

Original Research



INVESTIGATION OF *TERMINALIA PALLIDA* LEAF EXTRACT FOR ANTIULCER EFFECTS USING ETHANOL-INDUCED GASTRIC ULCER MODEL IN RATS

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Submitted on: 12.11.2015

Revised On: 18.11.2015

Accepted on: 23.11.2015

ABSTRACT

The antiulcer effects of the ethonolic extract of *Terminalia pallida* leaves were investigated using ethanol-induced gastric ulcer model in rats. The extract was prepared by refluxed successively with ethanol in soxhlet extractor for 72 hrs. A yield of 15.30% w/w dry extract was obtained. *Terminalia pallida* extract (EETP) exhibited a more gastro-protective effect against ethanol-induced stomach ulcers at 150, 300 and 600 mg/kg than Ranitidine (50mg) and solvent treated (control) rats. EETP 150mg/Kg preventive Index is 66.73%, and EETP 150mg/Kg preventive Index is 47.22% while Ranitidine 100mg/Kg 79.71% dose dependent healing effect. Lesions were observed to deviate from massive severe lesions with marked disorientation of the gastric epithelium in the control to fairly protected mucosa with Ranitidine and a better protected mucosa with intact epithelium in EETP (150,300 mg/kg) treated rats. EETP extract was found to be significantly protective against ethanol-induced gastric ulcers in the experimental rats.

KEYWORDS: *Terminaliapallida*, Ethanol, Antiulcer, Preventive index, Gastric ulcer, EETP(Ethanolic extract of *Terminalia pallida*)

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Indian Research Journal of Pharmacy and Science; 7(2015) 304-308;
Journal home page: <https://www.irjps.in>

INTRODUCTION

Peptic ulcer is a chronic, non-malignant inflammatory disease characterised by ulceration in the upper gastro-intestinal tract (stomach and duodenum) where parietal cells are found [1]. The etiology of gastric ulceration is multi factorial and not clearly defined, but some predisposing factors have been implicated. This include duration of starvation, nature of food ingested, bile reflux, lessened mucosal resistance, alteration of gastric mucosal blood flow, disruption of gastric mucosal barrier by stress, decrease in alkaline mucosal bicarbonate and mucus secretion[2], over dosage and or prolonged administration of non-steroidal anti-inflammatory drugs, persistent infection with *Helicobacter pylori*, and genetic factors as suggested by a higher incidence of duodenal ulcers in patients with positive family history of this disorder. Pathophysiology of ulcer is due to an imbalance between aggressive factors (acid, pepsin, *H. pylori* and non-steroidal anti-inflammatory agents) and local mucosal defensive factors (mucus bicarbonate, blood flow and prostaglandins). Oxidative stress-induced tissue damage with reactive oxygen species (ROS) is implicated as a cause and consequence of a variety of disorders, [3] including coronary heart disease, neurodegenerative disorders, autoimmune pathologies, cancer, apoptosis etc. [4]. Exposure of gastric mucosa to damaging factors such as ethanol, thermal stress or various irritants that are commonly named 'breakers' of gastric mucosal barrier produces pathological changes. Histamine is regarded as the critical regulator of gastric acid secretion. Most antiulcer drugs require prolong period of intake, yet ulcer relapse is a common occurrence. Many have

various adverse effects and no drug proves solely effective in treating peptic ulcer [5]. *Terminalia pallida* leaf is noted for being effective as a herbal treatment of different ulcer cases In south India [6].. A scientific investigation of this plant based on its folkloric use has not been done before. The aim of this study was to investigate the antiulcer effects of *Terminalia pallida* leaves using ethanol gastric ulcer induction model in rats.

MATERIALS AND METHODS

Solutions, reagents, drugs and chemicals

Freshly prepared solutions and analytical grade chemicals were used in all the experiments. ethanol were obtained from local suppliers, Ranitidine was the gift sample from (vimala analytical Labs, Hyderabad).

Animals

Wister albino rates of either sex weighing 180-220gms were used for the present study. They were procured from Sri Venkateswara enterprises Bangalore. They were acclimatized for one week under laboratory conditions they were housed in polypropylene cages and maintained at $25^{\circ}\text{C} \pm 2^{\circ}\text{C}$ under 12 hours dark/ light cycle and 65% humidity. The rats were allowed standard rat feed pellets supplied by Hindustan lever co. Mumbai. The litter in the cages was removed thrice a week to ensure hygenicity and maximum comfort for animals.

Preparation of the plant extract

The leaves were washed with fresh water to remove dirt and foreign particles and are washes with absolute ethanol to avoid the microbial growth, and were dried under the shade [7].. The dried leaves were crushed and grinded to get powder and

weighed. The powdered material of leaves of *Terminalia pallid* was refluxed successively with ethanol in soxhlet extractor for 72 hrs [8]. The solution so obtained was transferred to china dish and then allowed for drying. The extract so obtained was thoroughly washed with Ethyl acetate so as to remove the chlorophyll and was dried kept in a desiccators for further use [9].

Acute toxicity test

An attempt was made to identify LD₅₀ by using OPPTS 870.1100 guidelines (up and down procedure) EETP. It has been found that these extracts are safe to use in animals even at a dose 5 gm/kg orally body weight before and after administration of both the extracts as per schedule were noted and any changes in skin, fur, eyes, mucous membranes, behavior pattern etc. were observed. No sign of tremors, convulsions, salivation,

diarrhea and coma were seen. However remarkable reduction of spontaneous locomotor activity and drowsiness were found after drug administration [10]. This result promotes us to evaluate CNS depressant activity for both plants. But there was no mortality observed at 5000mg/kg b.w. Therefore, 150mg/kg, 300mg/kg, and 600mg/kg b.w. doses were selected for all studies [11].

Effect of *Terminalia pallida* extract on ethanol-induced gastric ulcers in rats

Terminalia pallida (EETP) produced a significant reduction in the mean ulcer index of 1.24 ± 0.20 and 1.23 ± 0.28 at 150 and 300 mg/kg respectively when compared with 2.96 ± 0.13 in solvent treated rats [12]. The extract had an equally better gastro-protective effect with the same preventive index of 59% at 250 and 750 mg/kg over 55% with Ranitidine (Table 1).

Table 1: Effect of *Terminalia pallida* extract on ethanol-induced gastric ulcers in rats

Treatment mg/kg	No. of animal	Mean ulcer index ± SE	Preventive index (%)
Control	6	10.25 ± 1.02	0
Ranitidine	6	2.08 ± 0.37	79.71
EETP150mg/kg	6	6.41 ± 0.50*	66.73
EETP300mg/kg	6	5.41 ± 0.52*	47.22
EETP600mg/kg	6	3.16 ± 0.49	40.10

*Superscript indicates significant difference at p<0.05 when compared with the control.

Macroscopic view of Alcohol induced gastric ulcer in Rats

Control



Standard



EETP 150mg



EETP300mg



EETP 600mg

DISCUSSION

Terminalia pallida (EETP) was found to be safe, up to a dose of 5000mg/kg b.w did not cause mortality in the rats [13]. Preliminary *in vivo* studies with extract doses above 600 mg/kg did not show appreciable difference between treated and normal rats. In the experimental rats, the extract exhibited maximal protective effect at 150,300mg/kg against ethanol-induced gastric ulcers over Ranitidine (100 mg/kg) and control [14]. This is evidenced in the ulcer index (150 mg/kg 300mg/kg EETP=6.41 $\pm$ 0.50, 5.41 $\pm$ 0.52; Ranitidine = 2.08 $\pm$ 0.37 and Control=10.25 $\pm$ 1.02), percentage ulcer preventive index (150 mg/kg, 300 mg/kg EETP=66.73, 47.22; Ranitidine =79.71% and Control=0%). EETP suppressed

ulcerogenic tendencies of ethanol in the experimental rats at doses 150 and 300mg/kg, an effect suggestive of antioxidant potential[15]. Antioxidants consist of vitamins, polyphenols, flavonoids, minerals and Antioxidants disrupt the chain reaction in which free radicals turn other molecules into free radicals like themselves, a process of chain breaking or stabilization [16].

CONCLUSION AND RECOMMENDATION

The results of the investigation of *Terminalia pallida* leaves for antiulcer effects using ethanol-induced gastric ulcer model in rats laid credence to traditional use of the plant leaves in ulcer treatment. The crude ethonolic extract of *Terminalia pallida* leaves at 150,300 mg/kg demonstrated preventive index

compared to Ranitidine treated rats. Further studies on *Terminalia pallida* extract are however,

recommended to evaluate its antioxidant power.

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Conflict of Interest Reported: Nil;

Source of Funding: None Reported