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# ANTI-ULCER ACTIVITY OF ETHANOLIC EXTRACT OF *GREWIA FLAVESCENS JUSS* WHOLE PLANT IN RATS.

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## ABSTRACT

Peptic ulcer disease is one of the most common gastrointestinal diseases. This affects approximately 5-10% of people during their life. As herbal medicine are potentially used in gastric ulcer prevention or management, because it has less side effect and efficient enough to be taken. Here present study has carried out to investigate antiulcer activity of ethanolic extract of *Grewia flavescens* juss (EEGF), Family-Tiliaceae whole plant in pylorus ligated and aspirin induced ulceration in the albino rats. Where ulcer scone, ulcer index and percentage inhibition of ulceration was determined for pylorus ligation and aspirin induced ligation models at doses of 100mg/kg, 200mg/kg and 400mg/kg for both methods taken as low doses, medium dose and high dose respectively. Antiulcer effect of EEGF was compared with standard drug ranitidine 10mg/kg (b.w., p.o). These observations helped us to conclude that ethanolic extract of *Grewia flavescens* juss. Posses significant antiulcer properties.

**KEYWORDS:** *Grewia flavescens* juss, Ethanolic extract, antiulcer activity.

## INTRODUCTION

Gastric peptic ulcer is one of the common disorders of gastrointestinal tract, which occur due to an imbalance between the offensive (gastric acid secretion) and defensive (gastric mucosal integrity) factors.[1] It is an illness that affects a considerable number of people worldwide. The etiological factors of this disorder include: stress, smoking, nutritional deficiencies, infections, frequent and indiscriminate use of non-steroidal anti-inflammatory drugs (NSAIDs).[2] A number of drugs including proton pump inhibitors and H2 receptor antagonists are available for the treatment of gastric ulcer, but clinical evaluation of these drugs have shown incidence of relapses, side effects and drug interactions.[3] In ayurveda, peptic ulcer mostly refers to amla pitta or perinamasula, amla pitta is a disease of the GIT especially of the stomach. Amla pitta literally means, pitta (abutilon indicum). Herbal medicine deals with plants and plant extract in treating diseases, these medicines are considerd safer because of the natural ingredient with no side effects.[4] Grewia flavescens popularly known as "donkeys berry", is a shrub or small tree, often seen in groups along the edges of roads, river banks and dry rivers, growing in large uniform groups. The plant parts are being used in Indian folk medicine. The leaves were reported to be useful in ulcerated tongue, colic pain, wounds, cholera and dysentery. *Grewia flavescens* a multi-stemmed shrub or small tree, up to 5m high. Its bark is dark grey-brown belongs to Tiliaceae family. The plant is used traditionally as Anthelmentic, CNS depressant[5], Nearly 40 species of this genus are found in India, some of which are well known for their medicinal value.[6-7] The berries of *Grewia flavescens* are soaked in water for two or three days to make a refreshing drink.[8] Hence the present study was designed to investigate the antiulcer activity of *Grewia flavescens* juss. whole plant ethanolic extract.

## MATERIALS AND METHODS

### Plant material

The crude Grewia flavescens juss whole plant was collected from Sri Venkateswara University, Tirupati, Andhra Pradesh, India, in the month of January, 2016. The plant was authenticated by plant taxonomist Dr. K. Madhava chetty, Assistant professor, Department of botany, Sri venkateswara University, Tirupati, A.P, India. The Grewia flavescens juss whole plants were cut into proper Size and washed 3 times with drinking water then dried in shade with proper care. The dried plant materials were blended in to coarse powder and passed through sieve 60.

**Preparation of extract**

The coarse powder 500gm was subjected to maceration and transferred to stopper flask, and treated with pure ethanol until the powder is fully immersed at room temperature. The flask was shaken every hour for the first six hours and then it was kept aside and again shaken after 24 hours from time to time to ensure better extraction. This process was repeated for 7 days, followed by exhaustive maceration for 5 days by using solvent ethanol. The solvent was decanted and filtered with filter paper and recovered with help of rotary vacuum evaporator. The extract was dried under desiccators and stored in an air tight container.[9] The final extract was then subjected to investigate the antiulcer activity.

**Animals**

Wistar Rats weighing between 150–200g of either sex are selected and kept under standard environmental condition 25±2ºC under 12h light and 12h dark cycles. Animals were divided in to 5 groups of 6 rats each. They are housed in cages, the animals were deprived of food for 24 hours before the commencement of experiment, but water allowed at ad libitum. The experimental protocols were duly approved by the Institutional Animal Ethics Committee (1412/PO/Re/S/2011/CPCSEA).

**Anti-ulcer activity of EEGF on Pylorus ligation method**

Peptic ulcer is worldwide problem and its prevalence is quite high in India. Smoking, alcoholism, and spices add to the severity of the disease. Peptic ulcer is a condition where benign lesions of gastric or duodenal mucous occur at a site where the mucosal epithelium is exposed to acid and pepsin. Gastric ulcers are caused due to imbalance between offensive and defensive factors of the gastric mucosa.

**Method**

The albino rats are weighing between 150- 200mg were divided in to 5 groups each of 6 animals. After the fasting period the rats were anaesthetized with diethyl ether. The abdomen was opened the pyloric end was ligated with a thread. The entire sample was given 60 minutes prior to pyloric ligation.[10]

Ulcer index = Un+ Us + Up/10

Un = average no.of ulcers per animal
Us = average no.of severity of ulcer score (graded from 0 to 3)
Up = percentage of animals with ulcers

Ulcer score
0-normal stomach
1-superficial mucosal erosion
2-deep ulceration
3-penetrated/ perforated ulcer

Percentage of inhibition of ulceration = U.I in control – U.I in test / U.I in control x 100

**Anti- ulcer activity of NSAIDS induced Ulceration in wistar rats**

Gastro duodenal ulceration and bleeding are the major limitations to the use of non-steroidal anti-inflammatory drugs (NSAIDs). NSAIDs can cause damage to the gastro duodenal mucosa via topical irritant effect of these drugs on the epithelium, impairment of the barrier properties of the mucosa, suppression of gastric prostaglandin synthesis by inhibiting COX-1, particularly aspirin, may cause gastrointestinal bleeding and ulcers., reduction of gastric mucosal blood flow and interference with the repair of superficial injury. The presence of acid in the lumen of the stomach also contributes to the pathogenesis of NSAID-induced ulcers and bleeding, by impairing the restitution process, interfering with haemostasis and inactivating several growth factors that are important in mucosal defense and repair.

**Aspirin induced ulcers in rats**

Five groups of albino rats 150–200g are used. Each group contains six animals. The test drugs administered orally in 2% acacia solution 10 minutes prior to oral aspirin in a dose of 200mg/kg (20mg/ml) six hours later, the rats sacrificed in anesthesia and their stomach removed. Formal- saline (2% V/V) is then injected in to the totally legated stomachs for storage over night. The next day, stomachs were opened along the greater curvature, then washed in warm water and examined under a 3-fold magnifier. The length of the longest diameter of the lesions measured and summated to give a total lesions scone in mm for each animal the mean count.[11]

**RESULTS AND DISCUSSION**

**Table: 1 Anti-ulcer activity of EEGF on Pylorus ligation method.**

| S.No. | Groups | Treatment | Ulcer index | Percentage inhibition of ulceration |
|---|---|---|---|---|
| 1 | I | Control | 11.4 | - |
| 2 | II | EEGF 100mg/kg | 11.1 | 2.63% |
| 3 | III | EEGF 200mg/kg | 8.7 | 20.78% |
| 4 | IV | EEGF 400mg/kg | 4.3 | 53.50% |
| 5 | V | Ranitidine 10mg/kg | 2.3 | 82.80% |

**Figure 1: Negative control**

**Figure 2: low dose EEGF**

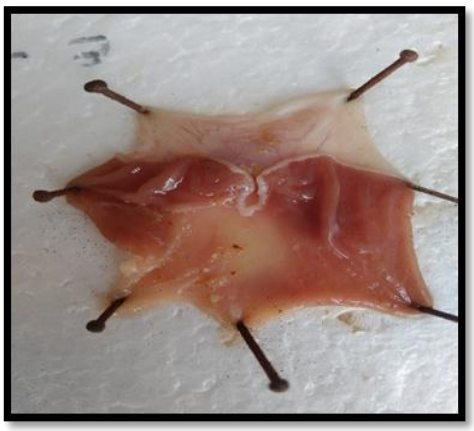

**Figure 3: Medium dose EEGF**

**Figure 4: High dose**

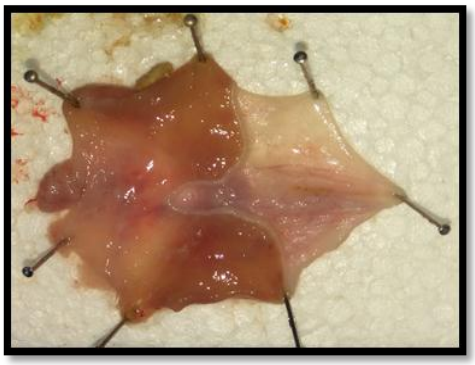

**Figure 5: Ranitidine**

**Table: 2: Anti-ulcer activity of EEGF on NSAIDS induced ulceration method**

| S.No. | Groups | Treatment | Ulcer index | Percentage inhibition of ulceration |
|---|---|---|---|---|
| 1 | I | Control | 12.3 | - |
| 2 | II | EEGF 100mg/kg | 11.4 | 7.31% |
| 3 | III | EEGF 200mg/kg | 10.9 | 11.38% |
| 4 | IV | EEGF 400mg/kg | 7.2 | 41.46% |
| 5 | V | Ranitidine 10mg/kg | 3.63 | 70.48% |

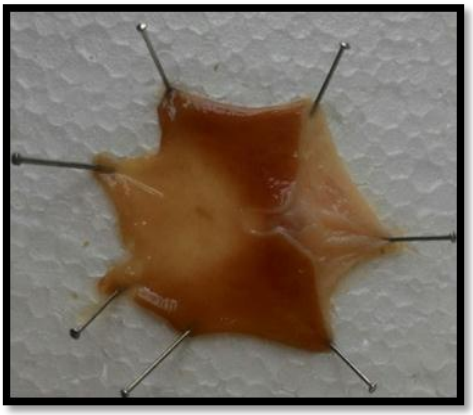

**Figure 6: Negative control**

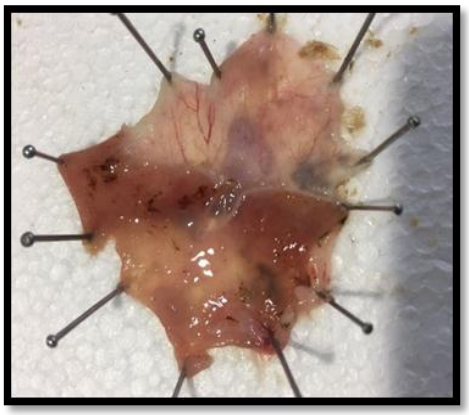

**Figure 7: Aspirin induced ulcer**

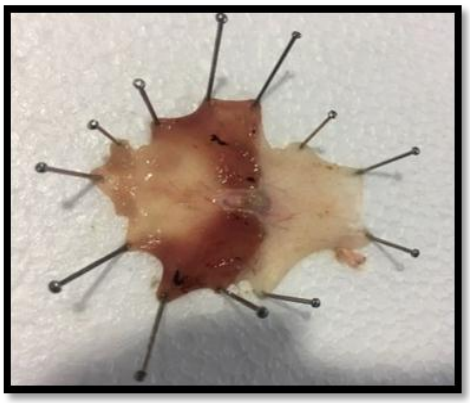

**Figure 8: Low dose EEGF**

**Figure 9: Medium dose EEGF**

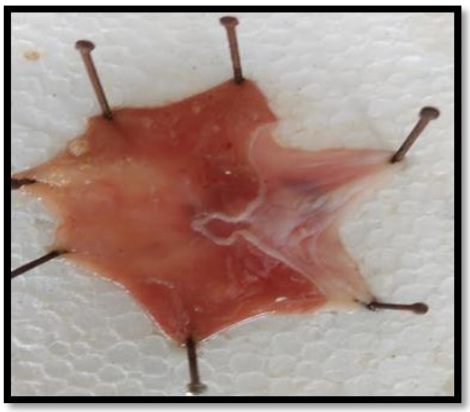

**Figure 10: High dose EEGF**

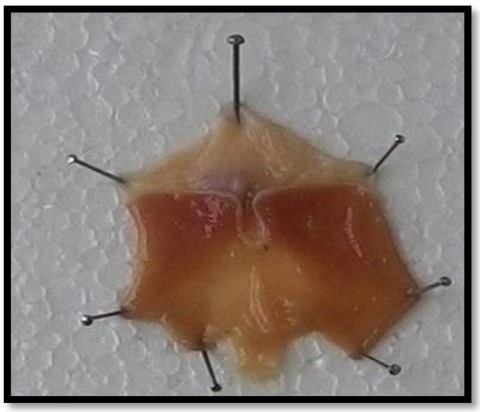

**Figure 11: Ranitidine**

## DISCUSSION

Here ulcer index and percentage inhibition of ulceration was determined for pylorus ligation and aspirin induced ligation models at doses of 100mg/kg, 200mg/kg and 400mg/kg for both methods taken as low doses, medium dose and high dose respectively. Antiulcer effect of EEGF was compared with standard drug ranitidine 10mg/kg (b.w., p.o). These observations helped us to conclude that ethanolic extract of *Grewia flavescens* juss. Posses significant antiulcer properties.

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