Research Article

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Assessment of Anti-ulcer activity of Tribulus Terrestris fruits in Pylorus ligated rats

V Siva Ganesh*[1], G Venkata Nagaraju[2]

[1*]Department of Pharmacology, Sri Adichunchanagiri College of Pharmacy, Adichunchanagiri University, BG Nagar, Mandya-571448, Karnataka, India

[2] Assistant Professor, Department of Pharmacy Practice, sims College of Pharmacy Guntur, A.P, India, and Department of Pharmacy Practice, School of Pharmaceutical Sciences, Jaipur National University, Jaipur, Rajasthan, India

***Corresponding Author**
V. Siva Ganesh
Email: ganesh.cology@gmail.com

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Abstract
Tribulus Terrestris is used in Indian, Chinese, Bulgarian, and South African folk medicine to treat sexual dysfunction, oedemas, abdominal distention, and cardiovascular disorders. Tt has been shown to have antibacterial, antihypertensive, diuretic, antiacetylcholine, haemolytic, spermatogenesis, libido, and anticancer properties, as well as cardiovascular system effects
Keywords: Tribulus Terrestris, South African, sexual dysfunction, antiacetylcholine.

1. Introduction

Tribulus terrestris (Tt) a member of Zygophyllaceae is an annual plant that originated in the Mediterranean region but is now widely scattered around the world. It is used in Indian, Chinese, Bulgarian, and South African folk medicine to treat sexual dysfunction, oedemas, abdominal distention, and cardiovascular disorders. Tt has been shown to have antibacterial, antihypertensive, diuretic, antiacetylcholine, haemolytic, spermatogenesis, libido, and anticancer properties, as well as cardiovascular system effects [1,2,3,4]. Despite extensive research on ulcers, the aetiology of chronic peptic ulceration remains unknown. Although the origins of ulcers are unknown in the majority of instances. It is

widely assumed that they are caused by a conflict between aggressive forces and endogenous defence mechanisms that maintain mucosal integrity. The drugs used to treat peptic ulcers are either designed to inhibit these aggressive elements or to stimulate the mucosal defence system. Regardless of how far conventional chemistry and pharmacology have progressed in developing effective medications, the plant kingdom could represent a useful source of new antiulcer chemicals for development as pharmacological entities or as simple dietary supplements to existing therapies [5,6,7]. The purpose of this study was to see how effective a methanolic extract of Tt fruits was at preventing pylorus ligation-induced ulcers in Wistar rats.

2. Material and methods:

2.1 Plant**:** Fruits of TT were collected from Ulavapadu, Andhra Pradesh, India. The plant was identified and authenticated by a Curator, Research Department, Foundation for Revitalisation of Local Health Traditions, 74/2 Jarakabande kaval, Post Attur, via Yelahanka, Bangalore, Karnataka 560 064, India.

2.2 Drugs and chemicals

Omeprazole and the other compounds used in this experiment were purchased commercially and were of analytical quality.

2.3 Fruit Extract Preparation:

The Tt fruits were dried in the shade, pulverised, and sieved using a 40-mesh sieve. In a soxhlet system, dried powder (200 g) was extracted sequentially with Petroleum ether, chloroform, and methanol. By distillation (at 60 °C without vacuum), the extracts were concentrated to a dry residue, which was then dried entirely in a desiccator and weighed. The methanol extract yield was found to be 21 grams. Only the methanol extract was proven to have gastroprotective properties.

2.4 Phytochemical and pharmacological screening

The methanol extract was tested for phytochemical and pharmacological effects. The methanol extract contained alkaloids, carbohydrates, flavonoids, saponins, and terpenes, according to early phytochemical analysis. Proteins, amino acids, phenols, glycosides, fixed oils, volatile oils, steroids, and tannins were found to be absent in the extract [8,9]. The methanol extract was uniformly suspended in 1 percent carboxymethyl cellulose (CMC) diluted in water and given orally as a dosing agent.

2.5 Animals

The investigation was carried out after receiving institutional ethics committee approval. For one week before and during the trials, albino Wistar rats of either sex (100–150 g; 4–6 weeks old) were kept under controlled conditions of light and dark (12 h/12 h), temperature (26±2°C), and relative humidity (44–56 percent). Standard laboratory feed and unlimited water were provided to the animals. Animals were fasted overnight for research purposes but were given free access to water.

2.6 Procedure for the experiment:

2.6.1 Determination of Total acidity

Total acidity was determined by placing an aliquot of 1 mL gastric juice in a 50 mL conical flask, adding two drops of phenolphthalein indicator, and titrating with 0.01N NaOH until a persistent pink colour was detected. The amount of 0.01N NaOH consumed was kept track of. The total acidity is calculated using the formula: n × 0.01 × 36.45 × 1000, where n is the volume of NaOH consumed, 36.45 is the molecular weight of NaOH, 0.01 is the normality of NaOH, and 1000 is the factor (to be represented in litre).

2.6.2 Free Acidity determination

Topfer's reagent was used instead of phenolphthalein indicator to determine free acidity. A small amount of stomach juice was titrated with 0.01N Sodium hydroxide until a canary yellow colour appeared. The amount of 0.01N Sodium hydroxide consumed was kept track of. The formula for determining total acidity was used to compute the free acidity [8].

2.7 Ulcer score

The gastric mucosa was examined for ulcers using a magnifying lens, and the ulcers were rated based on their severity in contrast to the standard. The ulcer score ranged from 0 to 0.5, with 0 indicating no ulcer and 0.5 indicating red colouring. 1.5, hemaorrhagic streaks; 1, solitary haemorrhagic spot 2, Ulcer greater than 3mm but less than 5mm; 3, Ulcer greater than 5mm [10].

The formula was used to compute the percentage of protection.

Protection percentage=100 (ut x 100)/ uc

Where ut denotes the ulcer index of the treatment group and

uc denotes the ulcer index of the control group.

The ulcer index is the average ulcer score for each animal.

2.8 Experimentation

The Wistar rats were separated into five groups of six animals each to test the effect of TTon pylorus ligated-induced ulcers. Group I was given a suspension of 1 percent carboxymethyl cellulose in distilled water (10 ml/kg) as a negative control. Group II were used as positive controls, with Omeprazole (8 mg/kg) as the reference. Methanolic extracts were given to groups III–V at dosages of 150, 300, and 600 mg/kg respectively. All treatments were given orally at a volume of 1 mL per 100 g of body weight.

One hour after therapy, the pylorus was ligated. The rats were slaughtered and the stomach removed six hours following the ligation. The contents of the stomach were collected, centrifuged, and the supernatant was analyzed. Shay et al. (1945) [11] showed how to measure and score the ulcer that occurred in the gastric mucosa. As previously stated, the ulcer index, percentage ulcerated surface, and % inhibition were calculated.

The hydrogen ion concentration in one millilitre of total centrifuged gastric contents from each pylorus-ligated rat was determined by titrating against a 0.01N NaOH solution using pH metre The experiment was carried out three times.

Statistical analysis

Statistical analysis was carried out using ANOVA followed by Tukey's test, with a significance level of p 0.05 accepted for differences between treatments. The mean and standard error of the mean are used to express the data.

3. Results and Discussion

The administration of methanolic extracts of TT in various doses (125, 250, and 500 mg/kg) resulted in a substantial graded and dose dependent reduction in ulcer index. The Tt also decreased volume of gastric contents, total and free acidity of the gastric fluid as shown in (Tables 1 and 2).

Treatment	**Total acidity m eq/ l (100 g)**	**Free acid m eq/ l (100 g)**	**Gastric secretion volume (ml)**
Negative Control	82.63±1.63	34.84±1.22	3.49±0.408
Positive Control	13.18±0.78	5.205±0.34	1.68±0.364

Test 1	45.28±0.99	25.59±0.39	2. 50±0.525
Test 2	54.30±1.51	22.87±1.91	2.74±0.384
Test 3	35.16±0.88	15.25±0.98	2.05±0.173

Table 1: Influence of Tribulus terrestris extract on various secretary (Gastric acid) parameters in a pylorus ligation-induced gastric secretion model

Treatment	Mean Ulcer Index
Negative Control	7.39±0.51
Positive Control	0.96±0.06
Test 1	4.47±0.40
Test 2	3.85±0.28
Test 3	2.905±0.17

Table 2: The effect of extract of tribulus terrestris extract on pylorus-ligated ulcer model in Wistar rats

Stomach ulcers induced by pyloric ligation occur as a result of increased gastric acid and pepsin buildup, which causes gastric mucosa autodigesion and the breakdown of the gastric mucosal barrier.

According to the findings, Tt administration resulted in a considerable increase in gastric juice pH, as well as a reduction in stomach volume, free acidity, and total acidity. This effect was comparable to that of the omeprazole-treated group. In a dose-dependent manner, Tt reduced the ulcer index more effectively. These findings suggested that Tt's antiulcer efficacy may be linked to its antisecretory properties.

Methanolic included alkaloids, carbohydrates, cardiac glycosides, flavonoids, saponins, tannins, and proteins, according to the phytochemical profile conducted in this study. In different experimental models of gastric and duodenal ulcers, flavonoids have been shown to have considerable anti-ulcer action.

When compared to a control (vehicle) group using Omeprazole 8 mg/kg as a standard, the present findings clearly show that oral administration of methanolic extract of Tt

fruits at different doses of 150, 300, and 600 mg/kg in a pylorus ligated model produces a significant graded and dose dependent antiulcer as well as anti-secretary activity.

4. Conclusion

It is possible that the anti-ulcer activity of the methanolic extract of TT is mediated by flavonoids. The findings imply that Tt extract may be a useful component of gastroprotection, reducing ulcer formation and having antisecretory properties. As a result, the current study discovered that methanolic extract of Tt fruits had a considerable gastroprotective (antiulcer) effect. However, more research is needed to determine its exact mode of action, as well as the isolation and characterization of the active ingredients.

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