Anti-ulcer activities of *Sphaeranthus indicus* Linn

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**Abstract**

The ethanol extracts of the whole plant *Sphaeranthus indicus* Linn. (ALS) (*Compositae*) was tested for anti-ulcer by aspirin plus pylorous ligation induced ulcer. The test extracts were tested at 250 mg and 500 mg/kg body weight. The anti-ulcer activity was assessed by keeping ranitidine 50 mg/kg as standard drug. The parameters studied were gastric volume, free acidity, total acidity, and ulcer index. The antiulcer activity was significant with the test extracts. In aspirin plus pylorus ligation method ALSI pretreated animal showed significant reduction in gastric volume, free acidity, total acidity, and ulcer index. The ulcer protection of the extract was found to be 82.9% and 85.3%, whereas the standard drug ranitidine showed 92.6%. The result suggested that ALSI possess significant and dose dependent anti ulcer activity.


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**INTRODUCTION**

*Sphaeranthus indicus* Linn. (*S. hirtus* willd.) (SI) commonly called as East Indian Globe Thistle belonging to *compositae* (Hindi-mundi & Tamil-kottakkarantai) which is widely distributed in India. The plant is used in traditional system of medicine in epilepsy, juice of the plant used in jaundice, hepatopathy and gastropathy. A parts of the herb mixed with oil is good for pruritus and painful swellings. The roots are bitter, acrid, sweet, thermogenic, diuretic, expectorant, febrifuge and stomachic. It is also useful in diabetes, hernia, haemorrhoids, helminthiasis and dyspepsia. Oil prepared by using the root is useful in scrofula. The powdered leaf is good for skin diseases and is
considered as a nervine tonic. (Annomymous, 1982; Chopra et al., 1956; Kirtikar and Basu, 1935). Phytochemical studies reported the presence of sesquiterpenes (Gogte et al., 1986), eudesmenolide and costic acid (Sohani Jayant et al., 1988), β-D-glucoside of (24 S)-24-ethylcholesta-5, 22-diene-3 β-ol (Singh et al., 1986), cyclopeptide alkaloids (Chughtai et al., 1992), 7-hydroxydesmonolides (Rajatkar and Nagasampagi, 1992), and Isoflavone glycoside (Yadava and Kumar, 1998). The pharmacological studies reported in this plant are antimicrobial activity (Singh et al., 1988), and immunostimulant activity of sesquiterpene glycoside (Shekhani et al., 1990).

However no study has been reported to reveal its anti-ulcer activity. Hence present study was under taken to evaluate anti-ulcer activity by aspirin plus pylorous ligation induced gastric ulcer method in rats.

MATERIALS AND METHODS

Plant Material

Pharmacognostically identified Sphaeranthus indicus Linn. (whole plant) was collected from waste lands near chennai in the month of May 2004 and identified by Dr. P. Jayaraman, Ph. D., Plant anatomy research centre, West Tambaram, Chennai- 600 045. The specimen voucher was deposited in S. R. M College of Pharmacy.

Preparation of Extract

The S. indicus whole plants were shade dried, powdered and extracted by maceration with 70% ethanol at room temperature for 24 h. Then the extract was concentrated using rotary vacuum evaporator to get the solid mass. The yield obtained was 7.5%. The extract, ranitidine were suspended in 1% sodium carboxy methyl cellulose (SCMC) and administered to the animals for anti-ulcer studies.

Animals used

Wistar albino rats of either sex were obtained from Tamilnadu Veterinary College and Research Institute, Chennai. The animals were maintained in colony cages at 25 ± 2 °C, relative humidity 50-55% maintained under 12 h light and dark cycle (06 to 18 h light; 18 to 06 h dark). The animals were fed with standard animal feed (Hindustan Lever Ltd.) and water ad libitum. All the animals were acclimatized to the laboratory conditions prior to experimentation. Acute toxicity study was performed for the extracts to ascertain safe dose by acute oral toxic class method of Organization of Economic Cooperation and Development, as per 423 guidelines (OECD) (Donald J. Ecobichon, 1997).

Anti-ulcer studies (Aspirin plus pylorus ligation induced gastric ulcer in rats)

Wistar albino rats of either sex weighing 150-200 g were divided into 4 groups, each group consists of 6 animals. All groups of animals received treatments as shown below along with 200 mg/kg of aspirin once daily for three days. Group 1 received 1.0 ml/kg p.o. 1% SCMC as vehicle control; Group 2 received 50 mg/kg, p.o. ranitidine as standard, Group 3 and Group 4 received 250 and 500 mg/kg, p.o. ALSI respectively. Ulceration in rats was induced as described by Goel et al., 1985. On the fourth day pylorus part was ligated following 36 h fasting (Shay et al., 1945). Four hours after the pyloric ligation the animals were sacrificed by decapitation. The stomach was opened and the ulcer index was determined (Ganguly and Bhatnagar, 1973). The gastric content was titrated against 0.01 N NaOH using Topfer’s reagent as indicator to find out the free acidity and total acidity (Kulkarni, 1999).

Statistical Analysis

The statistical analysis of all the result was carried out using one-way ANOVA followed by Dunnets multiple comparisons using graph pad in stat 3 and all the results obtained in the study were compared with the vehicle control group.

RESULTS AND DISCUSSION

In aspirin plus pylororous ligation induced gastric ulcer the ethanol extract of S. indicus showed significant reduction in gastric volume, free acidity, and ulcer score (Table 1). The total acidity was reduced to significant level only at 500 mg/kg. In
In terms of percentage ulcer inhibition, the ALSI exhibited 82.9 and 85.3 activity as compared to control. It is generally accepted that gastric ulcer results from imbalance between aggressive factors and the maintenance of the mucosal integrity through the endogenous defense mechanism. Several studies indicated that excess gastric acid formation by prostaglandin (PG) includes both increase in mucosal as well as aggressive factors, mainly acid and pepsin causes ulcer. Inhibitors of PG synthesis by aspirin results in the damage of mucosal, parietal and endothelial cells. The results demonstrated that S. indicus extract showed anti-ulcer effects possessing antisecretory mechanism. This interesting observation indicated that S. indicus extract can be a potential source for the treatment of ulcer. Although it showed good activity, further isolation of active chemical responsible for the activity is needed.

Table 1: Effect of alcohol extract of S. indicus on gastric secretion, acidity and ulcer score in aspirin plus pylorus ligated rats.

<table>
<thead>
<tr>
<th>treatment</th>
<th>volume of gastric secretion ml/100g</th>
<th>free acidity mEq/l/100g</th>
<th>total acidity mEq/l/100g</th>
<th>% ulcer inhibition</th>
</tr>
</thead>
<tbody>
<tr>
<td>vehicle control</td>
<td>2.760 ± 0.346</td>
<td>221.66 ± 14.42</td>
<td>357.66 ± 23.740</td>
<td>-</td>
</tr>
<tr>
<td>ranitidine 50 mg</td>
<td>*** ± 0.218</td>
<td>** ± 0.00</td>
<td>**248.41 ± 20.392</td>
<td>92.6</td>
</tr>
<tr>
<td>S. indicus 250 mg</td>
<td>*** ± 0.159</td>
<td>** ± 0.00</td>
<td>291.83 ± 22.436</td>
<td>82.9</td>
</tr>
<tr>
<td>S. indicus 500 mg</td>
<td>*** ± 0.133</td>
<td>** ± 0.00</td>
<td>**199.41 ± 25.818</td>
<td>85.3</td>
</tr>
</tbody>
</table>

Each value is the mean± S.E.M of six determinations. P**<0.01, ***P<0.001 Dunnet test as compared to control.

REFERENCES
