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
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

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

*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

**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
REFERENCE