ANALGESIC ACTIVITY OF ROOT EXTRACT OF SOLANUM MELONGENA LINN ROOT

Srivastava Ashish*, Sanjay Yadav
Department of Pharmacy, Saroj Institute of Technology and Management Lucknow, UP, India

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*Corresponding author
Ashish Kumar Srivast, Student, Email: ashish.srivastav78@yahoo.com

INTRODUCTION

Solanum melongena Linn. (Brinjal; Solanaceae), a culinary vegetable, has been in use in the Indian system of medicine. Various parts of the plant are useful in the treatment of inflammatory conditions, cardiac debility, and neuralgia, ulcers of nose, cholera, bronchitis and asthma.1 Its antioxidant2,3, analgesic4 and hypolipidemic5 activities have been reported. Egg plant contains a higher content of free reducing sugars, anthocyanin phenols, Glycoalkaloids6. Egg plant is known to some medicinal properties and said to be good for diabetic patients. It has also been recommended as an excellent remedy for liver complaints and can be used in the treatment of high blood cholesterol & helps to block the formation of free radicals and is also a source of folic acid and potassium.7 The present study was initiated to evaluate the antipyretic and analgesic activity of dry residue of root juice of Solanum melongena.

MATERIALS AND METHODS

Drug and chemicals
Acetic acid was obtained from Merck, Germany. Acacia was purchased from Beximco infusion Ltd. Diclofenac sodium was obtained from square pharmaceutical Ltd Bangladesh. Methanol & Ethanol (Sigma, U.S.A.)

Plant Material
The plant Solanum melongena Linn is selected on the basis of its use in Indian system of medicine and other Ethnobotanical resources in literature. Fresh roots of Solanum melongena Linn were collected from Vill+Post Koriyapar Distt. Mau and Identity of plant was confirmed and authenticated by taxonomy herbarium division of National botanical research institute (N.B.R.I), Lucknow, where voucher specimen has been deposited. (Reference no 97376).The collect plant parts were dried for one week and ground in to a coarse powder with help of a suitable grinder. The powder were stored in an air tight container and kept in cool, dark and dry place until analysis commenced

Animal
Swiss albino mice (6-8 weeks) of either sex weighing 25-30 g and male Wistar rats weighing 150-200 g were used. They were housed in light controlled room (12:12h) and at constant temperature (22±2°C) conditions. Animals were fed with standard laboratory diet and water.8,9

Preparation of the extract
The Hydroalcoholic extract was selected for Biological screening due to high alcoholic-soluble extractive value, high yield of successive alcoholic extract and TLC results. The analgesic screening was done using Hot plate method. Tail immersion methods and acetic acid induced in rats and mice. Hydroalcoholic extract was administered orally at the acute doses of 200mg/kg and 400mg/kg b.w. Several activities on these doses have already been reported. Both the doses showed significant (p<0.05) analgesic activity.

KEY WORDS: Brinjal, Solanum melongena Linn, analgesic activity
accomplished by the animal, because sometimes the animals started to give writhing but they did not complete it. This incomplete writhing was considered as half-writhing. Accordingly, two half-writhing were taken as one full writhing. The number of writhes in each treated group was compared to that of a control group while Diclofenac sodium (25 mg/kg, p.o.) was used as a reference substance. 

Tail immersion method

In present study analgesia was assessed according to the method of Luiz et al. Mice divided in the group of five each, were held in position in a suitable restrainer with the tail extending out. 3-4 cm area of the tail was marked and immersed in water bath thermostatically maintained at 51°C. The withdrawal time of the tail from hot water (in seconds) was noted as the reaction time or tail flick latency. The maximum cut off time for immersion was 180 seconds to avoid the injury of the tissue of the tail. 2% acacia solution was administered to control the animal, plant extract in dose of 200 mg/kg and 400 mg/kg were given orally by intubation. The initial reading was taken immediately before administration test and standard drugs 0, 30, 60, 2hr., 3hr, and 4hr after the administration. Tail flick latency difference or mean increase in latency after drug administration was used to indicate the analgesia produced by test and standard drug.

Statistical Analysis

Data were analyzed by one-way ANOVA followed by Dunnet’s test and p value < 0.05 were consider statistically significant

### RESULTS

The preliminary phytochemical screening of the dry residue showed the presence of flavonoids, alkaloids, Tannins and steroids. In acetic acid –induced writhing test Hydroalcoholic extract (200 & 400 mg/kg) reduced writhing count significantly (Table.1) and the results of hot plate test indicated a significant increase in reaction time at 3and 4h with 200 & 400mg/kg Hydroalcoholic extract, whereas reference drug Diclofenac sodium significantly increased the reaction time at 1and 2h (Table.2). In Tail –clipping test indicated a significant increase in reaction time at 3and 4h with 200 & 400mg/kg Hydroalcoholic extract, whereas reference drug Diclofenac sodium significantly increased the reaction time at 2and 3h. A number of flavonoids, plant extracts were shown to produce significant analgesic effect. A number of flavonoids have been reported to produce analgesic activity. Also, there are few reports on the role of tannins in analgesic activity. Hence, the present Analytical activity of S. melongena may be attributed to the presence of alkaloids, flavonoids and tannins. The present study demonstrates the potential analgesic effect of S. melongena, which supports the claims by traditional medicine practitioners as an analgesic remedy.

### DISCUSSION

The preclinical studies in rodents have indicated the potential analgesic activity of Hydroalcoholic extract of root extract of *Solanum melongena* Linn in acetic acid and tail immersion methods as compared to standard drug Diclofenac sodium. The present study demonstrates the potential analgesic effect of *S. melongena*, which supports the claims by traditional medicine practitioners as an analgesic remedy.

### Table 1: Effect of crude extract on acetic acid induced writhing response in mice

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Does (mg/kg) b.w.</th>
<th>Number of writhes (per 30 sec)</th>
<th>Percentage of inhibition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control (2%acacia)</td>
<td>0.1 ml/mg</td>
<td>46.3±1.31</td>
<td></td>
</tr>
<tr>
<td>Standard (Diclofenac sodium)</td>
<td>25 mg/kg b.w.</td>
<td>8.3±0.31**</td>
<td>82.01</td>
</tr>
<tr>
<td>Test 1 (Hydroalcoholic extract)</td>
<td>200 mg/kg b.w.</td>
<td>22.3±0.31**</td>
<td>54.67</td>
</tr>
<tr>
<td>Test 2 (Hydroalcoholic extract)</td>
<td>400 mg/kg b.w.</td>
<td>18±0.34**</td>
<td>61.34</td>
</tr>
</tbody>
</table>

Experimental group were compared with control P value (<0.01)

### Table 2: Analgesic effect of hydroalcoholic extract of root extract of *Solanum melongena* Linn in wister rat hot plate method

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Dose (mg/kg b.w.)</th>
<th>0 min</th>
<th>30 min</th>
<th>1hr</th>
<th>2hr</th>
<th>3hr</th>
<th>4hr</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control (2%acacia)</td>
<td>0.1/ml/mg</td>
<td>2.30±0.20</td>
<td>2.50±0.24</td>
<td>2.44±0.21</td>
<td>2.32±0.23</td>
<td>2.34±0.25</td>
<td>2.3±0.21</td>
</tr>
<tr>
<td>Standard (Diclofenac sodium)</td>
<td>25/mg/kg b.w.</td>
<td>1.96±0.21</td>
<td>4.56±0.28</td>
<td>8.92±0.86</td>
<td>11.53±1.15*</td>
<td>10.76±0.96*</td>
<td>10.23±0.98*</td>
</tr>
<tr>
<td>Test 1 Hydroalcoholic extract</td>
<td>200/mg/kg b.w.</td>
<td>2.01±0.23</td>
<td>3.86±0.55</td>
<td>6.82±0.67</td>
<td>7.13±0.28*</td>
<td>6.36±0.36*</td>
<td>8.34±0.38*</td>
</tr>
<tr>
<td>Test 2 Hydroalcoholic extract</td>
<td>400/mg/kg b.w.</td>
<td>2.12±0.17</td>
<td>4.39±0.69</td>
<td>7.71±0.52</td>
<td>8.14±0.60*</td>
<td>6.93±0.49*</td>
<td>7.02±0.53*</td>
</tr>
</tbody>
</table>

Experimental group were compared with control P value (<0.01)

### Table 3: Analgesic effect of hydroalcoholic extract of root extract of *Solanum melongena* Linn in wister rat tail immersion method

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Dose (mg/kg b.w.)</th>
<th>0 min</th>
<th>30 min</th>
<th>1hr</th>
<th>2hr</th>
<th>3hr</th>
<th>4hr</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control (2%acacia)</td>
<td>0.1/ml/mg</td>
<td>3.95±0.33</td>
<td>2.510±0.24</td>
<td>1.74±0.32</td>
<td>2.09±0.046</td>
<td>2.10±0.047</td>
<td>2.166±0.059</td>
</tr>
<tr>
<td>Standard (Diclofenac sodium)</td>
<td>25/mg/kg b.w.</td>
<td>3.4±0.38</td>
<td>3.967±0.45</td>
<td>3.171±0.44**</td>
<td>3.596±0.405*</td>
<td>3.667±0.490**</td>
<td>3.724±0.419*</td>
</tr>
<tr>
<td>Test 1 Hydroalcoholic extract</td>
<td>200/mg/kg b.w.</td>
<td>2.270±0.024</td>
<td>2.660±0.17</td>
<td>3.034±0.168*</td>
<td>3.843±0.192**</td>
<td>4.936±0.255**</td>
<td>5.897±0.248*</td>
</tr>
<tr>
<td>Test 2 Hydroalcoholic extract</td>
<td>400/mg/kg b.w.</td>
<td>2.405±0.34</td>
<td>3.094±0.355*</td>
<td>3.324±0.32</td>
<td>3.241±0.384**</td>
<td>4.304±0.365**</td>
<td>5.400±0.353**</td>
</tr>
</tbody>
</table>

Experimental group were compared with control P value (<0.01)

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