



EVALUATION OF GASTRO PROTECTIVE EFFECT OF *TRICHOSANTHES TRICUSPIDATA* LINN

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ABSTRACT

The study was designed to investigate the preliminary phytochemical screening and anti-ulcer potential of different leaf extracts of *Tricosanthus tricuspidata* Linn using ethanol induced gastric ulceration on albino wistar rats. The leaves were extracted with solvents like Hexane (HETT), Chloroform (CETT), Ethanol (EETT) and Water (AETT). The preliminary phytochemical test results showed that the leaves contain alkaloids, glycosides, saponins, carbohydrates, proteins, phytosterols. The rats were pretreated with ethanol for the induction of gastric ulceration. After 30 minutes, all extracts were administered at two dose levels (200 and 400 mg/kg⁻¹ p.o). Ranitidine (150mg/kg⁻¹ p.o) was used as standard drug. The results showed that the hexane extract elicited significant (\bar{P} <0.01) gastroprotective activity when compared with disease control.

Keywords: *Tricosanthus tricuspidata*, Anti-ulcer activity, Gastric ulceration, Ulcer index.

INTRODUCTION

Trichosanthes tricuspidata .Linn is a wild plant known as red ball in English, lal indrayan in Hindi, Korati Palam in Tamil. It has been reported to possess anti asthmatic activity in ayurvedic medicine, carminative and purgative in the Unani system of medicine and used as a remedy for fever in the Thai traditional system of medicine. The oil extracted from the root is used as a pain killer. Peptic ulcer is a conglomerate of heterogeneous disorders, which manifests itself as a break in the lining of the gastrointestinal mucosa bathed by acid and/or pepsin. Non Steroidal anti-inflammatory drugs (NSAID) ingestion is associated with erosions, petechiae, type C gastritis, ulceration, interference with ulcer healing, ulcer complications and injury to the small and large intestine¹. Although a number of Anti-ulcer drugs such as H₂ receptor antagonists, proton pump inhibitors and cytoprotectants are available for ulceration has side effects and limitations. Herbal medicine deals with plants and plant extracts in treating diseases. These medicines are considered safer because of the natural ingredients with no side effects². Therefore this study was designed to investigate the gastroprotective effect of *Trichosanthes tricuspidata* against ethanol induced gastric ulceration on albino rats.

MATERIALS AND METHODS

Plant material

The fresh leaves of *Tricosanthus tricuspidata* Linn were collected from Thanjavur District, Tamilnadu, India in the month of September. It was identified and authenticated (PARC/2009/386) by DR. P. Jayaraman, Director, the National Institute of Herbal Science, Plant Anatomy Research Center (PARC) at Chennai.

Extraction

The leaves were allowed to shade dried. Then the coarse powdered leaves were subjected to soxhlet extraction by using solvents like Hexane, Chloroform, Ethanol and Water on the polarity basis. After extraction the solvents were removed by Rotary vaccum evaporator³ (MAC Buchi type) under reduced pressure. Then each extract was stored in airtight container and placed in a desiccator.

Experimental animals

Albino wistar rats of weighing between 150-200gm were used for this study⁴. The animals were housed under standard conditions and room temperature (25±20°C). All animals were fed with standard rat pelleted diet (M/S Pranav Agro Industries Ltd., India). Under the trade name Amrut rat/mice feed and had free access to tap water. The study has got approval from the Institutional Animal Ethics Committee, Animal house facility (Registration No: 743/abc/cpsea), PRIST University, Thanjavur, TamilNadu, India. Approval number (M.Pharm-05/2009-2010) and the proposal was approved by the meeting which was held on 12/4/2010.

Acute oral toxicity study

Acute oral toxicity study was conducted as per OECD 425 guideline⁵. Female albino wistar rats (150-200 gm) maintained under standard laboratory condition was used. A total of five animals were used for this study which received a single dose (2000mg/kg Body weight) of the extract. Animals were kept overnight fasting prior to drug administration. Animals were observed individually once during the first 30 minutes after dosing, periodically during 14 days. Once daily cage side observations included changes in eyes and mucus membrane, skin and fur, respiratory rate, CNS changes and gross pathological examinations were carried out.



Experimental protocol

The experimental rats were fasted for 18 h but had water *ad libitum*⁶. The animals were randomly divided into seven groups of six each. Group I received 1ml of vehicle (5% Tween-80 aqueous solution)⁷, Group II was treated with 0.5ml of 90% Ethanol, p.o, Group III received standard drug Ranitidine 150 mg/kg, p.o, Group IV received HETT(200mg/kg, p.o), Group V received CETT(200mg/kg, p.o), Group VI received EETT(200mg/kg, p.o) and Group VII received AETT(200mg/kg, p.o). One hour later, ulceration was induced by intragastric administration of ethanol⁸. One hour after ethanol administration, the animals were sacrificed under ether anaesthesia⁹ and the stomach were surgically removed and opened along the greater curvature to examine the lesions macroscopically. The number and gravity of erosions were scored.

The scales were as follows: (0) no ulcer; (1) hemorrhagic and slight ulcer, length <2 mm; (2) one haemorrhagic and slight ulcer, length <5 mm; (3) more than one ulcer grade 2; (4) one ulcer length <5mm and diameter <2 mm; (5) from one to three ulcers of grade 4; (6) from four to five ulcers of grade 4; (7) more than six ulcers of grade 4; (8) complete lesion of the mucosa with hemorrhage.

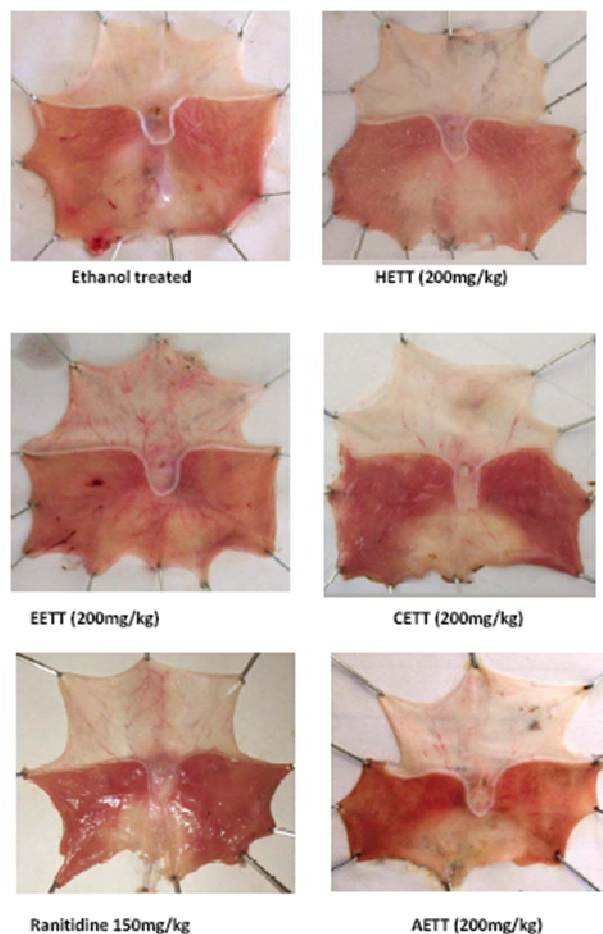
The stomachs were removed, opened rinsed with cold saline and the length of lesions (mm) was measured under microscope, summed and graded into 5 degrees of ulcer index as follows :

Length of Lesion	Score
Less than 1 mm	01
1 mm to 5 mm	02
5 mm to 10 mm	03
10 mm to 15 mm	04
More than 15 mm	05

From this data, the percentage inhibition of ulceration was determined for each group.

Statistical analysis

Values are expressed as Mean \pm S.E.M. Statistical significance was analyzed using one way ANOVA.



RESULTS

The extract of various leaf extracts of *Trichosanthes tricuspidata* was prepared using soxhlet extraction and the yield obtained was 11% which was subjected to preliminary chemical screening and resulted positively for the presence of Alkaloids, Carbohydrates, Saponins and Proteins as shown in the table 1.

Table 1: Phytochemical screening of *Trichosanthes tricuspidata*

S.No	Constituents	Hexane	Chloroform	Ethanol	Aqueous
1	Alkaloids	+	+	+	+
2	Glycosides	+	—	+	—
3	Carbohydrates	+	+	+	+
4	Saponins	+	+	+	+
5	Proteins	-	+	+	+
6	Phytosterol	—	—	+	—

Table 2: Percentage of ulcer inhibition due to the administration of various extracts of *Trichosanthes tricuspidata*

Group	Treatment	Dose (mg/kg ⁻¹)	Ulcer score	% of inhibition
I	Ethanol	-	12.37 \pm 0.48	--
II	Ranitidine	150	6.11 \pm 0.36***	72.32
III	HETT	200	8.62 \pm 0.61 **	43.77
IV	CETT	200	8.91 \pm 0.45 **	45.87
V	EETT	200	9.64 \pm 0.43 **	37.11
VI	AETT	200	9.65 \pm 0.85 **	37.05

Values are expressed as mean \pm S.E.M. (n=6) **P<0.01, ***P< 0.001 when compared with the control group



The extract did not produce any toxic symptoms or mortality up to the dose level of 2000mg/kg in albino rats and hence the drug were considered safer for further pharmacological screening according to the OECD 425 guidelines for acute toxicity, the LD₅₀ of *Trichosanthes tricuspidata* was more than 2000mg/kg.

Ulcer score and percentage inhibition of ulcers were studied, the percentage inhibition of Hexane, Chloroform, Ethanolic, Aqueous extract was found to be 43.77, 41.87, 37.11, and 37.05 respectively at 200 mg/kg.

DISCUSSION

Peptic ulcer disease (PUD) encompassing gastric and duodenal ulcers is the most prevalent GIT disorder that affects a considerable number of people in the world and some authors consider gastric ulcer as the new "plague" of 21st century¹⁰. The defense potential of mucus perimeter of gastric mucosa depends upon a delicate balance between the processes affecting the synthesis and secretion of its mucin constituents. To regain the balance, different therapeutic agents including plant extracts are used to inhibit the gastric acid secretion or to encourage the mucosal defense mechanisms by increasing mucus production, stabilizing the surface epithelial cells, or interfering with the prostaglandin synthesis thus the primary therapeutic approach of an anti-ulcer agent involves maintenance of a delicate balance of factors controlling the synthesis, secretion and breakdown of its proteins, glycoprotein, and lipid components, so as to strengthen the mucosal integrity¹¹. In the present study the reduction in ulcer index shows the ability of the extract either to protect the gastric mucosal (cytoprotective) against ulceration or may be suppression of already established ulcers.

CONCLUSION

Hexane extract and chloroform extract have more gastro protective activity that aqueous and ethanol extract. It concludes that the active constituent responsible for gastro protective activity is Polar in nature.

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