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EVALUATION OF ANTIDEPRESSANT ACTIVITY OF METHANOLIC EXTRACT OF *ANTIGONON LEPTOPUS*

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ABSTRACT

Depression is an extremely common psychiatric condition, about which a variety of neurochemical theories exist and a number of synthetic antidepressant drugs are available in practice, however their effectiveness does not hold true with the entire range of population suffering from this disorder. Moreover the side effects and the drug interactions are major restrictions in its clinical utility. On the other hand, herbal medicines are widely used across the globe due to their wide applicability and therapeutic efficacy coupled with least side effects. The present study was conducted to evaluate antidepressant activity of *Antigonon leptopus*, popularly known as decorative flower. The experimental study was done by using tail suspension technique (TST) in albino rat. Methanolic extract (50, 100, 150, 200 and 250 mg/kg p.o.) of *Antigonon leptopus* leaves administered orally. After 30 min of administration, decreased immobility period significantly in a dose-dependent manner is occur and indicate significant antidepressant-like activity. The efficacies of the extracts were found to be comparable to imipramine (15mg/kg) in TST. There are preliminary phytochemical screening showed presence of alkaloids, flavonoids and triterpenoids in methanol extract of *Antigonon leptopus*. The present investigation validated traditional claims of the plant. It is finally concluded that antidepressant activity of *Antigonon leptopus* may be attributed to flavonoids.

INTRODUCTION

Depression refers to a wide range of mental health problems characterized by the absence of positive effect such as loss of interest and enjoyment in ordinary things and experiences, low mood and a range of associated emotional, cognitive, physical and behavioural symptoms. Since all the synthetic drugs available for the treatment of depression have various adverse effects and problematic interactions, therefore, our aim was to explore the potential of plants in the treatment of depression [1]. *Antigonon leptopus* has no have any previous record related to Antidepressant property. Therefore, our study was focused on evaluation of antidepressant potential of *Antigonon leptopus* in laboratory animals.

Antigonon leptopus is a native plant of Mexico, commonly known as Mexican Creeper or coral vine, belonging to the flowering plant family Polygonaceae. The parts used are leave, flower, stem and root [2-3]. It is traditionally used for the treatment of many disease like asthma, liver and spleen disorder [4], cough and throat constriction [5], reduce swelling and its leaves tea preparation are used to treat hypertension, diabetes and menstrual pains [6]. *Antigonon leptopus* leaf extracts have many pharmacological properties such as anti-thrombin [7], anti-diabetic [8], analgesic and anti-inflammatory [9], Hepatoprotective [10], anthelmintic [11], anti-microbial [12], lipid peroxidation inhibitory activity [13]. The purpose of the present study was to investigate the

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antidepressant activity of methanolic extract of *Antigonon leptopus* leaves.

MATERIAL AND METHODS

Plant Material

The fresh and mature leaves of *Antigonon leptopus* were collected from the local areas of Azamgarh district, Uttar Pradesh. The identity of the plant was confirmed through Dr S.L. Gupta, a Scientist 'E' and Head of Office, Botanical Survey of India, C.R.C., Allahabad-211002.

Preparation of extract and Reference drugs and chemicals

Methanol (S.D. Fine Chemicals, Mumbai) was used for extraction of the plant material. Dried coarsely powdered *Antigonon leptopus leaves* (500 g) were successively Soxhlet extracted with methanol. The marc was air dried. Solvents from extract were recovered under reduced pressure using rotary vacuum evaporator and the dried extract was preserved in a vacuum desiccator containing fused calcium chloride (S.D. Fine Chemicals). The reference standard which are used in the experiment is imipramine HCl (Ranbaxy Pvt Ltd. Mumbai)

Preliminary phytochemical screening

Specific standard reagents were used for screening methanolic extract of *Antigonon leptopus* to investigate the different classes of phytoconstituents [14].

Animals

Albino rat of either sex, 2-4 months old and weighing around 100- 150 g were procured from the Disease Free Small Animal House, Pharmacy College Azamgarh, Uttar Pradesh. The animals had free access to food and water, and were housed in an animal room with alternating light-dark cycle of 12 hr each. The animals were acclimatized for at least 7 days to the laboratory conditions before behavioural experiments. The Institutional Animal Ethics Committee (IAEC) approved the experimental protocol and the care of laboratory animals was taken as per the guidelines of CPCSEA.

Acute oral toxicity studies

Toxicity studies of extract were carried out in albino rat weighing between 150-200 g. They were performed according to OECD guideline No. 423. Four groups of rat comprising two animals each were treated with 2 and 5 g/kg of the extract orally. The animals were then recorded continuously for 24hrs for any behavioural changes and for mortality and observed for 14 days for any sign and symptoms. All doses were found to be safe since no animal died even at the dose of 5g/kg when administered orally and the animals did not showed any gross behavioural changes [15].

Experimental Protocol

Either sex of animals were divided randomly into control, standard and experimental groups (n=6), before one day of the experiment. The first group (Group I) used as control group and receive vehicle, distilled water. The second group (Group II) has served as reference standard (Imipramine HCl 15mg/kg). Five groups (Group III, IV, V, VI and VII) served test groups and methanolic extract of *A. leptopus* leaves at five different doses such as 50, 100, 150, 200 and 250 mg/kg per orally. On the basis of above preliminary screening these five doses were selected [16-18].

The experimental test was carried out by using tail suspension model according to Steru.et.al. with little modification. In this study, for adaptation of laboratory condition, animals were transported from their housing colony to laboratory in their own cages before 1-2 hr. Animals were individually hung on the edge of the shelf 50 cm by above the floor with the help of adhesive tape placed approximately 1 cm from the tip of the tail. The immobility time duration was recorded for 5 min by using stop-watch. When the animal was hung passively and completely motionless, then it considered to be immobile. There are any changes in immobility were studies after 30 min of administration of methanolic extract, standard Imipramine and vehicle. The experiment was conducted dim light and noise free room.

Statistical Analysis

All the results were expressed as Mean ± Standard Error (SEM). Data was analyzed using one-way ANOVA followed by Dunnett's t-test. In all the tests, the criterion for statistical significance was $p<0.05$.

RESULT

Methanol of *A. leptopus* leaves was prepared successively in a Soxhlet apparatus. Methanolic extract was dissolved in respective solvents and were screened for different classes of phytoconstituents. Methanolic extract gave positive tests for the presence of alkaloids, steroids, carbohydrates, tannins, terpenoids, saponin glycosides and flavonoids glycosides. Acute oral toxicity studies involved the nontoxic nature of the plant extract of *A. leptopus*. There was no any toxic sign and symptoms observed at dose of 2000mg/kg and any death up profound to dose of 5000mg/kg in rat. This extract was evaluated for antidepressant activity at various dose levels, i.e., 50, 100, 150, 200 or 250 mg/kg, p.o. in rat. At all dose after 30 min of administration, decreased immobility period significantly in a dose-dependent manner is occur and indicate significant antidepressant-like activity. The activity was compared with that observed in the control group as well as with the group treated with the standard antidepressant drug imipramine (15 mg/kg). The time spent by the rat in immobile state after oral administration of various doses of the methanolic extract of *A. leptopus*

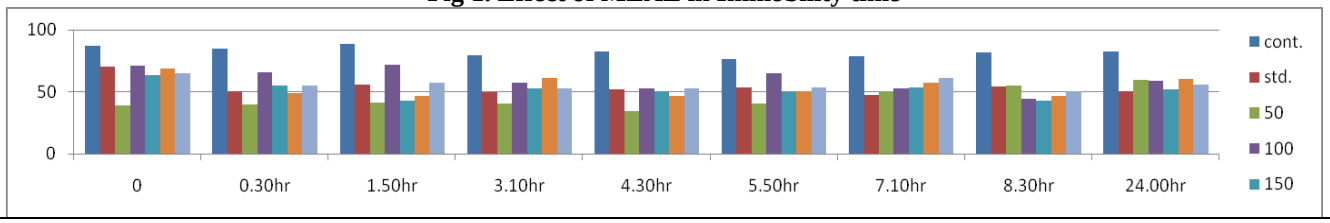
leaves, control and standard drug has been shown in table I. Highly significant antidepressant activity was observed in the methanol extract at a dose of 200 mg/kg with respect to control. The methanol extract (200 mg/kg) exhibited statistically equivalent antidepressant activity as exhibited by imipramine.

Table 1. Anti-depressant effect of MEAL by tail suspension method (mean ± SEM)

Group	Dose (mg/kg)	Immobility Period (in second)								
		Pre Treatment	I (.30 hr)	II (1.40 hr)	III (2.50)	IV (4.0 hr)	V (5.10 hr)	VI (6.20 hr)	VII (7.30 hr)	VIII (24.0 hr)
I	50	39.00± 2.24**	40.00± 0.00**	41.40± 1.60**	40.42± 1.58**	34.00± 0.00**	40.45± 0.45**	50.00± 0.00**	54.59± 2.41**	59.51± 2.49**
II	100	70.97± 3.03**	65.89± 3.11**	71.91± 3.09**	57.43± 1.57**	52.45± 1.55**	64.86± 3.14**	52.48± 1.52**	44.40± 1.60**	58.52± 2.48**
III	150	63.00± 0.00**	55.00± 1.00**	49.42± 1.58**	52.54± 2.46**	50.56± 2.44**	49.77± 0.23**	53.59± 2.11**	42.41± 1.59**	52.00± 2.00**
IV	200	68.89± 3.11**	49.00± 1.00**	46.43± 1.57**	61.00± 1.00**	46.47± 1.50**	50.00± 1.00**	57.00± 1.00**	46.42± 1.58**	60.64± 0.36**
V	250	64.6± 0.40**	55.00± 2.00**	57.54± 2.46**	52.56± 2.44**	52.58± 2.40**	53.59± 2.41**	61.00± 1.00**	50.53± 2.47**	55.55± 2.45**
Std.	15	70.51± 2.49	50.43± 1.58	55.45± 1.55	49.47± 1.53	51.59± 2.40	53.40± 1.60	47.42± 1.58	54.54± 2.46	50.56± 2.44
Cont.	15	86.85± 3.15	84.47± 1.53	88.39± 0.61	79.41± 1.59	82.53± 2.47	76.44± 1.56	78.46± 1.54	81.58± 1.42	82.50± 1.50

All values are expressed in mean ± standard error mean (n=6).
All data were found to be significant at 5% level of significance where $^{**}p<0.05$.

Fig 1. Effect of MEAL in Immobility time



DISCUSSION AND COCNLSION

Natural products exhibiting antidepressant properties are one of the great interests for a number of reasons. The current therapeutic goal in the treatment of major depression is to improve quality of life by normalizing mood and reversal of functional and social disabilities associated with depression. In the present investigation, methanolic extract of *Antigonon leptopus* exhibited significant antidepressant-like effects in tail suspension model. This model of depression is widely used for the screening of novel antidepressant drugs. The test is quite sensitive and relatively specific to all major classes of antidepressants drugs like tricyclics, selective serotonin reuptake inhibitors (SSRIs) and monoamine oxidase inhibitors (MAOIs). There are exact mechanisms underlying the antidepressant action cannot be analysed at the moment because of the presence of large number of Phytoconstituents in the *A. leptopus*. However, the antidepressant activity may be attributed to the presence of tannic acid in the extract. Tannic acid has been exhibited to be a non selective inhibitor of monoamine oxidase, thereby increasing the levels of monoaminergic neurotransmitters in the brain. Another possible mechanism of action is the attenuation of oxidative stress produced during depression, by the polyphenol and tannic acid present in *A. leptopus*. Thus, extract of *Antigonon leptopus* may be potential therapeutic value for the management of depressive disorder.

CONFLICT OF INTEREST

No conflict of interest

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