough to cause the mice to slide of the screen (Mandal et al., 2001).

RESULTS

Toxicity study

On the basis of the toxicity study, it was observed that the plant extract (PEPD) is non-toxic and caused no death in animals even upto an oral dose of 1500mg/kg body wt.

Effects on general behavioural profiles

The results are explained in Table 1. It was noted that PDPE affected spontaneous activity, sound, touch and pain responses at a doses of 200 mg/kg and above, producing mild/moderate depression in tests concerned with awareness and alertness when compared to control (2 % v/v aqueous Tween 80). However, Chlorpromazine (Std) produced more profound depression of responses in comparison with the PEPD.

Table 1. Effect of PEPD on general behavioral pattern (n=6)

Behvaior type	PEPD (200mg/ kg) b.w	PEPD (400mg/ kg) b.w	CPZ (400mg/ kg) b.w	Control (0.1mL/10gm)b.w
Spontaneous activity	++	+++	++++	0
Awarenes s	+	++	++	0
Alertness	++	+++	+++	0
Sound response	++	+++	++++	0
Touch response	++	+++	++++	0
Pain response	++	+++	++++	0

0-Noeffect. + - Slight depression. ++ - Moderate depression. +++ - Strong depression ++++ - Very strong depression. CPZ-Chlorpromazine. PEPD-Petroleum ether extract of pergularia daemia. Control- 2%v/v aqueous Tween 80

Potentiation of sodium pentobarbitone sleep

The extract (PDPE) showed significant potentiation in pentobarbitone induced sleeping time in mice at doses of 200 mg/kg and above when compared with controls (Fig. 1).

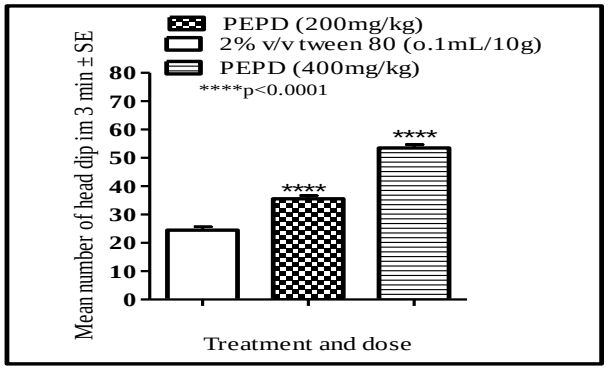

Fig 1: Effect of PEPD on Sodium Pentobarbitone- induced sleeping time (n=10). PEPD= Petroleum ether extract of *Pergularia daemia (forsk) Chiov.*

Exploratory behavioural effects

On the basis of the results obtained it was observed that there was a significant decrease in head dip responses in mice treated with PDPE 200 mg/kg and above compared with controls (Fig.2). In the Y-maze test, there was a decrease in the exploratory behavior of mice treated with PDPE at the doses of 200 mg/kg and above, compared with control (Fig. 3).

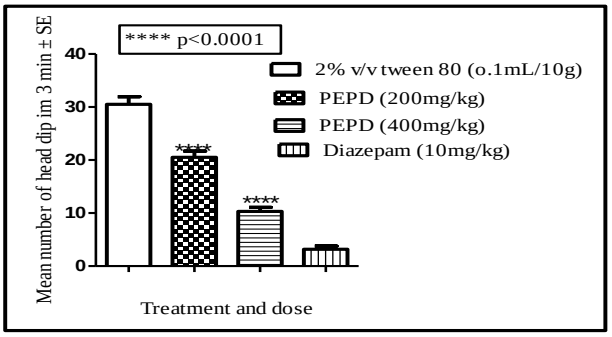

Fig 2: Effect of PEPD on exploratory behavior (Head dip test) n=10. PEPD= Petroleum ether extract of *Pergularia daemia (forsk) Chiov.*

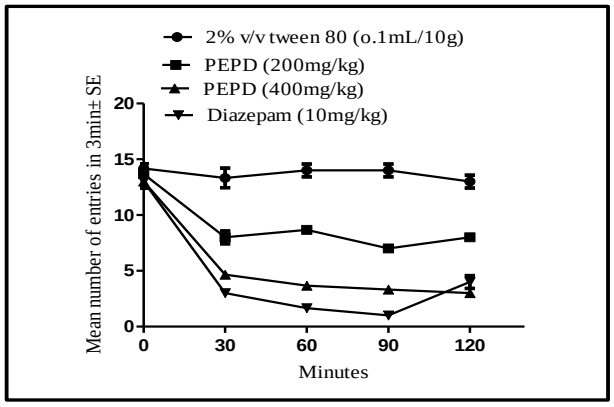

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Fig 3: Effect of PEPD on exploratory behavior (Y-Maze test) in mice. PEPD= Petroleum ether extract of *Pergularia daemia (forsk) Chiov.*

Effect on Muscle relaxant activity

From the results of the rotarod PDPE at doses of 200mg/kg and above produced significant loss in motor coordination in animals. The PEPD also produced a significant loss in coordination and muscle tone as evidenced from the 30° inclined screen test. The PDPE extract also produced a significant failure in traction (Table 2).

Table 2: Effect of PEPD on Muscle relaxant Activity

Treatment and dose	% of animals showing negative test		
	Traction test	30° Inclined test	Rotarod test
Control (2% v/v Tween80)	0	0	0
PEPD (200mg/kg)b.w	78.3*	63.8*	53*
PEPD (400mg/kg)b.w	67.2*	87.1*	69*
Diazepam(10mg/kg) b.w	100	100	100

Statistical signifiacance test for comparison of test with control was done using the chi-square test. *p<0.05, PEPD- Petroleum ether extract of *Pergularia daemia (forsk) Chiov.*

DISCUSSION

The experimental results obtained reveals that petroleum ether extract of the aerial part of *Pergularia daemia* appears to have effects on alteration in general behaviour patterns, evident from the spontaneous activity, sound, touch and pain responses.

The extract (PDPE) significantly potentiated the duration of pentobarbitone sodium-induced sleep in mice, suggesting probable tranquilizing action as well as CNS depressant action (Mukherjee et al., 1996; Fastier et al., 1957). The possible effects of PDPE were further examined on some other pharmacological models of psychoactive agent evaluation, e.g. exploratory behavior (head dip and Y-maze experiments), muscle relaxant activity (rotarod, 30° inclined screen and traction tests). Marked reduction of exploratory behavior pattern upon treatment with PDPE is in consistent with the actions known to occur with other CNS depressant drugs. In the experiment concerned with muscle relaxant activity, PDPE was found to produce significant loss in motor coordination and muscle tone. Hence, it can be concluded that the PEPD possess most of the characteristic activities of minor tranquilizers.

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