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Research Article

EVALUATION OF ANTI - ULCER ACTIVITY OF *Limnophyton obtusifolium*

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Abstract

The aim of study was to evaluate anti ulcer activity of the methanolic extract of the whole plant of *Limnophyton obtusifolium in* experimentally induced ulcer rats. Ulcers were induced by oral administration of ethanol and indomethacin. Omeprazole (20 mg/kg) was used as a reference standard. Acute toxicity studies of extracts were nontoxic up to recommended dose 2000mg/kg body weight orally as per OECD guidelines no.423. Animals were treated with *Limnophyton obtusifolium* extract of 200,400 mg/kg body weight. The antiulcer activity was accessed by determining and comparing the ulcer index in the test group with that of the standard drug treated group. *Limnophyton obtusifolium* (400mg/kg) showed maximum inhibition of ulcer. The results suggest that *Limnophyton obtusifolium* possesses significant antiulcer property.

Keywords: *Limnophyton obtusifolium*, anti- ulcer, Indomethacin, Ethanol.

INTRODUCTION

Peptic ulcer is one of the most common gastrointestinal diseases [1]. The exact Causes of peptic ulcer disease is not known but it may be result from an imbalance between acid-pepsin Secretion and mucosal defense factors [2]. Peptic ulcer disease occurs mainly due to consumption of NSAIDs, infection by H. pylori, stress or due to pathological condition such as zollinger – Ellison Syndrome. [3]

The plant *Limnophyton obtusifolium* belongs to the family Alismataceae; this is a family that contains approximately 15 genera and 85 species. However, it plays a large role in certain aquatic habitats. *Limnophyton obtusifolium* is distributed all over the world [4].Occasional in the edges of tagnant water ponds, tanks and reservoirs. *Limnophyton* comprises three species, L. *obtusifolium* from tropical Africa, Madagascar, India, Ceylon, and the Malay Peninsula; L. angolense from tropical Africa (Angola); and L. fluitans, also from tropical West Africa The whole plant of *Limnophyton obtusifolium* is used to treat epilepsy and anti ulcer in traditional medicine [5].

MATERIALS AND METHODS

The whole plant of *Limnophyton obtusifolium* was collected from Nellore, Andhra Pradesh. The taxonomical identification of the plant was done by Taxonomist, Dr. P. Jayaraman, Director; Plant Anatomy Research Centre (PARC). Chennai, Tamil Nadu. The voucher specimen bearing the number PARC/2010/665 After authentication, fresh leaves collected in bulk from plants, washed shade dried and then milled to a coarse powder by a mechanical grinder.

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Preparation of Extract

The powder dried plant was packed in to soxhlet column and extract with methanol. The extraction was carried out until the solvent in siphon tube becomes colourless. The extract was dried under reduced pressure using a rotary vacuum evaporator. The % yield was 3.4% w/w and the extract was kept in refrigerator.

Experimental Animal

Adult Wister albino rats weighing between 150-250 gm of either sex. They were obtained from the animal house in Sree Vidyanikethan College of Pharmacy, Tirupati. The animals were maintained under normal laboratory condition and kept in standard polypropylene cages at room temperature of 30° ± 2° and 60 to 65% relative humidity and provided with standard diet and water ad libitum. Ethical committee clearance was obtained from IAEC (Institutional Animal Ethics Committee) of (Approval No. SVCP / IAEC /05- 0039 dated on 10/02/2011).

Acute toxicity studies

Male wistar rats weighing 150-200gm were used for the study. The starting dose level of methanol extract of *Limnophyton obtusifolium*. was 2000 mg/kg body weight p.o as most of the crude extracts possess LD50 value more than 200 mg/kg p.o. Dose volume was administered 0.2ml per 100gm body weight to overnight fasted rats with were *ad libidum*. Food was withheld for a further 3-4 hours after administration of methanol extract of *Limnophyton obtusifolium* and observed for signs for toxicity. The body weight of the rats before and after administration were noted that changes in skin and fur, eyes, mucous membranes, respiratory, circulatory, autonomic and central nervous system and motor activity and behavior pattern were observed and also sign of tremors, convulsions, salivation, diarrhea, lethargy, sleep and coma were noted. The onset of toxicity and signs of toxicity also noted [6].

EVALVATION OF ANTI -ULCER ACTIVITY

Two animal models (Indomethacin and ethanol) were employed to evaluate the Anti-ulcer activity of *Limnophyton obtusifolium* extract.

Indomethacin-induced gastric ulcer

All the animals were fasted 36 hours before administration of indomethacin. The animals were divided into five groups each consisting of six rats. The rats were anaesthetized with ether 1 hour later the stomach was incised through the grater curvature and examined for the number of lesion under the dissecting microscope [7].

Group I - Animals treated with Indomethacin (20mg/kg, p.o)

Group II - Animals pretreated with standard drug omeprazole (20mg/kg)

Group III - Animals pretreated with MELO, (200mg/kg p.o) suspended in Distilled water.

Group IV - Animals pretreated with MELO, (400mg/kg p.o) suspended in Distilled water.

Ethanol induced ulcer model

All the animals were fasted for 24 hours before administration of ethanol Wister albino rats of either sex weighing in between 180- 250 gms were divided into five groups containing 6 animals in each group. Group I received ethanol, Group II treated with omeprazole (20mg/kg, p.o) were administered 30min prior to induction of gastric ulcer. Group III & Group IV received methanol extract of *Limnophyton obtusifolium* 200mg/kg & 400mg/kg respectively for 14 days. On the 14th day, Gastric ulcers were induced with absolute ethanol 90% (1ml/200g) orally [8]. They were kept in specially constructed cage to prevent coprophagia during and after the experiment. The animals were anaesthetized 1 hour later with anaesthetic ether and stomach was incised along the greater curvature and ulceration will be scored by following method. [9].
Ulcer index was calculated by

$$\%I = \frac{US_c - US_t}{US_c} \times 100$$

US_c - Ulcer surface area in control
US_t - Ulcer surface area in treated animals

Group I - Animals treated with Ethanol (1ml/200gm, p.o).

Group II - Animals pretreated with standard drug Omeprazole (20mg/kg)

Group III - Animals pretreated with MELO, (200mg/kg p.o) suspended in Distilled water.

Group IV - Animals pretreated with MELO, (400mg/kg p.o) suspended in Distilled water.

RESULT

In the present study, aqueous extract of *Limnophyton obtusifolium* was evaluated for its anti-ulcer activity against Ethanol and Indomethacin induced gastric ulcer model.

Indomethacin induced ulcer

In indomethacin induced ulcer model the plant extract at dose of 200 and 400 mg/kg showed significant gastro protective activity 35.71% and 57.14% Compared with standard drug omeprazole showed 71.42% (Table-I)

Ethanol induced ulcer

In ethanol induced gastric ulcer. Both doses of *Limnophyton obtusifolium* extract showed significant reduction in ulcer index. It was showing protection index 35.87% and 54.20 %at a dose of 200 and 400 mg/kg respectively compared with standard drugs omeprazole showed 72.53% (Table-II)

Table 1. Effect of *Limnophyton Obtusifolium* on Indomethacin Induced gastric Ulcer in rats

Group	Treatment	Ulcer Index	Percentage Inhibition (%)
I	Control (Indomethacin (20mg/kg, p.o)	14±0.69	-------
II	Standard (0meprazole 20 mg/ kg p.o)	4±0.9	71.42
III	MELO (200mg/kg p.o)	9.5±26	35.71
IV	MELO (400mg/kg p.o)	6.2±38	57.14

Values are expressed as mean± SEM, ANNOVA followed by student t- test in each group rats ***p≤0.001, as compared to indomethacin induced group.

Table 2. Effect of *Limnophyton obtusifolium* on Ethanol Induced gastric Ulcer in rats

Group	Treatment	Ulcer Index	Percentage Inhibition (%)
I	Control (Ethanol (1ml/200gm, p.o))	5.33±0.25	-------
II	Standard (0meprazole 20 mg/ kg p.o)	4.21±0.65	72.53
III	MELO (200mg/kg p.o)	9.83±0.34	35.87
IV	MELO (400mg/kg p.o)	7.02±0.86	54.20

Values are expressed as mean± SEM, ANNOVA followed by student t- test in each group rats ***p≤0.001, as compared to ethanol induced group.

Fig 1.Effect of *Limnophyton obtusifolium* on Indomethacin Induced gastric Ulcer in rats

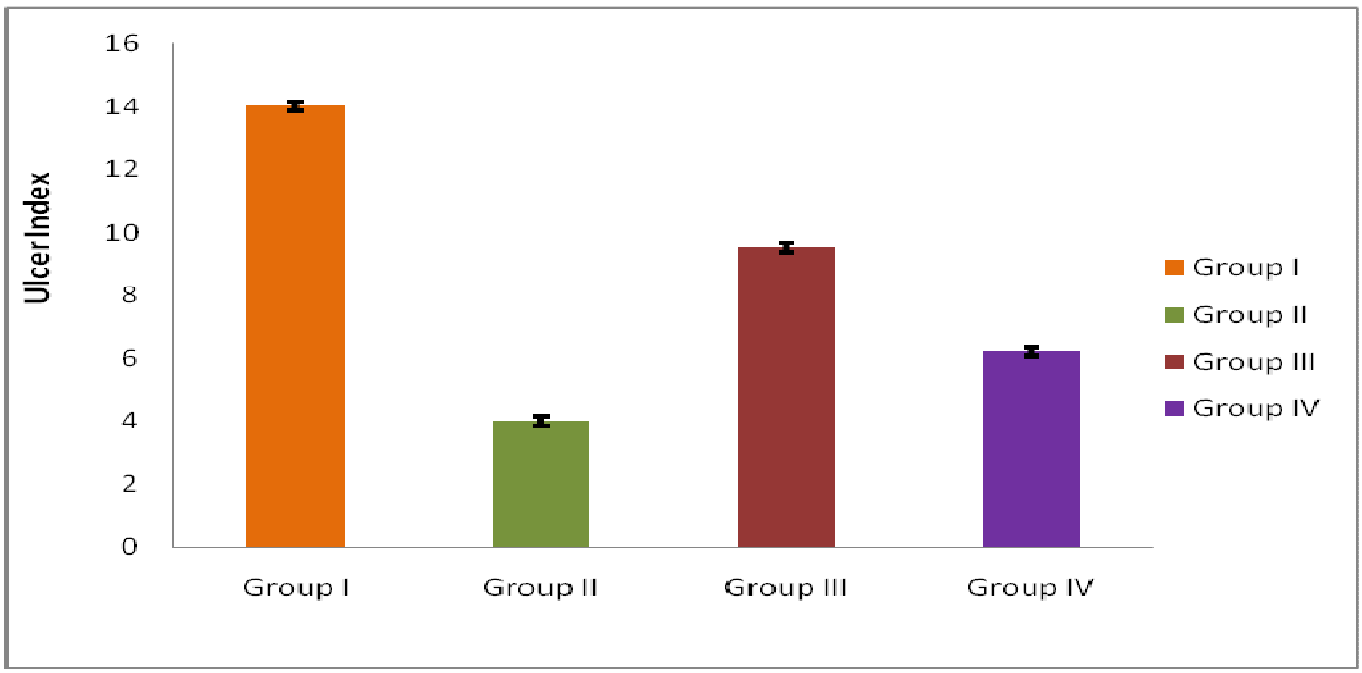
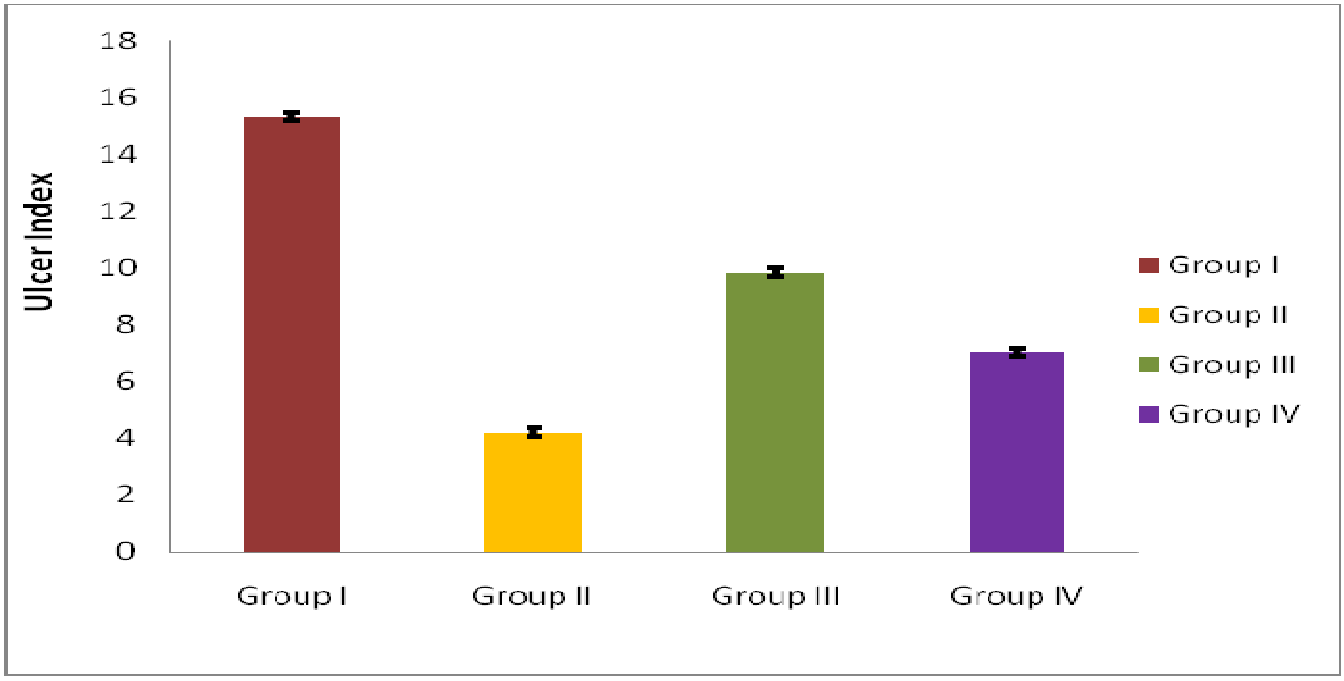


Fig 2. Effect of *Limnophyton obtusifolium* on Ethanol Induced gastric Ulcer in rats



DISCUSSION AND CONCLUSION

In most of the cases the etiology of the ulcer is unknown. It is generally accepted that it results from an imbalance between aggressive factors and the maintenance of the mucosal integrity through the endogenous defense mechanism [11]. 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.

Even though many products in the market for the treatment of gastric ulcers, including antacids, proton pump inhibitors, anticholinergics and histamine H2-antagonists, are used, most of these drugs produce several adverse reactions, such as gynecomastia, hematopoietic changes, acute interstitial nephritis [12], thrombocytopenia [13], anaphylaxis reactions [14], nephrotoxicity and hepatotoxicity [15]. Medicinal plants are amongst the most attractive sources of new drugs, and have been shown to give promising results in treatment of gastric and duodenal ulcers.

The gastric ulcer is induced by indomethacin, the cytoprotective effect of the anti-ulcer agent can be mediated through endogenous prostaglandins. The result obtained show that the ulcer surface area and mean ulcer index were significantly reduced in groups treated with the methanolic extract of *Limnophyton obtusifolium* compared to their respective control group. Therefore, it can be through that the MELO may stimulate the secretion of prostaglandins like-substances preventing gastric ulcers in order to probe the effectiveness of MELO. To conclude, the aqueous extract of *Limnophyton obtusifolium* possesses anti-ulcer activity.

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