ANTI ULCER ACTIVITY OF LEAF EXTRACT OF *Sapindus trifoliatus* Linn

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ABSTRACT

Preliminary phytochemical investigations of different extracts of leaves of *Sapindus trifoliatus* revealed the presence of flavonoids, sterols, terpenoids and saponins. The methanolic and aqueous extracts showed significant reduction in the pylorus ligation induced ulcers in rats. These results emphasize on the need to diversify in to alternative therapeutic approaches pertaining to herbal medicine. Where in a single easily available plant may provide answers to several therapeutic challenges as observed in the anti ulcer activity shown by different extracts of *Sapindus trifoliatus*.

Keywords: Antiulcer activity, Aqueous extract, Methanolic extract, Pyloric ligation, Sapindus trifoliatus

INTRODUCTION

Different parts of the *Sapindus trifoliatus* Linn (Sapindaceae), also known as Indian filbert or soapnut. Different parts of the *Sapindus trifoliatus* were used in the indigenous system of medicine because of their therapeutic values (Nadkarni, 1976, Kirtikar, 1992). The seed oil is employed medicinally as well as in manufacture of soap (Watt, 1922). β-sitosterol was isolated (Gupta, 1996) from the unsaponifiable matter of seed kernel oil. In the present study antiulcer activity of aqueous & alcoholic extract of leaves of *Sapindus trifoliatus* was studied.

Materials and Methods

**Plant materials**

The plant material of *Sapindus trifoliatus* authenticated by Dr. Usha Nalini, HOD, Dept of Botany, St Agnes College, Mangalore-2. The young leaves were collected from local area during the month February-April; the collected leaves were shade-dried at room temperature. The dried leaves subjected to size reduction to coarse powder by using mechanical grinder and passed through sieve No- 40. The powder was subjected to maceration with methanol and distilled water separately. Both the extracts were dried separately on the water bath until dry extract was obtained and stored in a dessicator. Preliminary phytochemical tests showed presence of triterpenoids, steroids, flavonoids and carbohydrates. The suspensions of methanol and aqueous extracts were prepared by using 0.6% of Sod CMC solution.

**Acute toxicity studies:**

Acute toxicity study was carried out in female albino rats as per staircase method (Ghosh, 2005) and OECD guidelines 425 (OECD guidelines 425, 2005). There was no mortality and no signs of toxicity were found upto 2,000mg/kg/body weight and found to safe up to 2,000mg/kg body weight. All the experiments were performed within the guidelines of the Institutional ethical committee of KSHEMA. Deralakatte, Mangalore. (KSHEMA /IAEC / 064/2007)
IN VIVO ASSESSMENT OF ANTI ULCER ACTIVITY

1. Pylorus ligated ulcer model:

The study was conducted on albino rats of weighing 180-250 gm and maintained under standard conditions (room temp 24 – 27 °C and humidity) with 12h light and dark cycle. The food and water were given ad libitum. Rats of either sex were randomly allocated in groups 8 containing six animals in each. Group I act as control; Group II as standard (Ranitidine 30 mg/ kg p.o); Group III,IV,V treated with 100,200,400 mg/ kg body weight of methanolic leaf extract of Sapindus trifoliatus, Group VI, VII, VIII treated with 100,200,400 mg/ kg body weight of aqueous leaf extract of Sapindus trifoliatus.

The above drug treatment was given for seven days. On 7th day the rats were fasted 36 h before pyloric ligation but water was allowed ad libitum. Care was taken to avoid corophagy. On the eighth day, the rats were anaesthetized with anaesthetic ether and abdomen was opened by a midline incision. The stomach was lifted out; the pyloric end portion was ligated. Care was taken not to occlude any blood vessels. Grasping the stomach with instruments was avoided. The stomach was replaced carefully and the abdomen wall was closed by interrupted sutures. The animals were sacrificed after 6 h with an overdose of anaesthetic ether and the cardiac end of the stomach was ligated. The stomach was taken out and cut along the greater curvature. The gastric juice was collected in centrifuge tubes and centrifuged for the estimation free and total acidity and other biochemical parameters like proteins and total carbohydrates. The volume and pH of the gastric juice were also measured.

The stomachs were then washed with running tap water to see for the ulcers in the glandular portions of the stomach. The numbers of ulcers were noted and severities of ulcers were scored macroscopically with the help of hand lens (10x) (Vogel, 2002).

Mean ulcerative index was calculated as follows

I . Presence of edema, hyperemia and single submucosal punctiform hemorrhages.

II . Presence of submucosal hemorrhagic lesions with small erosions.


Ulcer index = (number of lesion.I) + (number of lesion.II)× 2 + (number of lesion.III) ×3

The percentage inhibition was determined as follows

\[
\text{Percentage inhibition} = \frac{(\text{Control mean lesion index} - \text{test mean lesion index})}{\text{Control mean lesion index}} \times 100
\]

Free acidity and Total acidity were calculated and pH of gastric content was measured using digital pH meter.

Statistical analysis

All the results are reported as mean ± SEM. The statistical analysis was carried out using one way ANOVA followed by Dunnetts multiple comparisons. All the results are obtained in the study were compared with the vehicle control group. P<0.05 were considered statistically significant.
Table 1. Effect of *Sapindus trifoliatus* on Pylorus ligated Gastric ulcers in albino rats.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Gastric juice (ml/ 100 g)</th>
<th>pH</th>
<th>Free acidity (MEQ/ L)</th>
<th>Total acidity (MEQ/ L)</th>
<th>Mean ulcer index ± SEM</th>
<th>Percentage protection</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control (5 ml/ kg of 0.6 % CMC)</td>
<td>6.28±0.107</td>
<td>1.58±0.15</td>
<td>90.17±5.28</td>
<td>114.24±0.22</td>
<td>25.67±0.84</td>
<td>----</td>
</tr>
<tr>
<td>Ranitidine (30 mg/ kg)</td>
<td>3.27±0.201</td>
<td>4.90±3.12</td>
<td>20.24±6.78</td>
<td>34.65±0.13</td>
<td>7.24±3.38**</td>
<td>71.79 %</td>
</tr>
<tr>
<td>Methanolic extract 100 mg/ kg</td>
<td>5.68±0.310</td>
<td>3.23±1.32</td>
<td>78.67±2.48</td>
<td>81.03±0.18</td>
<td>19.65±0.35</td>
<td>23.45 %</td>
</tr>
<tr>
<td>Methanolic extract 200 mg/ kg</td>
<td>4.75±0.230</td>
<td>3.90±0.20</td>
<td>44.17±2.35</td>
<td>58.17±0.37</td>
<td>12.25±0.31</td>
<td>52.27 %</td>
</tr>
<tr>
<td>Methanolic extract 400 mg/ kg</td>
<td>4.10±0.314</td>
<td>4.01±2.12</td>
<td>28.01±1.01</td>
<td>40.72±0.41</td>
<td>9.03±0.24*</td>
<td>64.82 %</td>
</tr>
<tr>
<td>Aqueous extract 100 mg/ kg</td>
<td>6.10±0.275</td>
<td>3.01±0.15</td>
<td>84.61±0.31</td>
<td>100.08±0.34</td>
<td>21.06±0.61</td>
<td>17.95 %</td>
</tr>
<tr>
<td>Aqueous extract 200 mg/ kg</td>
<td>5.35±0.340</td>
<td>3.10±0.210</td>
<td>55.01±0.14</td>
<td>86.78±0.22</td>
<td>13.01±1.31</td>
<td>49.32 %</td>
</tr>
<tr>
<td>Aqueous extract 400 mg/ kg</td>
<td>4.85±0.525</td>
<td>4.7±0.314</td>
<td>36.71±0.11</td>
<td>61.65±0.42</td>
<td>10.10±0.01*</td>
<td>60.13 %</td>
</tr>
</tbody>
</table>

All the values expressed as Mean ± SEM

*P<0.05, **P<0.01 when compared with control*

Discussion

Preliminary phytochemicals screening of *Sapindus trifoliatus* indicates the presence of sterols, flavonoids, tannins, glycosides and triterpinoids. The anti ulcer activity was carried out by pylorus ligation method, the results were tabulated in Table 1, indicated that orally administrated dose of 400 mg/ kg body weight of both methanolic and aqueous extracts of leaves of *Sapindus trifoliatus* showed significant inhibition in ulcer production at 64.82 and 60.13 % respectively. Where as the dose of 200 mg/ kg body weight of both methanolic and aqueous extracts of leaves of *Sapindus trifoliatus* showed marked inhibition 52.27, 49.32 % respectively as compared to standard drug Ranitidine which showed 71.79 % protection (P<0.01).

The alcoholic and aqueous extracts of leaves of *Sapindus trifoliatus* was tested for anti ulcer activity and it was compared with standard Ranitidine and showed significant anti ulcer activity. The reduction gastric acidity and ulceration may be due to histaminergic mechanism by H2 receptor blocked (Brodie 1996, Pandit S 2002). Gastric ulceration is due to various factors, it is likely that many biogenic products may be involved. Prostaglandins, we know to protect but leukotrines predisposed to gastric ulceration. It will be interesting to study the effect of methanol and aqueous extracts of leaves of *Sapindus trifoliatus* on gastric mucosal profile of the leukotrienes.

It appears from the study that methanolic and aqueous extracts containing flavonoids and sterols effectively reduced gastric lesions produced by ethanol may have protective effect against various irritants. However further studies are required to evaluate the exact mechanism of action.
References:

- Dhuley JN, Protective effect of Rhinax, an herbal formulation against physical and chemical factors induced gastric and duodenal ulcers in rats. India Pharmacol, 1999; 31: 128.

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