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ORIGINAL RESEARCH ARTICLE

The Central Nervous System Activity of *Barleria prionitis* Linn. on the Locomotor Activity of Swiss Albino Mice using Actophotometer

Amites Gangopadhyay*, Jadupati Malakar, Amitava Ghosh, Jyotirmoy Deb, Sanjay Dey, Supriya Datta, Prabir Kumar Datta

Bengal College of Pharmaceutical Sciences and Research, B.R.B.Sarani, Bidhannagar, Durgapur- 713212, West Bengal, India

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ABSTRACT

The aim of the present study was to investigate central nervous system (CNS) activity of the 70% ethanol extract of leaves of *Barleria prionitis* Linn (Acanthaceae) in Swiss albino mice. General behavior was studied using actophotometer. According to the study, it was observed that the test drug has the stimulant activity. But in comparison with the standard drug viz. Fluoxetine hydrochloride available in the market, the stimulant activity seemed to be less. Fluoxetine stimulant activity in the animals was fond to be 91.93% whereas the test drug stimulated the animal only by 49.72%. The results suggested that ethanol extract of *Barleria prionitis* exhibit antidepressant activity in tested animal models.

Key words: *Barleria prionitis* leaf extracts; Locomotor activity; Fluoxetine; Actophotometer.

INTRODUCTION

Over past few decades, the affinity towards the herbal drugs has been grown by utilization of traditional medicinal plant to heal some critical diseases and it is turning out to be better medicine with respect to synthetic drugs that assure numerous side effects for prolong treatment.

Barleria prionitis Linn. (Acanthaceae) is widely distributed throughout India, Sri Lanka, Africa and tropical Asia. The crude extract of this plant is commonly used in folk medicine to treat whooping cough. The plant extract has also shown its potential applications as diaphoretic and expectorant. The plant has also shown anti-respiratory syncytial virus, anti-arthritic, anti-inflammatory and anti-fertility activities. In Ayurveda the leaves and the tender branches are used for treatment of toothache, strengthening of gums, whooping cough and premature ejaculation. Whole-plant extracts of porcupine flower contain iridoid glycosides, barlerin and verbascoside, which have shown potent activity against respiratory syncytial virus *in vitro* and may account for the plant's use in treating fever and several respiratory diseases in herbal medicine [1].Most of the central nervous system acting drugs influence the locomotor activities in man and animals. The CNS depressant drugs such as barbiturates and alcohol reduce the motor activity while the stimulants such as caffeine and amphetamine increase the activity. In other words, the locomotor activity can be an index of wakefulness (alertness) of mental activity.[2-3] The locomotor activity (horizontal) can be easily measured using an actophotometer which operates on photoelectric cells which are connected in circuit with a counter. When the beam of light falling on the photocell is cut off by the animal, a count is recorded. An actophotometer could have either circular or square arena in which the animal moves. Both rats and mice may be used for testing in this equipment. [4-5] In this investigation, we aimed to prepare 70 % ethanol extract of leaf of selected plant that was compared with Fluoxetine hydrochloride as standard and tween 80 as control for CNS stimulant activity on Swiss albino mice.

MATERIALS

The plant has been collected from the forest of Ichharia village, Bankura, West Bengal, India and has been authenticated by B.S.I., Shibpur, Howrah, West Bengal, India. Fluoxetine tablets were purchased from local market. Tween 80 was purchased from Merck specialty Pvt. Ltd. Swiss Albino mice were used for this experiment. All others chemical used were analytical grade.

***Corresponding Author:** Amites Gangopadhyay**, Email:** amites9@rediffmail.com

METHODS

Preparation of ethanolic extracts

The leaves were carefully washed under running tap water followed by sterile distilled water. These were air dried at room temperature (45^0C) for five days and pulverized to a fine powder using a sterilized mixer grinder and stored in air-tight bottles. Then the leaf powder extracted with 70% ethanol. After filtration of total extracts, the extracts were evaporated to dryness in vacuum.

Procedure for determination of CNS stimulant activity[4-5]

The animals were divided into three (3) groups and each group of animal contained five (5) animals. Weigh the animals and numbered them accordingly. Among the three groups, the first group was injected Tween-80 and after 30 min, the locomotor activity of each animal was noted by actophotometer (Digital actophotometer, Bluefic Industrial and Scientific Technologies) for 10 min. The second group was injected Fluoxetine hydrochloride (Dose: 2mg/kg) and after 30 min, the locomotor activity was observed for 10 min. *Barleria prionitis* leaf extract (70% ethanol extract) was injected into the third group and the locomotor activity scored for 10 min. The animal study was approved by institutional ethical committee of Bengal College of pharmaceutical Sciences and esearch.

Calculation of % CNS stimulation

The CNS stimulation in terms of per cent (%) can be determined by using the following formulas:

a) % CNS stimulation of standard drug = (S - C/C) × 100 %,

Where S is the mean value standard drug and C is the mean value of control.

b) % CNS stimulation of test drug (ethanol extract) = (T - C/C) × 100 %,

Where T is the mean value test drug and C is the mean value of control.

RESULTS AND DISCUSSION

The CNS stimulant activity was performed taking with three groups of animal where tween 80 as control and Fluoxetine hydrochloride as standard showed mean values 183.4 ± 5.16 (SEM) and 352 ± 18.70 (SEM) but ethanol extract of the selected plant as test sample showed the mean value 274.6 ± 24.46 by actophotometer. Whereas % of stimulation by the standard drug and % of stimulation by the test drug was fond to be 91.93 % and 49.72%. After performing the student t-test, the test was said to be statistical significant with significant differences between control and standard and control and test ($p<0.05$).The CNS stimulant activity of control, standard and test were shown in (**Table 1, 2 & 3**) respectively. The results revealed that 70% ethanol extract of leaf of *Barleria prionitis* plant has shown the CNS stimulant activity more than the control but less in comparison to standard drug Fluoxetine hydrochloride given in (**Fig 1)**. The % CNS stimulant activity was found to be 91.93 and 49.72 for standard drug and crude extract of selected plant.

Table 1: Result of CNS activity of Tween-80 as control on 1st group of animal

S No	Body weight (g)	Drug with dose treatment	Control (c)	Mean	Standard Error mean (SEM)
1	33gm	Tween-80 (c) [Dose:-250mg/kg body weight]	179	183.4(c)	± 5.16
2	30gm		170		
3	40gm		201		
4	38gm		187		
5	36gm		180		

Table 2: Result of CNS activity of Fluoxetine hydrochloride as standard on 2nd group of animal

S No	Body weight (g)	Drug with dose treatment	Control (c)	Mean	Standard Error Mean (SEM)
1	40gm	Fluoxetine hydrochloride [Dose:-2mg/kg body weight]	340	352(s)	± 18.70
2	35gm		315		
3	42gm		423		
4	27gm		351		
5	42gm		331		

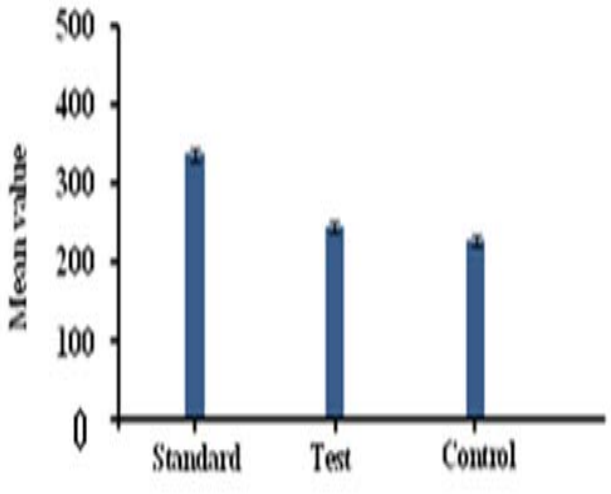
Table 3: Result of CNS activity of 70% Ethanol extract of *Barleria prionitis* leaf as test on 3rd group of animal

S No	Body weight (g)	Drug with dose treatment	Control (c)	Mean	Standard Error Mean (SEM)
1	45gm	70% Ethanol Extract of *Barleria prionitis* leaf [Dose-250mg/kg]	211	274.6(t)	± 24.42
2	50gm		278		
3	55gm		361		
4	40gm		256		
5	35gm		267		

Table 4: Results of student t-test between control & standard and control & test

Student t -test	T- STAT	T-CRITICAL	t-Stat > t-Critical
Between Control & standard	8.68	2.35	0.000024
Between Control & Test	3.65	1.85	0.0064

Fig 1: Mean value of CNS stimulant activity of standard, test and control on Swiss Albino mice



CONCLUSION

The experimental results conclude that ethanol extract of leaf of the *Barleria prionitis* plant has CNS stimulant activity. But in contrast to standard drug i.e. Fluoxetine hydrochloride it was found to be less. Therefore the plant extracts may be considered as CNS stimulant for further study.

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