International Journal of Drug Development & Research
| January-March 2013 | Vol. 5 | Issue 1 | ISSN 0975-9344 |
Available online http://www.ijddr.in
Covered in Official Product of Elsevier, The Netherlands
SJR Impact Value 0.13 & H index 2

Full Length Research Manuscript

Anti - ulcer activities of *Sphaeranthus indicus* Linn

P. Malairajan[1]*, G. Venu Babu[2], A. Saral[2], S. Mahesh[2], Gitanjali[2]
[1]Rofel Shri G. M. Bilakhia College of Pharmacy, Vapi (West)-396 191, Gujarat State, India
[2]S. R. M. College of Pharmacy, Kattankulathur-603 203, Kancheepuram District, India

Abstract

The ethanol extracts of the whole plant *Sphaeranthus indicus* Linn. (ALSI) (*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.

*Corresponding author, Mailing address:
P. Malairajan
E-Mail: pmalairajan@yahoo.co.in

Key words:
Anti-ulcer activity, aspirin plus pylorous ligation, *Sphaeranthus indicus*.

How to Cite this Paper:
P. Malairajan[1]*, G. Venu Babu[2], A. Saral[2], S. Mahesh[2], Gitanjali[2] "Anti - ulcer activities of *Sphaeranthus indicus* Linn" Int. J. Drug Dev. & Res., January-March 2013, 5(1): 43-46.

Article History:----------
Date of Submission: 12-09-2012
Date of Acceptance: 28-10-2012
Conflict of Interest: NIL
Source of Support: NONE

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. (Annonymouis, 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 ºC, 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 Co-operation 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 pylorous 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

terms percentage ulcer inhibition the ALSI exhibited 82.9 and 85.3 activity as compared to control.

It is generally accepted that gastric ulcer results for 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.

treatment mg/kg	volume of gastric secretion ml/100g	free acidity mEq/l/100g	total acidity mEq/l/100g	%ulcer inhibition
vehicle control (1% SCMC)	2.760 ± 0.346	221.66 ± 14.42	357.66 ± 23.740	-
ranitidine 50 mg	*** 1.160 ± 0.218	**0.00	**248.41 ± 20.392	92.6
S. indicus 250 mg	***0.833 ± 0.159	**0.00	291.83 ± 22.436	82.9
S. indicus 500 mg	***0.966 ± 0.133	**0.00	**199.41 ± 25.818	85.3

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

REFERENCES

1) Anonymous, 1982. Wealth of India, Raw materials, Publication and Information Directorate, CSIR, New Delhi. IV, 35-36.
2) Chopra, R.N., Nayar, S.I., Chopra, I.C., 1956. Glossary of Indian Medicinal Plants, Publication and Information Directorate, New Delhi. p. 232.
3) Kirtikar, K.R., Basu, B.D., 1935. Indian Medicinal Plant, II. Lalit Mohan Publication, Allahabad pp. 1347- 1348.
4) Gogte, M.G., Ananthasubramanian, L., Nargund, K.S., Bhattcharya, S.C., 1986. Some interesting sesquiterpenoids from *S. indicus* Linn. (Compositae). Indian Journal of Chemistry 25B, 233-238.
5) Sohani Jayant, S., Rojatkar, Supada R., Kulkarni, Mandakini, M., Dhaneshwar Narayandatta, N., Tavale, Sudam, S., Gururow, Tayur, N., Nagasampagi, Bhimsen, A., 1988. A new edudesmonolide and costic acid from *S. indicus* Linn. Journal of Chemical Society, Perkins Trans. 2, 157-160.
6) Singh, S.K., Tripathi, V.J., Singh, A.K., Singh, R.H., 1989. β - D-glucoside of (24 S)-24-ethylcholesta-5, 22-diene-3β-ol from *S. indicus*. Indian Drugs 26, 317-318.
7) Chughtai, M.I.D., Khokhar, Irshad, Ahmed, Ashfaq. 1992. Isolation, purification and structural determination of alkaloids from the flowers of *S. indicus*. Sci International (Lahore), 4, 151-154.
8) Rojatkar, S.R., Nagasampagi, B.A., 1992. 7-Hydroxyeudesmonolides from *Sphaeranthus indicus*. Phytochemistry 31, 3270-3271.
9) Yadava, R.N., Kumar, S., 1998. A novel isoflavone glycoside from the leaves of *Sphaeranthus indicus*. Fitoterapia 70, 127-129.
10) Singh, S.K., Saroj, K., Tripathi, V.J., Singh, A.K., Singh, R.H., 1988. Antimicrobial principle from *Sphaeranthus indicus* L. family Compositae. International Journal of Crude Drug Research 26, 235-239.
11) Shekhani, M.S., Shah, P. M., Yasmin, A., Siddiqque, R., Perveen, S., Khan, K. M., 1990. Atta-ur-Rahman. An immunostimulent sesquiterpene glycoside from *Sphaeranthus indicus*. Phytochemistry 29, 2573-2576.
12) Donald, J., Ecobichon, 1997. The Basis of Toxicity Testing. CRC Press, New York, pp. 43–49.
13) Goel, R.K., Chakrabarti, A., Sanyal, A.K., 1985. The effect of biological variables on the antiulcerogenic effect of vegetable plantain banana. Planta Medica 2, 85-88.
14) Shay, H., Komarov, S.A., Fels, S.E., Meraze, D., Gruenstein, M., Siplet, H.A., 1945. Simple method for the uniform production of gastric ulceration. Gastroenterology 5, 43-61.

15) Ganguly, A.K., Bhatnagar, O.P., 1973. Effect of bilateral adrenalatomy on production of restraint ulcers in the stomach of albino rats. Canadian Journal of Physiology and Pharmacology 51, 748-750.

16) Kulkarni, S.K., 1999. Handbook of Experimental pharmacology, 3rd ed. Vallabh Prakashan, New Delhi. pp. 148-150.