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Antidepressant activity of dichloromethane extract of *Valeriana jatamansi* roots

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ABSTRACT

The present study was designed to evaluate the antidepressant activity of *Valeriana jatamansi* (Fam. Valerianaceae) roots. The dichloromethane extract was subjected to antidepressant activity evaluation on lacca mice using forced swimming test. The standard and test extract were administered per oral route. Dichloromethane extract of the roots exhibited significant dose dependent antidepressant activity at 400 mg/kg, comparable to that of standard imipramine (12.5 mg/kg).

Keywords: *Valeriana jatamansi*, Antidepressant, Forced swim test.

INTRODUCTION

Depression is a complex heterogeneous mental disorder characterized by profound and persistent feeling of sadness/despair, loss of interest in routine activities, low self-esteem, worthlessness and suicidal thoughts. The life time prevalence rate of depression varies from 5 % to 12 % in men and 10 % to 25 % in women. Pharmacological treatment of depression through ages has included benzodiazepines, barbiturates, monoamine oxidases and serotonin reuptake inhibitors. However, these classes of drugs have many unwanted side effects, mainly withdrawal reactions, dependence and suicidal ideation, thus, a matter of concern. Keeping in mind these considerations researchers are inclining towards plants in search of lead molecules which can combat depression.

Valerian is a common name given to crude drug consisting of the underground parts of *Valeriana* species. It is one of the top selling herbs and is widely used traditionally for the treatment of mental disorders. The genus *Valeriana* comprises 200 species distributed worldwide and many of them are used medicinally. Hooker in 1882 reported 13 species from Indian subcontinent and Wealth of India mentions only three species, namely *V. jatamansi*, *V. hardwickii* and *V. pyrolaefolia* from India [1-5]. Thus, the objective of present study was to evaluate the antidepressant activity of *V. jatamansi* roots.

EXPERIMENTAL**Plant material**

The roots of *V. jatamansi* were purchased from local market of Bhunter, Kullu. Voucher specimen of *V. jatamansi* roots (accession number 1466) has been

deposited in the Museum-cum-Herbarium of University Institute of Pharmaceutical Sciences, Panjab University, Chandigarh.

Chemicals and reagents

Dichloromethane (Thermo Fisher Scientific India Pvt. Ltd., Mumbai), carboxy methyl cellulose (Merck Specialities Pvt. Ltd., Mumbai) and tween 80 (HiMedia Laboratories Pvt. Ltd., Mumbai) were used. Imipramine (Torrent Pharmaceuticals) was used as standard antidepressant agent.

Preparation of extracts

Coarsely powdered roots and rhizomes of *V. jatamansi* were (100 g) were macerated (24 h) twice with DCM at room temperature. The extract was filtered and solvent was recovered using rotary vacuum evaporator under reduced pressure. Dried extract was preserved in vacuum desiccator containing anhydrous silica gel blue.

Experimental animals

Lacca mice (20-30 g) of either sex, housed at Central Animal House, Panjab University, Chandigarh, were maintained in a 12 h light/dark cycle at a constant temperature of 25°C. The mice were fed standard pellet diet (Ashirwad Industries, Mohali) and water *ad libitum*. The animals were fasted for animals were allocated to different experimental groups

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each of five mice. All the studies were performed as per the guidelines of the Institutional Ethical Committee of Panjab University, Chandigarh, India (45/GO/ReBi/S/99/CPCSEA).

Preparation of doses

Tween 80 (5 %) in aqueous carboxy methyl cellulose (0.5 %) was used as vehicle for preparing the suspension of extract and standard drug. Doses of various substances were prepared by suspending appropriate quantities in vehicle so as to administer these to mice in a volume ranging from 0.20 to 0.30 mL, per oral route, using a tuberculin syringe fitted with an oral canula. The vehicle alone served as control.

Antidepressant activity evaluation

Forced swim test

Forced swimming test (FST) was used to evaluate antidepressant activity [6,7]. Mice were forced to swim in glass jar (25 cm × 12 cm × 25 cm) containing water to a height of 15 cm at room temperature (25°C±1°C). After an initial period of vigorous activity to escape, the animals assumed a typical immobile posture (ceased to struggle

with minimal limb movements just sufficient to keep their head above the level of water). Mice were administered a single dose (100, 200, and 400 mg/kg) of the extract or the standard antidepressant imipramine (12.5 mg/kg, po) 60 min before the evaluation. Total immobility period during 6 min test session was noted.

Statistical Analysis

The data have been expressed as mean±standard deviation of mean. Significant differences among the groups were assessed using one way analysis of variance (ANOVA). The test was followed by Tukey's multiple range test, p values less than 0.05 were considered as significant.

RESULTS

Antidepressant activity

The DCM extract at a dose of 400 mg/kg demonstrated a statistically significant diminution of immobility time when the animals were subjected to FST (Table1). Results of imipramine (12.5 mg/kg) were similar to results of those observed with the DCM extract.

Table 1. Antidepressant activity of dichloromethane extract of *V. jatamansi*

Group	Dose(mg/kg)	Mean immobility time ± SD* (sec)	Per cent decrease from control
Control	-	58.0 ± 6.4	-
Imipramine	12.5	9.0 ± 2.4**	85
Dichloromethane extract	50	40.0 ± 4.1**	31
	100	34.0 ± 2.8**	41
	200	25.0 ± 3.7**	57
	400	20.0 ± 3.5**	66

*n = 5; **significant at p<0.05

DISCUSSION

The genus *Valeriana* has been used since time immemorial for treatment of various mental conditions. A methanolic extract of *V. fauriei* has been shown to possess antidepressant activity in mice. The activity guided fractionation led to the isolation of α -kessyl alcohol as the active principle [8]. Valerian is also an ingredient of two patented stress relieving formulations [9,10]. Various species have been investigated for their numerous biological effects, however, no significant reports pertaining to antidepressant activity of *V. jatamansi* were available [11]. Thus, it was considered worthwhile to evaluate the antidepressant potential of *V. jatamansi* roots.

DCM extract of *V. jatamansi* roots was prepared as valepotriates known for their numerous biological effects are soluble in DCM. The antidepressant activity was evaluated using forced swim test. FST has been used in preclinical tests to evaluate behavioral despair, i.e., measure of failure to escape from an aversive stimulus. The forced swimming induced immobility in animals is claimed to represent a condition similar to human depression which

can be reversed by antidepressant drugs. Results of the present study indicate that the dichloromethane extract of *V. jatamansi* has significant antidepressant activity at a dose of 200 mg/kg. However, maximum antidepressant activity was observed at a dose of 400 mg/kg which is comparable to standard imipramine (12.5 mg/kg).

CONCLUSION

Present investigation shows that dichloromethane extract of *V. jatamansi* roots exhibits antidepressant activity, thus, validating their traditional use for the management of mental disorders.

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CONFLICT OF INTEREST

Nil

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