International Journal of Science and Research (IJSR)
ISSN: 2319-7064
SJIF (2020): 7.803

Anti - Ulcer Activity of *Ficus benghalensis* Linn Stem Bark Ethanolic Extract in Rats

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Abstract: ***The study was perform to evaluate the antiulcer activity of ethanolic extract of Ficus benghalensis LINN stem bark in gastric ulcer effected rats. Anti - ulcer activity was evaluated via oral administration of ethanolic extract of Ficus benghalensis LINN stem bark at the dose are given 250, 500 and 1000mg/kg thrice per day for 5 days before pyloric ligation ulceration and indomethacin induced ulceration. In indomethacin and pyloric ligation model, the pre - treatment with ethanolic extract of Ficus benghalensis LINN stem bark and ranitidine significantly reduce the ulcer index, free acidity as compared with controlled group. The % protection of ulcers were evaluated. The extract showed significantly (P<0.05) increase in pH with significant decrease in volume of gastric juice, free and total acidity. Histopathological findings also confirm the antiulcer activity of ethanolic extract of Ficus benghalensis LINN stem bark in albino wistar rats. The present study showed that ethanolic extract of Ficus benghalensis LINN stem bark have anti - ulcer activity in 2 models. The various chemical constituents are present in Ficus benghalensis such as carbohydrates, phenols, tannins, flavones saponins, steroids, Quinones, bengalenosides, leucocyanidin glycoside, terpenoids and cardiac glycosides. These compounds have various pharmacological activities such as antioxidant, antimicrobial, anticancer, antiulcer, analgesic, antipyretic, antidiarrhoeal, anti - Tumor, immunomodulatory activity.***

Keywords: Antiulcer activity, *Ficusbenghalensis* bark extract, pyloric ligation model, indomethacin induced ulceration, ranitidine

1. Introduction

A gastric ulcer is an important cause of morbidity and mortality all over the world affecting the lives are millions of people in their everyday of life. Gastric ulcers are very common disease human suffering today, it is a localised loss of gastric as well as duodenal mucosa. Peptic ulcer mainly occur in the path of GIT tract which is exposed to gastric acid and secretion, mainly 2 types of ulcers occur in human system: -

1) Peptic ulcer and
2) Duodenal ulcer

The major factors lead to ulcer is infection with gram negative, helicobacter pylori, increased HCl secretion inadequate mucosal defense against gastric acid. The peptic ulcers occurs due to imbalance between aggressive factor such as acid, pepsin, bile, H. Pylori and defensive factor such as prostaglandin, bicarbonate secretion, etc.

These days, number of medicinal plants have therapeutic role for the treatment of disease in human. *Ficus benghalensis* LINN belongs to the throughout the Indian forest land. It is the national plant of India. The various parts of the plant like leaves, bark, roots and tender shoots have also been used in the traditional system of medicine. The *Ficus benghalensis* has been heightened by reports of its traditional uses as antibacterial, antioxidant, analgesic, antimicrobial, antidiabetic, hepatoprotective. Our present study was carried out to find out anti - ulcer activity of ethanolic extract of *Ficus benghalensis* LINN stem bark in Pylorus ligation and indomethacin induced ulcer model in rats.

2. Materials and Methods

Chemicals

All the chemicals are used of analytical grade and obtained from Rankem, RFCL Ltd. New Delhi, Central Drug House New Delhi,, E - merck Mumbai India.

Plant Material

Ficus benghalensis bark was collected from local area of Kanpur, Uttar Pradesh, India. It was identified and authenticated by Dr. Navin K. Ambasht, HOD of Botany at Chirst Church college Kanpur, Uttar Pradesh and a voucher specimen was deposited at the herbarium.

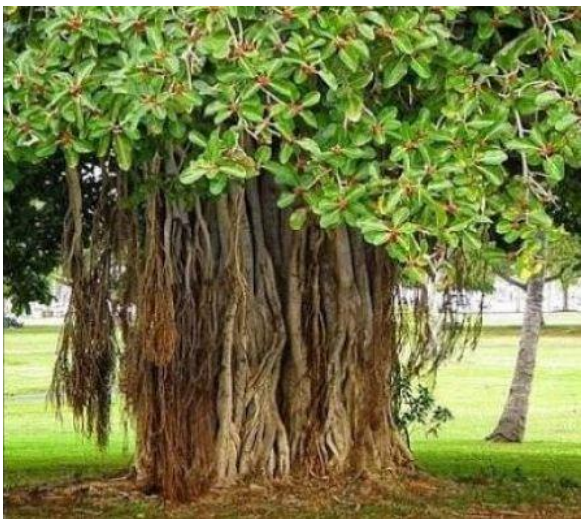

Figure 1: Ficus Benghalensis Plant

Figure 2: Ficus Benghalensis Leaves

Table 1: Scientific classification of F. benghalensis Linn. (Edwin and Sheeja, 2006)

Kingdom	Plantae
Sub kingdom	Spermatophyta
Division	Magnoliophyta
Class	Magnoliopsida
Sub class	Hamamelidae
Order	Urticales
Family	Moraceae
Genus	Ficus
Subgenus	Urostigma
Species	*Ficus Benghalensis Linn.*

Preparation of Extract

The air dried bark powder (650gm) was subjected to successive extraction using petroleum ether (60 ˚- 80 ℃). The extract was filtered and filtrate was evaporated by using vacuum evaporator under the reducing pressure at ≤ 50 ℃ temperature. The raw extract obtained after evaporation was stored in desiccator. After the extraction, concentrated solvent was using rotary evaporator and water was evaporate and remaining residue of bark was discarded and extract was weighed.

The % yield of extracts was evaluated using the formula:
% Yield= Weight of extract (g) / Weight of dry powder (g) ×100

Phytochemical Screening

The freshly prepared ethanolic extract of *Ficus benghalensis* bark was quantitative identification for the presence of major phytochemical constituents. The phytochemical test was carried out by standard methods.

Experimental Animals:

Wistar Albino rats were used in the study. The animal care andhandling will bw done according to the guideline set by CPCSEA with the approval of IAEC (Institutional animal Ethics Committee). All animal were housed in polypropylene cages in a well - ventilated room for experiment under the controlled conditions of temperaturer 23±3 ℃ and 12 hr light/dark cycle. They were provided with food and distilled water ad libitum**.**

Acute Toxicity Study:

The acute oral toxicity study would be carried out as per the guidelines set by Organization for Economic Cooperation and Development (OECD) received form Committee for the Purpose of Control and Supervision of Experiments on Animal (CPCSEA). The acute toxicity will be determined on rat by fixed dose method of OECD Guide line no.423.

Pylorus Ligation (PL) Induced Ulcer Model:

Animals were divided into 5 groups and every groups have 6 rats. Group I animals given suspension of 1% CMC in distilled water for 5 days. Group II animals given ranitidine for 5 days. Groups III, IV, V given 250, 500, 1000 mg/kg. b. w. of ethanolic extract of *Ficus benghalensis* LINN stem bark for 5 days. On the sixth day animals were kept for overnight fasting. Pyloric ligation was done. Animals were anesthetized by using ether and abdomen was cut open through a middle incision. Expose the stomach, a thread passed around the pylorus and ligated after 4 hours of pylorus ligation the rats were cervical decapitation and the stomachs were removed, the gastric content was collected and the volume was noted. The gastric contents were used for the estimation of physical and biochemical parameters.

Indomethacin Induced Ulcer:

Five groups of *Wistar Albino rats* were used in indomethacin induced ulcer study of *Ficus benghalensis*linn. Ethanolic extract. Each group have six animal and 24 hrs with purified water prior to experiment. The Group 1 on animals was treated with 1%CMC solution in distilled water. And Group 2 was treated with 50 mg/kg ranitidine. Group 3, 4, 5 were treated with ethanolic extract 250, 500, 1000 mg/kg p. o. respectively

Indomethacin Induced Gastric Ulcers Model

Data are mean±S. E. M, n = 6 in each group ***Significant variation as compared to pyloric ligated group (P<0.05).

Antiulcer Study:

Animals were divided into 5 groups each comprising of 6 rats. Group I animals received suspension of 1% CMC in distilled water for 5 days. Group II animals received ranitidine for 5 days. Groups III, IV, V received 250, 500, 1000 mg/kg. b. w. of ethanolic extract of *Ficus benghalensis* LINN stem bark for 5 days. On the sixth day animals were kept for overnight fasting. Pyloric ligation was done according to the method (Shay et. al, 2010). Animals were anesthetized using ether and abdomen was cut open through a middle incision. Expose the stomach, a thread passed around the pylorus and ligated after 4 hours of pylorus ligation the rats were cervical decapitation and the stomachs were removed, the gastric content was collected and the volume was noted. The gastric contents were used for the estimation of physical and biochemical parameters.

Histopathological Studies:

Tissues of stomach were collected, blotted to free blood, fixed in 10% neutral buffered formalin for 48 hrs and were processed using a tissue processor. The tissue were processed and trimmed for Paraffin block embedment. The 5µm thick sections cut by using a rotary microtome and stained with eosin and hematoxyline for histopathological examination. After the standard processing, the ulcerated

gastric tissue were examined microscopically for pathomorphological changes suc as congestion, haemorrhage, edema, leucocytic infiltration and erosion.

3. Results and Discussion

Phytochemical Screening:
Phytochemical screening of the ethanolic extraction of *Ficus benghalensis* LINN. Bark revealed presence of flavonoids, tannins, Alkaloids, carbohydrates, phenol, terpenoids, cardiac glycosides, saponin and steroids.

Histopathological Evaluation:
Histopathological changes on ulceration caused lesions including haemorrhagic, erosion, oedema and lymphocytes infiltration of gastric mucosal layer. Degeneration where as ethanolic extract of *Ficus benghalensis* stem bark at dose (250, 500, 1000 mg/kg) and ranitidine (50 mg/kg) treated groups showed significant protection against the observed damages in gastric mucosa.

Pylorus Ligation Induced Ulcer:
The extract showed a reduction in the gastric volume at 250, 500 and 1000 mg/kg dosage levels. Other aggressive factors like free acidity and total acidity levels in comparison to positive control group decreased in all the three dose levels. Ulcer score and carbohydrate/protein ratio also supported the result. But only the highest dose 1000 mg/kg caused significant reduction in above parameter which was comparable to standard drug ranitidine.

Indomethacin Induced Ulcer:
Pretreatment of rats with *Ficus benghalensis* stem bark ethanolic extract was a dose dependent protection from indomethacin - induced ulceration. Reduction of lesion index of the ethanolic extract of *Ficus benghalensis* (250, 500, 1000 mg/kg) extract was similar to the result od ranitidine (50mg/kg), and provided the cytoprotection in comparison with indomethacin treated group ($P<0.05$).

4. Discussion

In this Investigation we highlighted Antiulcer activity of ethanolic extract of *Ficus benghalensis* stem bark in different experiment method for gastric ulcer models.

These extract showed antiulcer activity against pyloric ligation induced gastric ulcer and Indomethacin induced gastric ulcer in rats.

5. Conclusion

The present study established potent ANTIULCER activity of ethanolic extract of bark of *Ficus benghalensis* LINN. Induced gastric ulceration in rats. When the results are compared plant extract and ranitidine showed similar activity in different method of induced ulcer.

6. Acknowledgement

I would like to express my special thanks of gratitude to my teacher **Ms. Meghatiwari,** who gave me the golden opportunity to do this wonderful research work of "Anti - Ulcer Activity Of *Ficus benghalensis* Linn Stem Bark Ethanolic Extract In Rats". Who also helped me completing my research work. I came to know about so many new things I am really thankful to them. Secondly I would also like to thanks my parents, friend and seniors who helped me a lot in finalizing this project within the limited time frame.

7. Symbol and Abbreviations

- NAOH: Sodium hydroxide;
- CPCSEA: Committee for the purpose of control and supervision of experiments on animals;
- OECD: Organisation for economic co - operation and development;
- ̊c: Degree Celsius;
- Cm: Centimeter
- MW: Molecular Weight;
- UC: Ulcer index of treated group;
- UT: Ulcer index of disease control group;
- %: Percent;
- CMC: Carboxy methyl cellulose.

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