Evaluation of Anti-inflammatory activity of the whole plant extracts of *Solanum americanum* Miller. (Solanaceae) in albino male rats

K.N.Pushpalatha¹, V.S.Ramachandran and K.Arumugasamy*

Department of Botany, Bharathiar University, Coimbatore, Tamilnadu, India. 641046
* PG and Research Department of Botany, Kongunadu Arts and Science College, Coimbatore, Tamilnadu, India. 641029

**Abstract**

The present study investigates the anti-inflammatory activity of chloroform, methanol and ethanol extracts of whole plant of *Solanum americanum* (Solanaceae) against the carrageenan induced rat paw oedema in Wister Albino rats at dose dependent manner (150mg and 200mg/kg body weight). The ethanobotanical and medicinal values of the plant *Solanum americanum* (American night shade) have been mentioned in ancient literature. The ethanolic extract showed more inhibition when compared to chloroform and methanol extracts of *S.americanum*. The extracts were significant at (*p* < 0.05); when compare to the standard drug as; indomethacin.

**Key words:** *Solanum americanum*, medicinal plant, anti-inflammation, carrageenan

¹**Corresponding author:** pushpalatha68@gmail.com
Introduction

Solanum americanum belonging to the family Solanaceae. The genus Solanum is one of the most important largest genera of the family comprising of about 1700 species in the world and 33 species reported from the state of Tamil Nadu. Herbal medicines derived from plant extracts are being increasingly utilized to treat a wide variety of clinical diseases and pharmacological evaluation in Indian traditional systems of medicine. The nature provides us drugs in the form of herbs, plants and an alga's to cure the incurable diseases without any toxic effect [3]. Research on medicinal plants is an important fact of biochemical research in India because of several reasons [2]. The berries of S. nigrum (Solanaceae) have been reported in ancient Indian medicinal literature with beneficial effects in inflammation, tuberculosis, diuretics etc., [3, 4]. The present study was undertaken to evaluate the anti-inflammatory activity of chloroform, methanol and ethanol extracts of whole plant of Solanum americanum in Wister Albino rats.

Materials and Methods

The plant Solanum americanum was collected from Melkowhutti, Niligiri District, Tamilnadu. The shade dried powder of this plant material was extracted with chloroform, methanol and ethanol in a soxhlet apparatus separately. The filtrate was concentrated at low temperature and high pressure by lyophilization. Anti-inflammatory activity was investigated by the method described by Winter et al., [5]. Albino rats 150 and 200mg/kg body weight were procured from Trissur medical college, Trissur, Kerala used for the experiment. The animals were maintained with pellet diet and water ad libitum. Animals were divided into five groups comprising five animals in each group. In all group acute inflammation was produced by sub plantar injection of 0.1 ml freshly prepared 1% suspension of carrageenan in normal saline in the right hind paw of the rats. The paw volume was measured plethysmometrically at 0-180 mins after carrageenan injection. First group was given normal saline orally by IGC, group second, third and fourth (150 and 200 mg/kg body weight) received the chloroform, methanol and ethanol extracts and the fifth group received indomethacin as standard (10mg/kg body weight). The percentage inhibition was measured at 60, 120 and 180 mins. after carrageenan injection. Anti-inflammatory activity was measured as percentage inhibition in oedema level when drug was present relative to control. The mean paw volume was expressed in terms of mean ± SEM and evaluated for statistical significance by ANOVA followed by Dunnett’s tests. $p < 0.05$ was considered by statistically significant.
Result and Discussion

The anti-inflammatory activity of Solanum americanum against carrageenan induced paw oedema has been shown in Table 1 and 2. The results were compared to that of the reference drug indomethacin. The chloroform, methanol and ethanol extracts of S. americanum at 150 and 200mg.kg-1 exhibited maximum inhibition of 53.09%, 71.80% and 74.93% and the minimum inhibition were found as 15.54%, 60.59% and 73.08% respectively in carrageenan-induced hind paw oedema, while indomethacin (10mg.kg-1 showed 67.00% inhibition of oedema after three hours of drug treatment. These results were found to be exhibited more inhibition in the ethanolic extract followed by methanol and chloroform which were shown in the (Table1 and Figs.1, 2& 3).

Table1: Effect of SA extracts on the Percentage inhibition of Carrageenan induced paw oedema

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Dose mg/kg</th>
<th>0 min</th>
<th>60 min</th>
<th>120 min</th>
<th>180 min</th>
<th>% Inhibition after 180 min</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group-I</td>
<td>Normal saline</td>
<td>30.15±2.63</td>
<td>66.56±2.59</td>
<td>99.31±4.65</td>
<td>128.31±5.56</td>
<td>-</td>
</tr>
<tr>
<td>Group-II</td>
<td>150 mg/kg</td>
<td>24.31±1.14</td>
<td>61.66±2.64</td>
<td>81.56±1.36</td>
<td>108.36±2.51</td>
<td>15.54</td>
</tr>
<tr>
<td></td>
<td>200 mg/kg</td>
<td>18.21±1.05*</td>
<td>43.61±2.06*</td>
<td>68.56±2.11*</td>
<td>60.19±1.85*</td>
<td>53.09</td>
</tr>
<tr>
<td>Group-III</td>
<td>150 mg/kg</td>
<td>32.61±3.05</td>
<td>58.50±1.98</td>
<td>56.31±1.65*</td>
<td>50.56±2.06*</td>
<td>60.59</td>
</tr>
<tr>
<td></td>
<td>200 mg/kg</td>
<td>21.56±1.96*</td>
<td>30.44±2.61**</td>
<td>45.63±1.56**</td>
<td>36.18±1.65**</td>
<td>71.80</td>
</tr>
<tr>
<td>Group-IV</td>
<td>150 mg/kg</td>
<td>26.59±1.26</td>
<td>29.56±1.05</td>
<td>42.94±1.81</td>
<td>34.54±1.18</td>
<td>73.08</td>
</tr>
<tr>
<td></td>
<td>200 mg/kg</td>
<td>17.14±1.10**</td>
<td>20.61±1.31**</td>
<td>40.11±1.35**</td>
<td>32.16±1.56**</td>
<td>74.93</td>
</tr>
<tr>
<td>Group-V</td>
<td>100 mg/kg</td>
<td>25.61±1.51</td>
<td>31.59±1.03**</td>
<td>43.69±2.05**</td>
<td>42.33±2.14**</td>
<td>67.00</td>
</tr>
</tbody>
</table>

Each Value is SEM ± 5 individual observations * P <0.05; ** P<0.01 Compared paw oedema induced control vs drug treated rats

Group I. : Control rats given normal saline orally by using an intragastric catheter tube (IGC).
Group II : Rats given Chloroform SA Extract at the dose of 150 and 200 mg/ Kg body weight by IGC
Group III : Rats given Methanol SA Extract at the dose of 150 and 200 mg/ Kg body weight by IGC
Group IV : Rats given Ethanol SA Extract at the dose of 150 and 200 mg/ Kg body weight by IGC
Group V : Rats given Indomethacin at the dose of 10 mg/ Kg body weight by IGC
Oedema which develops after carrageenan inflammation is a biphasic event. The initial phase is attributed to the release of histamine and serotonin. The oedema maintained between the first and second phase is due to Kinin like substances [6]. The second phase is said to be promoted by prostaglandin like substances. It has been reported that the second phase oedema is sensitive to drugs like hydrocortisone, phenylbutazone and indomethacin [5, 7, 8]. The results of carrageenan induced rat paw oedema model indicated the dose dependent anti-inflammatory activity i.e., the dose effect of 200mg/kg body weight of ethanol extract was more active than 150mg/kg bodyweight which were found to be statistically significant. The findings of present study showed that the sub-effective doses of various extracts of Solanum americanum potentiated anti-inflammatory model, indicating that Solanum americanum extract may be possibly be useful as an adjuvant along with standard anti-inflammatory drug. It can possibly lower the dose requirement as well as adverse effects of standard anti-inflammatory drug.
References


