



## GASTROPROTECTIVE ACTIVITY OF ETHANOLIC PLANT EXTRACT OF *EUPHORBIA NERIIFOLIA* ON SURGICALLY INDUCED GASTRIC ULCER IN RATS

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### ABSTRACT

Gastroprotective activity of *Euphorbia neriifolia* plant extract was studied in pylorus ligated shay rat ulcer model. The parameter determined was gastric volume and ulcer index. The plant extract *Euphorbia neriifolia* was studied at two dose levels viz., 200 and 400mg/kg. Omeprazole was used as reference control. The test drugs were administered orally 18 hrs before ligating the pylorus in rats. Pylorus was ligated under pentobarbital sodium anaesthesia and after 4 hrs the animals were sacrificed, stomach was carefully removed and the gastric juice was measured. The stomach was cut open along greater curvature and the ulcer index was determined. The ethanolic extract of *Euphorbia neriifolia* showed significant decrease in both gastric volume and ulcer index in dose dependent manner. From the result it was concluded that *Euphorbia neriifolia* exhibited antiulcer property on pylorus ligated shay rat ulcer model.

**Key words:** *Euphorbia neriifolia*, Omeprazole, Pylorus ligation, Ulcer Index.

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### INTRODUCTION

Peptic Ulcer Disease or PUD, one of the most common ulcers, refers to ulcer of the gastrointestinal tract in the region of the stomach. This is an important cause of morbidity and mortality throughout the world affecting the lives of millions of people in their everyday life. Peptic ulcers are present in around 4% of the population. They newly began in around 53 million people in 2014. About 10% of people develop a peptic ulcer at some point in their life (Najm, 2011).

The pathogenesis of peptic ulcer disease includes a complex imbalance between gastric offensive factors like acid, pepsin secretion, *Helicobacter pylori* (*H.pylori*), bile salts, ethanol, some medications like NSAIDS, lipid peroxidation, nitric oxide (NO) and defensive mucosal factors like prostaglandins (PG's), gastric mucus, cellular renovation, blood flow, mucosal cell shedding, glycoproteins, mucin secretion, proliferation and antioxidant enzymes like catalase (CAT), superoxide dismutase (SOD) and glutathione levels (Marietta and John, 2010). There are enormous chemical agents available for the treatment of peptic ulcers but proclaim serious side effects like H<sub>2</sub> antagonists is the precipitating cause of impotence and arrhythmias whereas the use of proton pump inhibitors is a unforeseeable cause for hypergastrinemia and atrophic gastritis. The use of antacids leads to stomach distention, belching, constipation and there

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is risk of ulcer perforation and other drugs like anticholinergics induce constipation, dry mouth, urinary retention, blurred vision and precipitation of glaucoma (Reilly, 1999).

Ulcer protective causes constipation, triggers diarrhoea, dizziness, edema and hypophosphatemia where as abdominal cramps, uterine bleeding and abortion is the probable cause of prostaglandin analogues (Aktharet *al.*, 1992). So herbal drugs have preserved their importance due to relatively less toxic, better cultural acceptability, better compatibility with human body, lesser adverse effects, economical, effective and easy availability (Pandeyet *al.*, 2008).

*Euphorbia neriifolia* is an herb extensively used in the Indian system of medicine; it is a small deciduous tree of the family Euphorbiaceae. As a tree having number of branches so as *Neriifolia* having tremendous uses. The plant is reported to contain sugar, tannins, flavonoids, alkaloids and triterpenoidal saponin etc. As traditional medicine the plant is useful in abdominal troubles, bronchitis, tumors, leucoderma, piles, inflammation, and enlargement of spleen, anemia, ulcers, and fever and in chronic respiratory troubles. The plant has been reported to have analgesic, hepatoprotective, immunostimulant, anti-inflammatory, mild CNS depressant and wound healing potential (Shaikhet *al.*, 2011). Current study was planned to conduct the gastroprotective activity of ethanolic extract of *Euphorbia neriifolia* on pylorus ligated (Shay) rat ulcer model.

## MATERIALS AND METHODS

### Plant Material

The *Euphorbia neriifolia* plant was collected from the outskirts of Pondicherry. The plant was identified as *Euphorbia neriifolia* and authenticated by the botanist, Botanical Survey of India, Agricultural University, Coimbatore, India. The voucher specimen (BSI/AU/2016 -052) has been deposited in Herbarium for further reference.

### Preparation of Extract

The plant washed with water, dried in sunlight for one hour and then it was dried under shade. The plant was chopped in to small pieces, and it was grounded in to coarse powder using mechanical grinder. Dried course powders of *Euphorbia neriifolia* plant were extracted with ethanol (90%) by using soxhlet apparatus. The extracts were then concentrated, dried and stored in desiccators. Obtained alcoholic extract were used for the pharmacological study.

## Animals

Healthy male Sprague – Dawley rats weighing between 200 – 250 gm were used for this study. The animals were obtained from animal house, Sri Lakshmi Narayana Institute of Medical Sciences, Pondicherry, India. On arrival, the animals were placed at random and allocated to treatment groups in polypropylene cages with paddy husk as bedding. Animals were housed at a temperature of  $24\pm 2^{\circ}\text{C}$  and relative humidity of 30 – 70 %. A 12:12 light: day cycle was followed. All animals were allowed to free access to water and fed with standard commercial pelleted rat chaw (M/s. Hindustan Lever Ltd, Mumbai). All the experimental procedures and protocols used in this study were reviewed by the Institutional Animal Ethics Committee (932/a/06/CPCSEA) and were in accordance with the Institutional ethical guidelines.

## Pharmacological Evaluation

### Pylorus Ligated (Shay) Rat Ulcer Model (Shay, 1945)

The animals were divided into four groups each consisting of six rats. Group I represented control group of received 0.1% Carboxy Methyl Cellulose Solution (CMC). Group II received Omeprazole (10 mg/kg). Groups III & IV, received *Euphorbia neriifolia* extract, in doses of 200 and 400 mg/kg respectively. All the test drugs were administered orally by suspending in 0.1% CMC solution.

After the test drug administration, the rats were kept for 18 h fasting and care was taken to avoid coprophagy. The animals were anaesthetized with Pentobarbitone sodium (45mg/kg, ip). The abdomen was opened by a small midline incision below the xiphoid process; pylorus portion of stomach was slightly lifted out and ligated. Precaution was taken to avoid traction to the pylorus or damage to its blood supply. The stomach was placed carefully in the abdomen and the wound was sutured by interrupted sutures. Four hours after pylorus ligation the rats were sacrificed and the stomach was removed. The stomach was then incised along the greater curvature and observed for ulcers. The number of ulcers was counted using a magnifying glass and the diameter of the ulcers was measured expressed as ulcer index.

### Statistical Analysis

The values were expressed as mean  $\pm$  SEM. The statistical analysis was carried out by one way analysis of variance (ANOVA) followed by Dunnet's 't' - test. P values  $<0.05$  were considered significant.

## RESULTS

The effects of ethanolic extract of *Euphorbia neriifolia* was studied in pylorus ligated gastric ulcer model in rats and the results were shown on table 1. *Euphorbia neriifolia* at 200 and 400mg/kg showed dose dependent protective effect against gastric ulcer induced by pyloric ligation. *Euphorbia*

*neriifolia* 200 and 400 mg /kg significantly decrease the gastric volume ( $p<0.01$  and  $p<0.001$ , respectively) and dose dependently reduced the ulcer index. Omeprazole the reference anti-ulcer agent, significantly ( $p<0.001$ ) reduced both the gastric volume and the ulcer index induced by pyloric ligation.

**Table 1. Effect of Ethanolic Plant Extract of *Euphorbia neriifolia* on Pylorus Ligation induced Ulcer in rats**

Groups	Drug Treatment	Gastric Volume (ml)	Ulcer Index
I	Control(0.1 % CMC)	11.3 ±0.96	77.31±3.47
II	Omeprazole (10mg/kg)	2.93±0.14***	18.46±1.07***
III	<i>Euphorbia neriifolia</i> (200mg/kg)	6.52±0.32**	32.55±1.22***
IV	<i>Euphorbia neriifolia</i> (400mg/kg)	4.71±0.19***	22.64±1.26***

Values are in Mean ±SEM;

\* $P<0.05$ , \*\*  $P<0.01$  and\*\*\*  $P<0.001$  Vs Control

## CONCLUSION

The ethanolic plant extract of *Euphorbia neriifolia* exhibited gastroprotective activity against pylorus ligated ulcer model. The gastroprotective activity possessed by *Euphorbia neriifolia* was due to

Its antisecretory property. The antiulcer activity of *Euphorbia neriifolia* may be due to the presence of phytoconstituents like tannins, flavonoids, alkaloids and triterpenoidal saponin.

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