EFFECT OF SOLANUM MELONGENA ETHANOLIC LEAF EXTRACT ON YEAST INDUCED PYREXIA IN ALBINO RATS

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ABSTRACT
The aim of the study was to evaluate the effect of Solanum melongena ethanolic leaf extract on yeast induced pyrexia in albino rats. The leaves of S. melongena were collected, air dried and ground to fine powder. The ethanolic extract was prepared by percolating the dried powder with 95% ethanol. Eighteen albino rats (100-200gms) were divided into three groups of six animals each. Group I received 3% gum acacia 5 ml/kg, Group II, ethanolic extract of S. melongena leaves (SME) 500 mg/kg and group III, paracetamol 40mg/kg orally. Pyrexia was induced in animals by administering 20% yeast suspension in 3% gum acacia 20ml/kg subcutaneously. After 19 hours, 3% gum acacia, SME and paracetamol were administered. The rectal temperature of animals were recorded at 60, 120, 180, 240 mins intervals. Statistical analysis was done by using one-way ANOVA, followed by Dunnet’s ‘t’ test. A p-value of < 0.01 was considered significant. Both the test drug S. melongena extract and standard drug paracetamol significantly (p<0.01) reduced yeast elevated rectal temperature at 60, 120, 180 and 240 mins respectively. The ethanolic leaf extract of S. melongena showed significant antipyretic activity which was maximum at 180 mins.

Keywords: Fever, Solanum melongena, paracetamol, yeast.

INTRODUCTION
Fever is an elevation of body temperature that exceeds the normal daily variation and occurs in conjunction with an increase in hypothalamic set point from “normothermic” to febrile levels very much resembling the resetting of the home thermostat to a higher level in order to raise the ambient temperature in a room[1]. It is a complex, coordinated autonomic, neuroendocrine and behavioural response that is adaptive and is used by nearly all vertebrates as part of the acute–phase reaction to immune challenge[2]. It is well known that traditional herbal medicine existed before the application of modern scientific method to health care and even today majority of the world population depends on herbal health care practices[3]. S. melongena is an economic flowering plant belonging to the family Solanaceae. It is widely distributed in India for its fruit[4]. Various parts of the plant are useful in the treatment of inflammatory conditions, cardiac debility,
neuralgias, ulcer of nose, cholera, bronchitis and asthma\cite{5}. Besides, having many traditional uses, S. melongena is reported to exhibit many important pharmacological actions. The study aimed to evaluate the effect of S. melongena ethanolic leaf extract on yeast induced pyrexia in albino rats.

The study was carried out in the department of pharmacology at Assam Medical College in 2006. Materials used were dried leaves of S. melongena, 95% alcohol, percolator, petri dishes, paracetamol, distilled water, 3% gum acacia suspension and dried yeast. Fresh S. melongena leaves were collected within Dibrugarh district of Assam, in the months from March to May 2006. A taxonomist of Dibrugarh University identified and confirmed the leaf samples. The leaves were air dried at room temperature and were ground to a fine powder. Ethanolic extract was obtained by percolating the dried powder with 95% ethanol. The experiment was carried out in albino rats of the species Rattus norvegicus of either sex weighing 100-200 gms. All the animals were taken care of under ethical consideration with approval from the institutional ethical committee (Registration no.- 634/02/a/CPCSEA), Assam Medical College.

Toxicity studies: The ethanolic extract of S. melongena leaves were subjected to acute oral toxicity as per OECD Guidelines 425\cite{6}. Mortality in the acute oral toxicity test was not seen in the limit test up to dose 2000 mg/kg.

The ethanolic extract of S. melongena leaves was tested for antipyretic activity by yeast induced method as described by Rao RR et al (1997) with slight modifications\cite{7}. In their antipyretic study rectal temperatures were recorded after 18 hours of yeast administration. In the present study the same was measured after 19 hours of yeast administration. Prior to the experiment the rats were maintained in separate cages for 7 days and the animals with approximately constant rectal temperature (within normal range) were selected for the study. Total 18 numbers of animals were used in the study. Table 1 shows the experimental design. Pyrexia was induced in overnight fasted rats by injecting subcutaneously 20% aqueous suspension of dried yeast in 3% gum acacia at a dose of 20 ml/kg, below the nape of the neck. Rectal temperatures were recorded by clinical thermometer immediately before and 19 hours after dried yeast injection. Thereafter, the animals were divided into three groups with six animals in each group. All the drugs were administered orally and the volumes of all medicaments were kept constant at 5 ml/kg.
body weight of the animals. Temperatures were recorded every 60 minutes up to 240 minutes.

**TABLE 1: SHOWING THE EXPERIMENTAL DESIGN**

<table>
<thead>
<tr>
<th>GROUP</th>
<th>TREATMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group–I (control)</td>
<td>3% gum acacia (5 ml/kg, P.O.)</td>
</tr>
<tr>
<td>Group–II (test)</td>
<td>SME (500 mg/kg, P.O.)</td>
</tr>
<tr>
<td>Group–III (standard)</td>
<td>Paracetamol (40 mg/kg P.O.)</td>
</tr>
</tbody>
</table>

Statistical analysis:

The data were subjected to statistical analysis using one way ANOVA followed by Dunnet’s t’ test. p values < 0.01 were considered significant.

**RESULTS**

**TABLE 2: SHOWING EFFECT OF THE ALCOHOLIC EXTRACT OF SOLANUM MELONGENA LEAVES ON YEAST INDUCED PYREXIA IN ALBINO RATS**

<table>
<thead>
<tr>
<th>group</th>
<th>Drug, Dose (mg/kg) S.C.</th>
<th>Rectal temperature (°C)</th>
<th>Rectal temperature after administration of drug (°C)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Normal (A)</td>
<td>19 Hours after yeast Administration (B)</td>
<td>60 mins (C1)</td>
</tr>
<tr>
<td>Group–I (Control)</td>
<td>3% gum acacia (5 ml/kg)</td>
<td>37.55 ± 0.16</td>
<td>38.52 ± 0.09</td>
</tr>
<tr>
<td>Group–II (Test)</td>
<td>SME (500 mg/kg)</td>
<td>37.15 ± 0.13</td>
<td>38.20 ± 0.23</td>
</tr>
<tr>
<td>Group–III (Standard)</td>
<td>Paracetamol (40 mg/kg)</td>
<td>37.25 ± 0.22</td>
<td>38.83 ± 0.24</td>
</tr>
<tr>
<td>One way ANOVA</td>
<td>F</td>
<td>3.31</td>
<td>2.40</td>
</tr>
<tr>
<td></td>
<td>df</td>
<td>15, 2</td>
<td>15, 2</td>
</tr>
<tr>
<td></td>
<td>p</td>
<td>&gt; 0.05</td>
<td>&gt; 0.05</td>
</tr>
</tbody>
</table>

All values are expressed Mean ± SEM (n = 6); Percentage reduction in rectal temperature is given within parenthesis, a: p < 0.01 when compared to control; ANOVA followed by Dunnet’s Multiple Comparison Test.
Percentage Reduction = \( \frac{B - Cn}{B - A} \times 100 \) where n = 1, 2, 3 or 4

Effect of ethanolic leaf extract of \( S. \) melongena on rectal temperature in rats is presented in Table 2. The subcutaneous injection of yeast suspension markedly elevated the rectal temperature after 19 hours of administration. The \( S. \) melongena ethanolic leaf extract at a dose of 500 mg/kg produced significant reduction in mean temperatures at different time intervals. The antipyretic effect started from 60 mins of SME administration and remained upto 240 mins. The maximum antipyretic activity was observed at 180 minutes. Both the test drug \( S. \) melongena extract and standard drug paracetamol 40 mg/kg significantly reduced the yeast-elevated rectal temperature at 120, 180 and 240 mins compared to control group.

\( S. \) melongena is a plant with many medicinal properties. The medicinal properties of the plant are derived from its chemical constituents. The plant’s antioxidant property is due to the flavonoids\(^8\). A bioflavonoid glycoside named solanoflavone is present in the leaves and fruits of \( S. \) melongena\(^9\).

In many earlier studies, flavonoids have been reported to exhibit antipyretic effect\(^{10, 11}\). In a previous study, the increase in the body temperature intensified the lipid peroxidation process, which indicates that pyrexia is associated with increased oxidative stress. The antioxidant supplementation decreased the lipid peroxidation process\(^{12}\). The flavonoids and an anthocyanin (nasunin) from \( S. \) melongena reported to have antioxidant activity\(^{13}\). Hence, the antioxidant activity of \( S. \) melongena may be one of the possible mechanisms by which it reduces the elevated body temperature\(^5\).

The results of the present study suggest that the ethanolic leaf extract of \( S. \) melongena in the dose of 500 mg/kg, significantly reduced the temperature of pyretic rats as revealed from the observation. The antipyretic effect of \( S. \) melongena may be attributed to the presence of flavonoids. This finding reinforces the claims by traditional medicinal practitioners using \( S. \) melongena leaves as an antipyretic preparation. After observing the results of the present study, it would not be unwise to carry out further study to confirm the true potential of this plant, for its antipyretic activity, so that it may be clinically applicable and commercially viable.
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REFERENCES


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