Ethnobotanical Leaflets 12: 490-493. 2008.

Locomotor Activity of Leaf extracts of *Pithecellobium dulce Benth.*

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Issued 13 July 2008

Abstract

Objective: To study Locomotor activity of aqueous and alcoholic extracts of leaves of *Pithecellobium dulce* Benth. Materials and methods: CNS depressant activity of leaf extracts of *P. dulce* was evaluated using actophotometer in albino mice. The potency of alcoholic and aqueous extracts of leaf was compared with that of chlorpromazine at a dose of 100mg / kg. The acute toxicity was determined using albino mice. Results: Both extracts caused significant CNS depression action in albino mice. The activity of alcoholic extract was more, when compared to chlorpromazine. Conclusion: CNS depression action of extracts may be due to increase in the concentration of GABA in brain.

Key Words: *Pithecellobium dulce*, Locomotor activity, Chlorpromazine, GABA.

Introduction

Pithecellobium dulce Benth. (Leguminosae)[1] is a small to medium sized, evergreen, spiny tree up to 18 m height, native of tropical America and cultivated throughout the plains of India and in the Andamans. It is known as Vilayati babul in Hindi and Kodukkapuli in Tamil. The bark of the plant is reported to be used as astringent in dysentery, febrifuge and it is also useful in dermatitis and eye inflammation. The leaves have been reported to possess astringent, emollient, abortifiacient and antidiabetic properties. A steroid saponin, lipids, phospholipids, glycosides, glycolipids and polysaccharides have been reported from the seeds[2-5]. The bark contains 37% of tannins of catechol type. Quericitin, kaempferol, dulcitol and afezilin have been reported from the leaves[6,7]. Roots have been reported to possess estrogenic activity [8]. Studies on alkylated resins from seed oil have been reported recently [9].

The present investigation was undertaken to study the CNS depressant activity of aqueous and alcoholic extracts of this plant in mice by using actophotometer and compared with that of chlorpromazine, a standard antidepressant agent.

Materials and Methods

Plant material

Pithecellobium dulce fresh leaves were collected from Sembulam Village at kancheepuram Dist.(Tamilnadu state , India) in the month of January 2005. The plant was identified by local people of that village and authenticated by Dr. P. Jayaraman, Director, plant anatomy research centre (PARC), chennai. A herbarium specimen of the plant was preserved (APCP-3/2005) in the Department of pharmacognosy of our Institute for further

reference.

Animals

Adult swiss albino mice (25-30g) of either sex maintained under standard condition (temperature: 23° ± 2°C, relative humidity: 55 ± 10% and 12 hr light and dark place) was used for the experiment comprising of six mice in each group. The animals were allowed standard laboratory feed and water *ad libitium.* Ethical clearance for performing the experiments on animals was obtained (Reg. No.409/ 2001/CPCSEA, India) from the Institutional Animal Ethics Committee (IAEC), adhiparasakthi college of pharmacy, Melmaruvathur.

Preparation of Aqueous and Alcoholic Extracts

The fresh leaves of *P. dulce* were washed with water, air- dried at room temperature and then reduced to coarse powder. The powdered mass of leaf was defatted with petroleum ether (60-80 c) followed by extraction with alcohol (95% v/v) and water. The extracts were filtered and the filtrates were concentrated under reduced pressure to obtain the extracts as solid residues. The freshly prepared extracts were chemically tested for the presence of different constituents using standard methods [10].

Gross Behavioural and Toxicity Studies

In acute toxicity study, swiss albino mice [11] of either sex weighing 20 – 25gm and of 90 days age were used to determine the dose. Animals were divided into 4 groups consisting of 6 animals, in each group. One group observed as a control. The extracts were suspended in 2% gum acacia and administered at concentration of 1000, 2000 and 3000 mg/kg orally via gastric catheter for remaining 3 groups. After administration of test samples, the animals were observed continuously for first four hours for behavioral changes (Behavioral, Neurological and autonomic response) and at the end of 24 hr, 48 hr and 72 hr for mortality, if any.

Screening of CNS Depressant Activity

The CNS depressant activity [12] of the extracts was evaluated by studying locomotor activity of mice using a actophotometer. In this method, Swiss albino mice of either sex (25 - 30 gm) were randomly distributed into four groups of six animals each. Animals of the first group were placed individually in the activity cage for 10 min and the activity was monitored. Then the animals were given chlorpromazine 3mg/kg, intraperitoneally and were tested again for activity 30 min after administration. The animals of the second and third group were treated with ethanol and water extract, respectively at a dose of 100 mg/kg, intraperitoneally and tested similarly. Percent decrease in activities were calculated for each animal using the formula, percent decrease in activity=$(1-W_a/W_b)X100$, where W_a and W_b are average activity scores after and before drug administration, respectively and average decrease in activity was calculated for all groups.

Statistical Analysis

The data were analysed [13] using student's 't' test (paired), where readings of the animals before drug administration served as control and the level of significance was set at $P<0.05$.

Results and Discussion

The fresh aqueous and alcoholic extract of *P. dulce* gave positive chemical reactions for glycosides, saponins, proteins, amino acids and flavonoids etc. No toxic symptoms were observed for the drug up to of

2000mg/kg body weight. So the dose of 100mg/kg was arbitrarily selected based on this toxicity study. It was found that, both extracts significantly depressed (Table 1) the locomotor activity at the tested dose level in mice. The activity was found to be maximum for alcoholic extract and minimum for aqueous extract. Further the activity of alcoholic extract was more when compared with chlorpromazine, a standard CNS depressant agent.

Table 1. Locomotor activity of leaf extracts of *Pithecellobium dulce Benth.*

Group	**Dose (mg/kg)**	**Locomotor activity (10 min)**		**% decrease in Activity**
		Before treatment	**After treatment**	
Chlopromazine	3	395.6 ±55.7	34 ± 5.8	89.50
Alcoholic extract	100	458 ± 123.2	63.3 ± 8.2*	93.30
Aqueous extract	100	315.3±26.2	43.3 ± 10.4	60.30

Values are expressed as a mean ±SEM ; $P^{*}<0.05$ vs control; n=6

Both extracts produced reduction in spontaneous motor activity, and this effect may be attributed to central nervous system depression, as depression of locomotor activity is common to most neuroleptics. The better CNS depressant activity of the alcoholic extract of *P. dulce* may be due to increase in the concentration of GABA in brain [14].Further studies on the exact chemical constituent responsible for CNS depressant activity is under investigation in our lab.

Acknowledgement

The authors are thankful to Arulthiru Bangaru Adigalar, President and Thirumathi V. Lakshmi bangaru Adigalar, Vice president, Adhiparasakthi College of Pharmacy, Melmaruvathur for providing necessary lab facilities to carry out this research work.

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