World Journal of Pharmaceutical and Life Sciences
WJPLS
www.wjpls.org
SJIF Impact Factor: 6.129

ANTIULCER ACTIVITY OF NUTS OF SEMECARPUS ANACARDIUM LINN.

Dr. R. Xavier Arulappa*, M. Jerubin Welsingh, V. Vasudevan and S. Mohan

HOD Department of Pharmaceutical Chemistry, S.A. Raja Pharmacy College, Vadakankulam, Tirunelveli District – 627116, Tamil Nadu, India.

Corresponding Author: Dr. R. Xavier Arulappa
HOD Department of Pharmaceutical Chemistry, S.A. Raja Pharmacy College, Vadakankulam, Tirunelveli District – 627116, Tamil Nadu, India.

Article Received on 10/12/2020 **Article Revised on 30/12/2020** **Article Accepted on 20/01/2021**

ABSTRACT

This study was performed to determine the antiulcer activity of extracts of *semecarpus anacardium* against pylorous ligation induced gastric ulcer. The ethanolic extract of *semecarpus anacardium* at the dose of 400 mg/kg P.W markedly decrease the incidence of ulcers in pyloric ligated rats. In pyloric ligated rats, there was an increase in the gastric volume, free and total acidity and ulcerative index as compared to the control group. The ethanolic extract of seme carpus anacardium at the dose of 400 mg/kg showed significant reduction in the above parameters which was comparable to the standard drug Ranitidine (50 mg /Kg). Semecarpus anacardium extract showed ulcer protection index 70.45% where as standard drug Ranitidine showed ulcer protection index 76.13%.

KEYWORDS: *Semecarpus anacardium*, Chloroform extract, ethanolic extract, pylorous ligation induced gastric ulcer and Ranitidine.

INTRODUCTION

Peptic ulcer disease (PUD) is a spectrum of diseases consisting of gastritis, gastric ulcers and duodenal ulcers.[1] It is known to occur when the endogenous defense mechanism of the protective mucosal barrier have failed to sufficiently counteract the aggressive factors (hydrochloric acid, pepsin and Helicobacter pyroli) and is characterized by burning sensation in the abdomen.[2] These agents have been implicated in the pathogenesis of gastric ulcer, including enhanced gastric acid and pepsin secretion, inhibition of prostaglandin synthyesis and cell proliferation growth, diminished gastric blood flow and gastric motility.[3] A duodenal ulcer occurs more frequently than gastric ulcers. Medicinal herbs are significant source of pharmaceutical durg. Latest trends haver shown increasing demand of phyto drugs and some medicinal herbs have been proven antiulcer activity. Herbal medicines are considered safer because of their natural ingredients with no side effects.[4]

Semecarpus anacardium linn belongs to the family Anacardiaceae,[5] and it is deciduous tree, known as cen-kottai commonly found in the outer Himalayas to Coromandel Coast. The phytochemical studies revealed the nuts of consist of Flavonoids, alkaloids, carbohydrates, phenolic compounds, glycosides, phytosterols proteins and amino acids and coumarins.[6] The plant traditionally used as anti inflammatory, Antioxidant, Antibacterial Immuno modulatory, cytoprotective activities.[7] This plant is related to semecarpus species. So far the ulcer activity was not confirmed in this plant and its related species. Hence steps taken whether this plant possess the above property and to check other phyto chemical constituents.

MATERIALS AND METHODS

Plant Collection

The nuts of *semecarpus anacardium* were collected from Tirunelveli, Tamilnadu during the month of September 2018. It was identified and authenticated by Dr. V. Chelladurai, Research officer- Botany, central council for Research in Ayurveda and Siddha, Govt of India. The voucher specimen is (SARPC/RXA/CC-301) was deposited in the department of pharmaceutical chemistry in S.A. Raja Pharmacy College, Tirunelveli for future reference.

Preparation of extract

The nuts of *semecarpus anacardium* were shade dried and reduced to coarse powder in a mechanical grinder. About 1 Kg of coarsely powdered plant material was first extracted with chloroform for 72 hours. The extract was concentrated with rotary evaporator to get solid residue. The marc left was removed, dried and successively extracted with ethanol by hot percolation until complete extracted was effected. It was then concentrated under reduced pressure and finally dried in desiccators.

Animal used

The Wistar albino rats of either sex weighing between 150gm to 200 gm were used for the study. They were procured from Cape bio lab and Research Centre, Marthandam, Kanyakumari District, Tamilnadu, India. They were maintained on the synthetic pellet feed and clean water ad libitum. Animals were housed in controlled conditions with a temperature of 25 $\pm 2^0$c and relative humidity 55±10% and 12/12 hours light dark cycle environment.[8] Animals were kept in cages atleast 5 days before dosing to allow for acclimatization to laboratory condition. The experimental protocol was approved by the Institutional Animal ethical committee (Approved No: SARPC/IAEC/008/18-19) by the IAEC (Reg. No 2009/PO/RE/S/18/CPCSEA) dated on 17.11.2018. All the experiments were performed in the morning according to current guidelines for the care of laboratory animals. OECD test guidelines 425. The standard orogastric cannula was used for oral drug administration.

Acute toxicity studies

According to Literature survey, doses of *semecarpus* were used from 100-400 mg/kg on this basis, the dose level of *semecarpus anacardium* that were selected for evaluation of antiulcer activity was 200mg/kgand 400 mg/kg dose level were selected for the evaluation of anti-ulcer activity.[9]

Experimental Design

The Wistar Albino rats of either sex were divided into six groups of six animals (n=6) each. The first group was the normal control received 2% gum acacia suspension 1ml/kg while the second group served as standard received Ranitidine (50 mg/kg) in 2% gum acacia suspension. The third group was received with (CESA) at the dose 200 mg/kg. The fourth group was received with (CESA) at the dose 400 mg/kg. The fifth group was received with (EESA) at the dose 200mg/kg. The Sixth group was received with (EESA) at the dose of 400mg/ kg body weight respectively by oral route.

Animals were fasted for 24 hours before the study but had free access to water. After one hour, the animals were anesthetized using anesthetic ether. The abdomen was opened, and the pyloric portion was ligated. The abdominal was closed by sutures.

After 4 hr of ligation, the animals were sacrificed with excess of anesthetic ether. The abdomen was opened and a ligature was placed around the cardiac sphincter. The stomach was removed.[10] Gastric volume, pH, free and total acid content of gastric Juices were determined. Mean ulcer score for each animal was expressed as ulcerative index and the percentage ulcer protection was also calculated.

Estimation of gastric volume and free and acidity changes in pyloric ligation model

Gastric volume

Four hours of Ligation, stomachs were centrifuged and subjected to titration for estimation of free and total acidity. One mille meter of the supernatant liquid was pipette out and dilute to 10ml with distilled water. The solution was titrated against 0.01 N NaoH using topfer's reagent as indicator. The endpoint is the appearance of orange colour. The volume of NaoH needed was taken as corresponding to free acidity. Then the titration was further continued by adding 1% solution of phenolphthalein till the solution becomes pink colour. The volume of NaoH required was noted and was taken as corresponding to total acidity. The sum of two titrations was total acidity.[11] Acidity was expressed as

$$\text{Acidity} = \frac{\text{Volume of NaoH x Normality x 100 mEq/L/100gm}}{0.1}$$

Estimation of gastric ulcerative index changes in pyloric ligation model

Ulcerative index was measured by takagietal method.[12] The stomach was opened along with the greater curvature. The stomach was washed with running tap water. Then it was placed on a flat wooden plate to count the ulcerative area. The ulcer index was determined by using the formula.

$$\text{Ulcer index} = \frac{10}{X}$$

Where, X = Total mucosal area/ total ulcerated area.

Percentage ulcer protection was calculated using the formula.

$$\text{Ulcer protection (\%)} = \frac{100 - Ut}{Uc \times 100}$$

Where

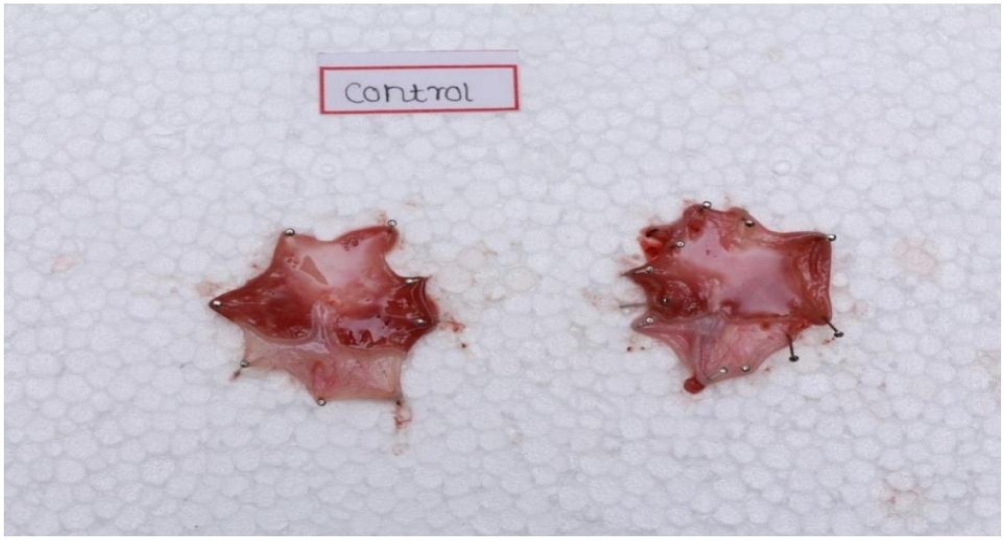
Ut = Ulcer index of treated group.

Uc = Ulcer index of control group.

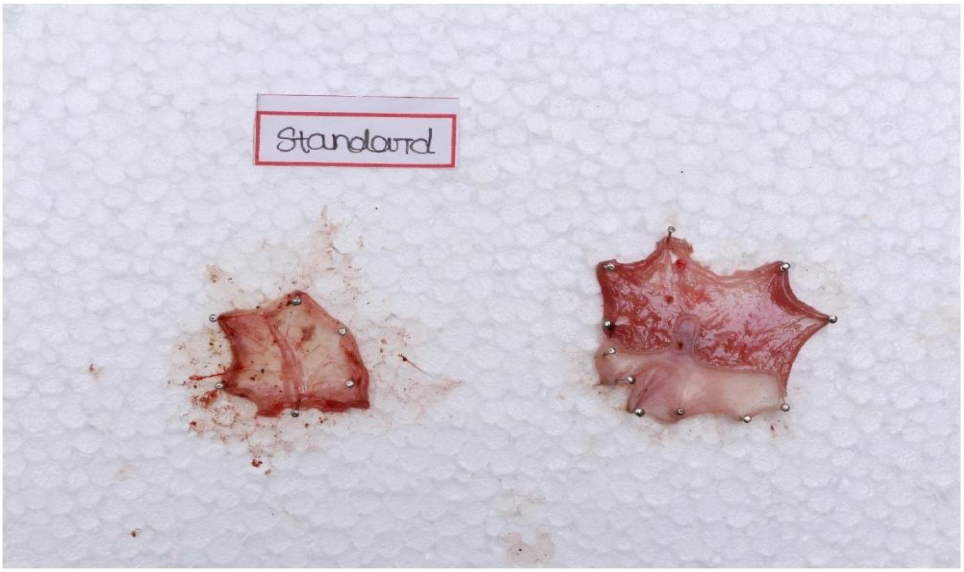
Statistical Analysis

All the biochemical results were expressed as mean ± standard error of mean (SEM) data were analysed by one way ANOVA followed by Dunnett's test.

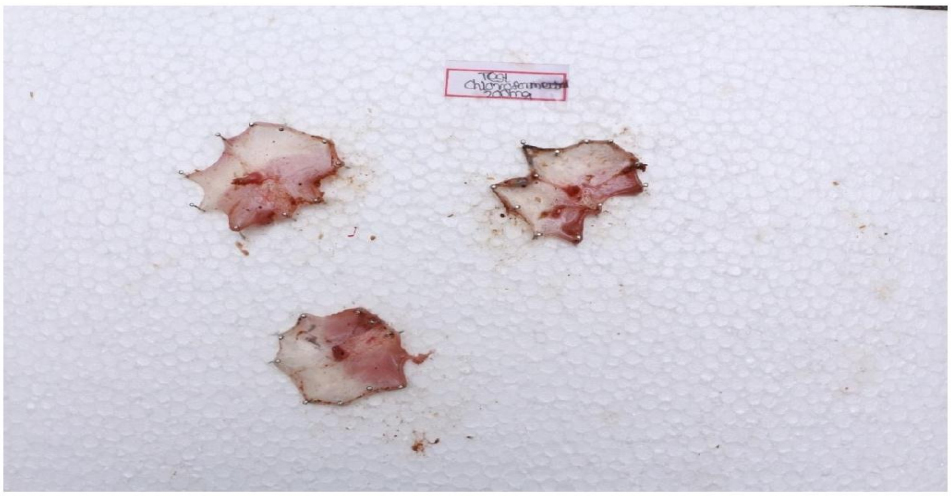
Control of *Semecarpus anacardium* Linn



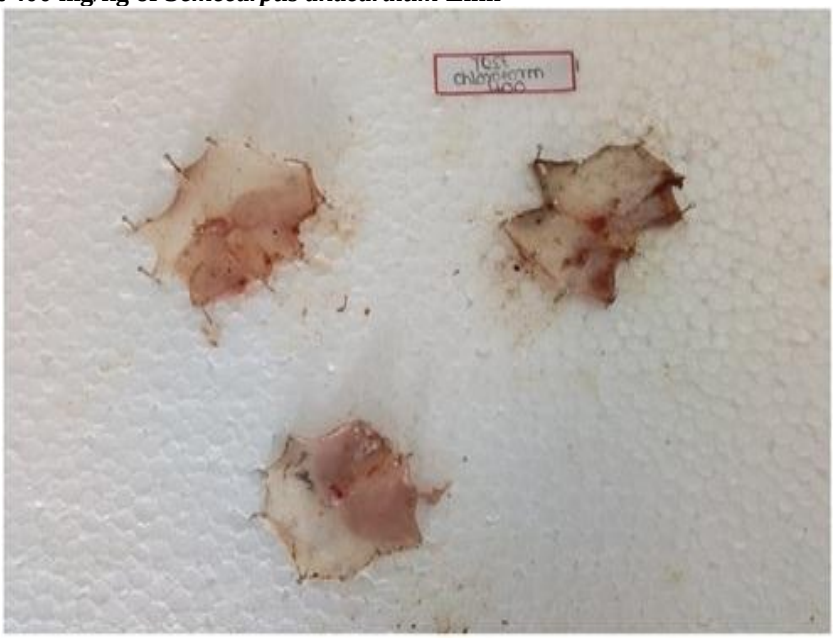
Standard of *Semecarpus anacardium* Linn



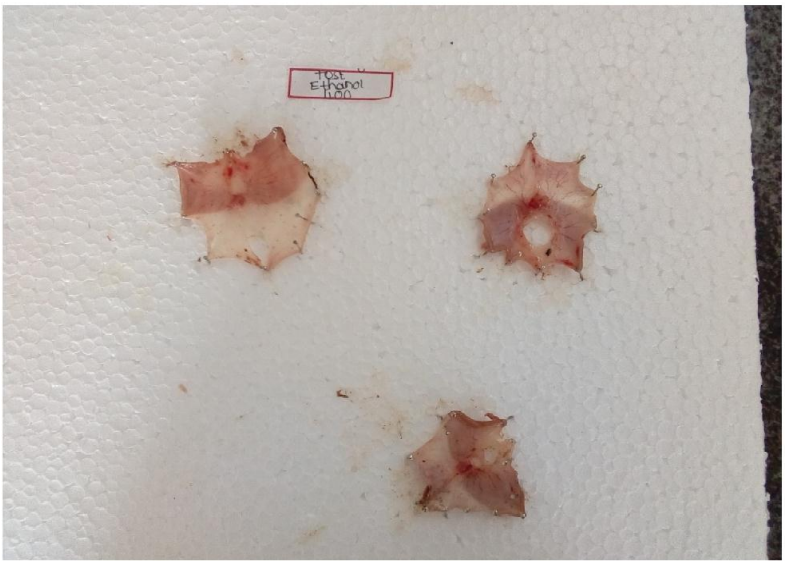
Chloroform Extract 200 mg/kg of *Semecarpus anacardium* Linn



Chloroform Extract 400 mg/kg of *Semecarpus anacardium* Linn



Ethanol Extract 200 mg/kg of *Semecarpus anacardium* Linn



Ethanol Extract 400 mg/kg of *Semecarpus anacardium* Linn

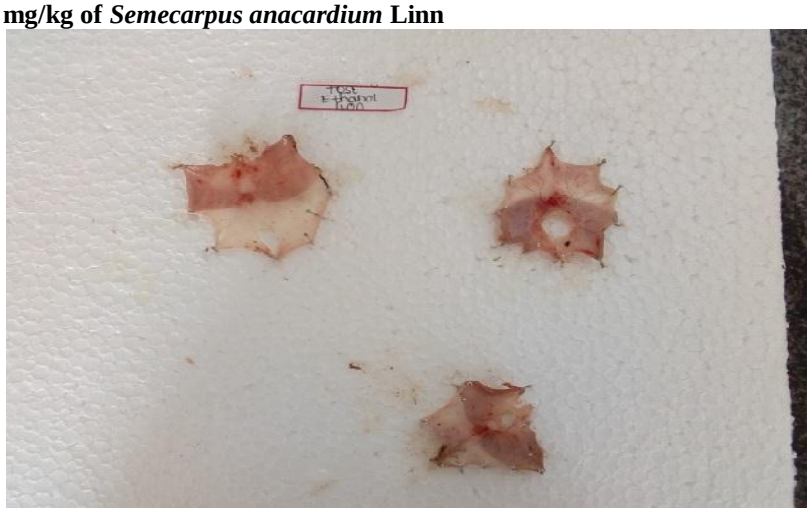


Table No. 3: Effect of ***Semecarpus anacardium Linn*** **extract on gastric parameters by pyloric ligation induced ulceration in Wistar albino rats**

Treatment	Volume of gastric content (ml)	pH of gastric content	Free acidity (meq/L/ 100mg)	Total acidity (meq/ L/100mg)	Ulcer index	% inhibition of ulcer
Vehicle control	9.43 ± 0.04	1.16 ± 0.06	66.33 ± 0.49	105.0 ± 0.36	8.78 ± 0.06	-------
Standard Ranitidine 50 mg/kg	4.75 ± 0.07***	5.13 ± 0.04***	63.83 ± 0.47**	80.17 ± 0.47***	5.13 ± 0.04***	76.13%
Chloroform extract 200 mg/kg	7.38 ± 0.10***	3.10 ± 0.03***	67.50 ± 0.42ns	94.17 ± 0.47***	3.10 ± 0.03***	57.95 %
Chloroform extract 400 mg/kg	7.60 ± 0.07***	3.78 ± 0.04***	61.00 ± 0.57***	80.67 ± 0.49***	3.78 ± 0.04***	64.77 %
Ethanol extract 200 mg/kg	6.70 ± 0.08***	4.01 ± 0.04***	56.83 ± 0.47***	97.33 ± 0.49***	4.01 ± 0.04***	65.90 %
Ethanol extract 400 mg/kg	6.20 ± 0.05***	5.10 ± 0.03**	78.83 ± 0.47***	108.7 ± 0.49***	5.10 ± 0.03***	70.45 %

All values are expressed as mean± S.E.M, n=6 Values are significantly different fromVehicle administered control group. P values: ns- non significant, * p< 0.05, ** p< 0.01, *** p< 0.001 (One way ANOVA followed by Dunnett's test).

RESULTS AND DISCUSSION

In pyloric ligated rats, there was an increase in the gastric volume, free and total acidity and ulcerative index as compared to the control group, extract showed reduction in gastric secretion free and total acidity and ulcerative index at dose of 200 mg and 400 mg kg showed significant reduction in the above parameters which was comparable to the standard drug Ranitidine. It was suggested that EESA at both the concentration has anti ulcer potency. The results were shown in Table No: 1 and Figure No: 1 to 6.

CONCLUSION

The anti ulcer activity of *Semecarpus anacardium* is evident from the studies conducted based on the evaluation of acidity of gastric juice, gastric volume, pH, ulcer index and percentage of inhibition of ulcer. The group of rats that were treated with *Semecarpus anacardium* extract showed significant reduction in the acidity of gastric juice and the length of lesion present in the stomach of rats. From the above data EESA 400 mg/kg was more potent than other extract and we can conclude that the effect produced by the extract was dose – dependent. Thereby our focus to take part to identify and isolate the active constituent for future studies.

ACKNOWLEDGEMENT

I hereby express my sincere gratitude to **Dr. Jacob Raja M.D.S., FIDA,** Chairman, Rajas Medical Institutions, Kavalkinaru for his motivation and valuable suggestions in the successful completion of this work.

REFERENCE

1. Gregory MC, Tolamn KG. Diseases: Manifestation and pathophysiology Inc: Remington, The science and practice of pharmacy, Lippincot, Willam and wilkins, USA 20th ed, 2000; I: 1084-1085.
2. Dhuley JN, Naik SR. protection by Rhinax in various models of ulceration in rats J. Ethnopharmacol, 1998; 63: 219-225.
3. Toma W, Hiruma- Lima CA, Gurrer Ro, Souza AR, preliminary studies of Mammea Americana L. Sark extract point to an effective antiulcer effect on gastrioc models in mice, phytomedicine, 2005; 12: 345- 350.
4. Hamdulay: Evaluation of gastric antiulcer activity of Trichsanthes dioica Rox leaves, International Journal of Pharmaceutical sciences and research, 2012; 3(11): 4332-4337.
5. P.K. Varier, VPK Nambiar, C. Ramankutty *Semecarpus anacardium* Linn Nuts, Indian Medicinal Plants, 1996, 5: 99-103.
6. Harbone, J.B, Phytochemical methods, chapman and Hall, London, 2005; 49-52.
7. Nadkarni KM, Nadkarni A Indian Materia Medica; popular prakashan Bombay, 1982; I: 1119- 1123.
8. Vinothaposhan G., and Sundar K, Antiulcer activity of *Adhatoda vasica* leaves against gastric ulcer in rats, Journal of Global pharma Technology, 2009; 3(2): 7-13.
9. Arul B; Hypoglycemic effect of *semecarpus anacardium* Linn; clinical pharmaeology, 2004; 26(10): 759-763.

10. Khayum, M.A, Nanda Kumar K and Rao V.N, Antiulcer activity of stem extracts of Tinospora Malaborica, 2009; I: 885-890
11. Rajkapoor B, Anandan R, Antiulcer effect of nigellia slativa Linn against gastric ulcer in rats, current science, 2002; 82: 177-179.
12. Takagi, K, Okabe S, A new method for the production of chronic gastric ulcer in rats and the effect of several drugs on healing, Jour Pharmacol, 1969; 19: 418-428.