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EVALUATION OF ANTI-ULCER ACTIVITY OF ETHANOLIC EXTRACT OF *EMBLICA OFFICINALIS GAERTN* IN ALBINO RATS

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Abstract:

Emblica Officinalis Gaertn plant leaves have been used to treat peptic ulcer disease in Ethiopian folk medicine, but its efficacy has not been validated. The present study was therefore carried out to evaluate the anti-ulcer activity of ethanolic plant extract of Emblica Officinalis Gaertn in albino Wister rats.

The purpose of the study is to evaluate the antiulcer activity on ethanolic extract of Emblica Officinalis Gaertn plant leaves in experimental animals. The antiulcer activity was evaluated against pylorus ligation and aspirin induced ulcers in Albino rats. The EEEOG was administered orally at a dose of 200 mg/kg and 400 mg/kg in rats. Omeprazole (20 mg/kg) was used as standard drug and 1% CMC and aspirin (250 mg/kg) were used in control group. Preliminary phytochemical screening revealed the presence of several bioactive compounds. No mortality rate in rats was found up to 2000 mg/kg dose. The EEEOG produced significant decrease in gastric juice volume, free acidity, total acidity, total acid output, ulcer score and ulcer index but increase in gastric juice p^H in both models when compared to control group. It produced 69.01% and 68.11% ulcer inhibition in pylorus ligation and aspirin induced method. It also produced significant results for antioxidant parameters. The obtained results were due to the presence of flavonoids in EEEOG which produce antisecretory effect. Conclusion: The obtained results revealed that the EEEOG exhibits antiulcer activity in albino rats. The high dose (400 mg/kg) of EEEOG gives significant results when compared to low dose (200 mg/kg) of EEEOG.

Keywords *Emblica Officinalis Gaertn plant leaves, antisecretory, cytoprotective, gastric ulcer, Aspirin induced ulcers and Pylorus Ligation ulcers.*

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INTRODUCTION:

Medicinal plants represent the most ancient form of medication, used for thousands of years in traditional medicine in many countries around the world. The empirical knowledge about their beneficial effects was transmitted over the centuries within human communities.

Natural products play a pivotal role as a source of drug compounds and, currently, a number of modern drugs which are derived from traditional herbal medicine are used in modern pharmacotherapy.

The extraction procedure is a crucial step in the study of the bioactive molecules from plant sources. Currently, in addition to more traditional techniques, modern extraction methods are being utilized, such as ultrasound-assisted and supercritical fluid extraction methods. Moreover, the development of advanced tools for the qualitative and quantitative assessment of phytochemicals, such as high-performance liquid chromatography (HPLC) and liquid chromatography/mass spectrometry (LC/MS), significantly improved phytochemical investigation.

On the other hand, the biological properties of many plant species traditionally utilized together with their bioactive components have been elucidated until now. The more classical bioassay-guided natural drug discovery process and the modern processes, including high-throughput screening, and even the new reverse Pharmacognosy approach, allowed the identification of a great number of bioactive phytochemicals.

Nevertheless, medicinal plants still have a hopeful future, as the phytochemical composition and the potential health benefits of many species have not yet been studied or still need to be more deeply investigated.[1]

Peptic ulcer and other acidic symptom affect up to ten percentages of the humans with sufficient severity to prompt victims to seek medical attention. The more significant disease condition requiring medical fuscous is ulcer and gastro esophageal disease. In the US, approximately 4 million people have peptic ulcer (duodenal and gastric types), and 350 thousand new patient are diagnosed in each year, around 180 thousand peoples are admitted to hospital and treated with drugs yearly, and about five thousand patient from this case die each year as a result of ulcer condition. The lifetime of human being developing a peptic ulcer is about 10 percentages for Americans males and four percentages for female population[2].

Peptic ulcers is wound in the lesions that are most often affected in younger to older adults population, but this may diagnosed in young adult life. They often appear without obvious sign and symptom, after a period of days to months of active phase of disease, it may heal with or without drug treatment. It also affect because of bacterial infections with H. Pylori.

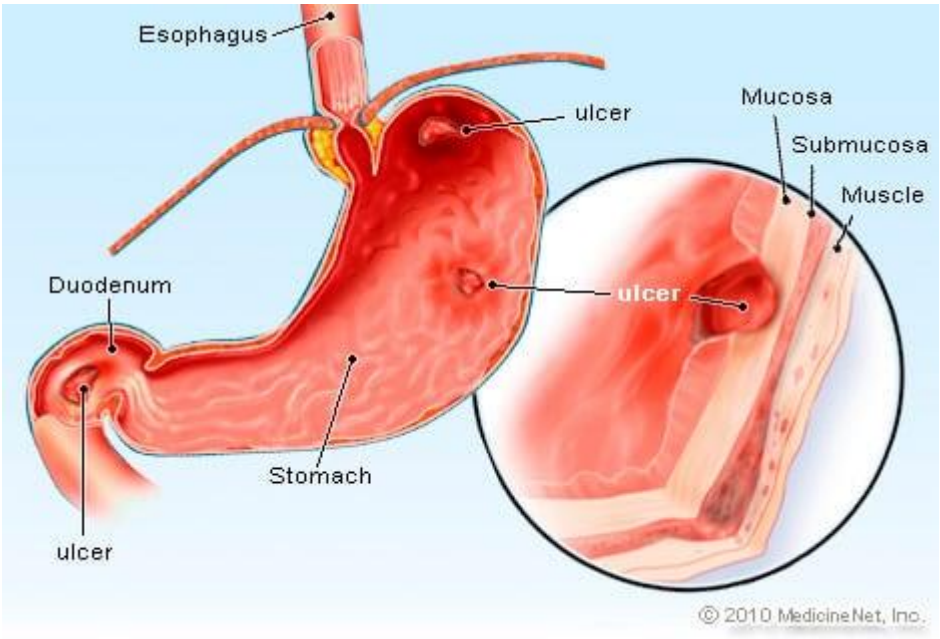

Figure 1.1-Diagram of Peptic Ulcer[3]

The following statistics relate to the prevalence of peptic ulcer[4]:

Table 1.1-prelavance of peptic ulcer

Country/Region	Extrapolated prevalence	Population estimated used
USA	5,398,077	293,655,405
Canada	597,571	32,507,874
India	19,578,503	1,065,070,607
Russia	2,646,581	143,974,059
Australia	366,050	19,913,144

Danger of ulcer [5]:

Bleeding: Upper gastrointestinal (UGI) bleeding is the secondary common medical condition that effect high mortality in peptic ulcer. UGI bleeding commonly present along with hematemesis (vomiting with digested food and blood or coffee-ground like substance) and black, tarry stools (melana). Clinical diagnosis of UGI done by nasogastric tube lavage shows blood or coffee-ground like material presence. However this diagnosis may be negative when the bleeding arises beyond a closed pylorus region. Most of the patient's having bleeding ulcers can be treated with fluid and blood resuscitation, drug therapy, and endoscopic surgery.

Perforation: This ulcer may be spread to small intestine, oesophagus and large intestine ulcers account for 60, 20 and 20 percent of perforations.

Penetration: Ulcer penetration called due to the permeation of the ulcer among the bowel part without free perforation and filtration of whole contents inside the peritoneal cavity. Surgical treatment regimen recommended that permeation affect in twenty percentage of ulcers, but little proportion of penetrating ulcers become clinically important. The common symptom these complications include acidic irritation, weight reduction and diarrhea: watery vomiting is an uncommon, but diagnostic symptom. No evident clinical data is available in the treatment regimen and guidance for the curing of penetrating ulcers.

Obstruction: Gastric wall obstruction among the frequent ulcer symptoms. Most of the cases are related with duodenal or pyloric part ulceration is 5 percent of the patient populations. Changes in lifestyle and dietary:

Aspirin and related drugs (non-steroidal anti-inflammatory drugs), [6] alcohol, [7] coffee [8] (even decaf) and tea[9] can interfere with the curing of the peptic ulcers. Smoking may also low the ulcer healing process[10]. People with ulcer symptom have been evaluated to had more carbohydrate than people with no ulcers, [11-12] from this route may occur with a genetic susceptibility for the ulcer pathogenis[13].

Sugar has also been reported to increase stomach pH. Salt may cause the stomach and intestine irritation. Large uptakes of salt have been linked to higher risk of stomach ulcer[14-15]

One of the amino acid Known as Glutamine, is the important source in the energy in cells which coverthe stomach and intestine[16]. It is also prevent the stress ulcer related by large burns of the preliminary study about the pathogenesis of ulcers[17]

TYPES OF PEPTIC ULCER

1) Gastric ulcer
2) Duodenal ulcer

Gastric ulcer[18]

Gastric ulcers are usually single and less than 20 millimeter in diameters. Ulcers on the small curvature are mainly related for the chronic gastritis condition, whereas those in the larger curvature are often associated to the non-steroidal anti-inflammatory drugs effects.

Physiological factors in gastric ulcers: [19]

Gastric ulcers almost invariably arise in the setting of H. pylori gastritis or chemical gastritis that results in injury to epithelium. Most patients with gastric ulcers secrete less acid than do those with duodenal ulcers and even less than normal persons.

The factors implicated include: [20]

(1) back-diffusion of acid into the mucosa,
(2) Decreased parietal cell mass,
(3) Abnormalities of the parietal cells themselves.

A minority of patients with gastric ulcers exhibit acid hypersecretion. In these persons, the ulcers are usually near the pylorus and are considered variants of duodenal ulcers. Interestingly, the intense gastric hypersecretion that occurs in the Zollinger-Ellison syndrome is associated with severe ulceration of the duodenum and even the jejunum but rarely with gastric ulcers.

Duodenal ulcer: Duodenal ulcers are ordinarily located on the walls of the duodenum, on a short distance of the pylorus region.

Physiological factors in duodenal ulcers: [21] The maximal capacity for acid production by the stomach reflects total parietal cell mass. Both parietal cell mass and maximal acid secretion are increased up to twofold in patients with duodenal ulcers. However, there is a large overlap with normal values and only one third of these patients secrete excess acid.

Accelerated gastric emptying, a condition that might lead to excessive acidification of the duodenum, has been noted in patients with duodenal ulcers. However, as with other factors, there is substantial overlap with normal rates. Normally, acidification of the duodenal bulb inhibits further gastric emptying.

6. MATERIALS AND METHODS:

The designing of methodology involves a series of steps taken in a systematic way in order to achieve the set goal(s) under the prescribed guidelines and recommendations. It includes in it all the steps from field trip to the observation including selection and collection of the medicinal leaves, selection of dose value, standardization of protocol, usage of instruments, preparation of reagents, selection of specific solvents for extraction, formation of protocols and final execution of the standardized protocol. All this requires good build of mind and a good and soft technical hand to handle the materials and procedure in a true scientific manner.

List of Drugs and Chemicals:

Drugs and Chemicals used in this study were of analytical grade and of highest purity procured from standard commercial sources in India.

Table No: 7.1- List of Drugs and Chemicals used for study

Chemical name	**Make**
Ethanol	MSB Chemicals
Omeprazole	Sun Pharmaceuticals Pvt. Ltd.
Aspirin	USV Private Limited
Topfer's reagent	Finar Chemicals Ltd. Ahemdabad
Phenolphthalein reagents	Finar Chemicals Ltd. Ahemdabad
Sodium Hydroxide	Merck
Carboxymethylcellulose	Accent Microcell Limited
Distilled	NA

7.1. Instruments

Following instruments were required for the study:

Table No: 7.2- List of Instruments used for study

Name of the instrument	***Source***
Centrifuge	Dolphin
Digital weighing balance	Horizon
Heating mantle	ASGI®
Disection box	Camel
Refrigerator	Videocon
Actophotometer	Dolphin
Glass cylinder	ASGI®
Adhesive tape	YVR medivision Pvt Ltd
Thread	YVR medivision Pvt Ltd
Stop watch	ASGI®
Syringes	YVR medivision Pvt Ltd
Needles	YVR medivision Pvt Ltd
Soxhlet extractor	ASGI®
Condenser	ASGI®
Burette stand	Dolphin
Round bottom flask	ASGI® , Amar
Mixer	Videocon
Oven	ASGI®
Water bath	ASGI®
Stirrer/glass rod	ASGI®
Watch glass	ASGI®
Whatmann filter paper	Manipore microproducts, Ghaizabad.
Butter paper	ASGI®
Spatula	ASGI®
Rubber pipes	ASGI®

PRELIMINARY QUALITATIVE TEST

7.2. Preliminary Phytochemical Screening

Preliminary phytochemical screening of the leaves extract was carried out for the analysis of Alkaloids, Carbohydrates, Tannins, Saponins, Steroids, Phenols, Flavonoids .as per the standard methods.

1. Detection of Alkaloids: Extracts were dissolved individually in dilute Hydrochloric acid and filtered.

a) Mayer's Test: Filtrates were treated with Mayer's reagent (Potassium Mercuric Iodide). Formation of a yellow-colored precipitate indicates the presence of alkaloids.

b).Wagner's Test: Filtrates were treated with Wagner's reagent (Iodine in Potassium Iodide). Formation of brown/reddish precipitate indicates the presence of alkaloids.

c).Dragendroff's Test: Filtrates were treated with Dragendroff's reagent (solution of Potassium Bismuth Iodide). Formation of red precipitate indicates the presence of alkaloids.

d). Hager's Test: Filtrates were treated with Hager's reagent (saturated picric acid solution). Presence of alkaloids confirmed by the formation of yellow coloured precipitate.[98]

2. Detection of Carbohydrates: Extracts were dissolved individually in 5ml distilled water and filtered. The filtrates were used to test for the presence of carbohydrates.

a). Molisch's Test: Filtrates were treated with 2 drops of alcoholic α-naphthol solution in a test tube. Formation of the violet ring at the junction indicates the presence of Carbohydrates.

b). Benedict's Test: Filtrates were treated with Benedict's reagent and heated gently. Orange red precipitate indicates the presence of reducing sugars.

c). Fehling's Test: Filtrates were hydrolysed with dil. HCl, neutralized with alkali and heated with Fehling's A&B solutions. Formation of red precipitate indicates the presence of reducing sugars.[99]

3. Detection of saponins

a). Froth Test: Extracts were diluted with distilled water to 20ml and this was shaken in a graduated cylinder for15 minutes. Formation of 1cm layer off a am indicates the presence of saponins.

b). FoamTest:0.5gm of extract was shaken with 2ml of water. If foam produced persists forten minutes it indicates the presence of saponins.

4. Detection of steroids

a). Salkowski's Test: Extracts were treated with chloroform and filtered. The filtrates were treated with few drops of Conc. Sulphuric acid, shaken and allowed to stand. Appearance of golden yellow colour indicates the presence of triterpenes.

b). Libermann Burchard's test: Extracts were treated with chloroform and filtered. The filtrates were treated with few drops of acetic anhydride, boiled and cooled. Conc. Sulphuric acid was added. Formation of brown ring at the junction indicates the presence of phytosterols.[100]

5. Detection of Phenols

Ferric Chloride Test: Extracts were treated with 3-4 drops of ferric chloride solution. Formation of bluish black colour indicates the presence of phenols.

6. Detection of Tannins

Gelatin Test: To the extract,1 %gelatin solution containing sodium chloride was added. Formation of white precipitate indicates the presence of tannins.

7. Detection of Flavonoids

a). Alkaline Reagent Test: Extracts were treated with few drops of sodium hydroxide solution. Formation of intense yellow colour, which becomes colourless on addition of dilute acid, indicates the presence of flavonoids.

b). Lead acetate Test: Extracts were treated with few drops of lead acetate solution. Formation of yellow colour precipitate indicates the presence of flavonoids.[101]

Preparation of Extract:

Freshly collected leaves were washed, shade dried under room temperature for three weeks, powdered into a coarse powder and passed through 22 sieve number. Then, 300g of coarse powdered leaves was extracted with ethanol solvent using soxhlet apparatus. Before and when each extraction, the marc was utterly dried and weighed. Solvent recovery was done with the help of distillation. The filtrate was dried by keeping it in a dessicator.

% yield

The percentage yield of the ethanolic extract of *Emblica officinalis* was determined to calculate the amount of extract obtained from the powdered plant material after extraction.

1. A known quantity 100g of dried and coarsely powdered Emblica officinalis leave was taken.
2. The powdered material was subjected to extraction using ethanol by a suitable extraction method (Soxhlet extraction or maceration).

3. The extract was filtered through Whatman filter paper to remove the plant residues.
4. The collected filtrate was concentrated using a rotary evaporator under reduced pressure.
5. The concentrated extract was dried to obtain a constant weight.
6. The dried extract was weighed accurately and the percentage yield was calculated using the following formula.

$$\text{Percentage Yield} = \frac{\text{Weight of dried extract}}{\text{Weight of powdered plant material}} \times 100$$

Experimental Animals:
Albino rats of either sex, weighing 150-200g were selected to study the present research work. The animals were housed in a polypropylene cage. Each cage had 6 animals. The animals were fed with standard rat diet and water *ad libitum* for one week before and during the experiment. The protocol of experiment was approved by Institutional Animal Ethics Committee (IAEC) of PRRM College of Pharmacy (1423/PO/Re/S/11/CPCSEA).[102]

Acute Toxicity Studies:
The acute oral toxicity study was determined using OECD 423 toxic class method guideline. As per the guideline mentioned above, three healthy Albino rats were orally administered leave extract employed 2000mg/kg considering the available information on mortality is unlikely at the highest starting dose level. Animals were monitored for changes in body weight, clinical symptoms and mortality during the first four hours following the drug's administration and then twice daily for the next 14 days.[103]

Pylorus Ligation Method:
Albino rats of either sex were selected, having weight of 150-200g. Each group had received 6 animals. Control group of animals received 1% CMC and treatment group of animals were received 200mg/kg and 400mg/kg ethanolic extract of *Emblica Officinalis Gaertn*. Omeprazole (20mg/kg) used as standard drug. On 28th day of experiment, the animal stomach was opened, ligated and sutured. After 4hrs, the animals were sacrificed, stomach content was collected, centrifuged and parameters were estimated. Before the day of experiment, animals were fasted for 24hrs by only supply of water.

Aspirin Induced Ulcers:
Albino rats of either sex were selected, weighing 150-200g. Each group had received 6 animals. As per treatment scheduled, all animals were received ethanolic extract of leaves suspended in 1% CMC for 28 days except control and normal group. On 28th day of experiment, control, standard and treatment groups receive aspirin (250 mg/kg) suspended in 1% CMC with the help of gavage. After 4hrs, the animals were sacrificed, stomach content was collected, centrifuged and parameters were estimated. Before the day of experiment, animals were fasted for 24hrs with free access of water.[104]

Evaluation of Parameters:
Gastric Juice Volume:
The stomach was excised carefully, opened along the greater curvature and the gastric contents were removed. The gastric contents were collected in a graduated tube and centrifuged at 2000 rpm for 10mins. The supernatant liquid was collected and expressed as ml/100gm body weight.

Ulcer Score, Ulcer Index and % Inhibition:
After rats were sacrificed, the stomach of a rat was opened along the greater curvature, washed it slowly under running tap water and put it on the slide and observed under 10X magnification for ulcer. Score of ulcers was determined as:
0 = Normal coloured stomach, 0.5 = Red colouration, 1 = Spot ulcers, 1.5 = Haemorrhagic streaks, 2 = Ulcers ≥ 3 but ≤ 5, 3 = Ulcers > 5
The mean ulcer score for each animal was described as Ulcer index. The formula for ulcer index is as follows:

$$UI = UN + US + UP \times 10^{-1}$$

Where
UI = Ulcer index,
UN = Average number of ulcers as per animal,
US = Average number of severity score in animals,
UP = Percentage of animals with ulcers.
Percentage of ulcer inhibition was calculated as:

$$\% \text{ Inhibition of ulcer} = \frac{\text{Ulcer index control} - \text{Ulcer Index test}}{\text{Ulcer index control}} \times 100$$

Free Acidity and Total Acidity:
The content of gastric juice was centrifuged at 1000rpm for 10 mins. Pipette out 1ml of supernatant liquid and dilute it to 10ml of distilled water. Note the p^{H} of the solution with the help of p^{H} meter. Titrate the solution against 0.01N NaOH solution using topfers reagent as an indicator. Titrate to end point when the solution turns to orange colour. Note the quantity of NaOH that corresponds to free acidity. Titrate further till the solution regains its pink colour by using phenolphthalein as an indicator. Note the total volume of NaOH, that represents total acidity. It can be expressed as mEq/l/100g. Following formula was used to calculate acidity:

$$\text{Acidity} = \frac{\text{Volume of NaOH} \times \text{Normality}}{0.1} \times 100 \text{ mEq/l/100g} \quad (7)$$

Gastric Juice p^H:
The p^H of gastric juice was recorded with the help of digital p^H meter.

Total Acid Output:
Total acid output =
It is expressed as μEqL^{-1}/100g body weight

Statistical Analysis:
The results of the experiment were expressed as mean ± SEM. Statistical analysis between different groups were performed by using one way ANOVA followed by Dunnett's comparison test T with the help of computer software GraphPad Prism 7.01.[105]

8. RESULTS

Phytochemical screening test
The freshly prepared extract of the leaves of *Emblica Officinalis Gaertn* was subjected to phytochemical screening tests for the detection of various active constituents. The extract showed the presence of alkaloids, tannins, steroids, phenolic and flavonoids, carbohydrates, and glycosides in crude extract of *Emblica Officinalis Gaertn* leaves as depicted in Table.

Table 8.1: Result of chemical group tests of the Ethanolic Extract of *Emblica Officinalis Gaertn* leaves

Test	Ethanolic Extract
Carbohydrates	+
Tannins	+
Flavonoids	++
Saponins	+
Phenols	++
Steroids	+
Alkaloids	++
Glycosides	+

Ethanolic extract; (+): Present; (-): Absent; (+++); Reaction intensity is high; (++): Reaction intensity is medium; (+): Reaction intensity is normal.

The percentage yield
The percentage yield of the ethanolic extract of *Emblica officinalis Gaertn*. was found to be 18%.

Acute Toxicity Studies:
By performing preliminary phytochemical screening on ethanolic extract of plant *Emblica Officinalis Gaertn*, it showed the presence of certain bioactive compounds like alkaloids, flavonoids, saponins, terpenoid and acid compounds. Acute toxicity study was carried out as per OECD guidelines. The present study states that there was no mortality rate in animals up to the dose of 2000mg/kg. Based on this, 200mg/kg and 400mg/kg doses were selected to carry out the research work.

Pylorus Ligation Induced Ulcer:
Pre-treatment of EEEOG at a dose of 200mg/kg and 400 mg/kg to treatment group of animals effectively reduces gastric juice volume, free acidity, total acidity, total acid output, ulcer score and ulcer index while increased in gastric juice p^H when compared to control group of animals. But, the EEEOG at a dose of 400mg/kg produced significant results.

Aspirin Induced Ulcer:
On 28th day of experiment, treatment group of animals received 200mg/kg and 400mg/kg of EEEOG along with 250mg/kg aspirin drug which produced significant results by reducing gastric juice volume, free acidity, total acidity, total acid output, ulcer score and ulcer index by simultaneously increased in gastric juice p^H when compared to control group of animals. Pylorus ligation model produced effective results when compared to aspirin induced ulcer model.

Table 1: Effect of EEEOG on Pylorus Ligation Induced Ulcer

Groups	Gastric Juice Vol. (ml)	pH	Free Acidity (mEq/L/100g)	Total Acidity (mEq/L/100g)	Total Acid Output (mEq/L/100g)	Ulcer Score	Ulcer Index	% Inhibition
Normal	1.12 ± 0.02	3.9 ± 0.05	15.60 ± 0.12	22.10 ± 0.30	0.30 ± 0.002	0	0	-
Control	1.95 ± 0.01###	3.2 ± 0.01###	53.30 ± 0.41###	56.12 ±0.43###	0.95 ± 0.01###	4.99 ± 0.20##	10.12	-
Standard	1.45 ± 0.01***	4.1 ± 0.09***	24.12 ±0.41***	26.56 ±0.31***	0.40 ± 0.03***	4.2 ± 0.30**	7.10	48.10
Low Dose	1.53 ± 0.05***	3.6 ± 0.02**	32.1 ± 0.53**	35.20 ± 0.56**	0.50 ± 0.02***	3.12 ± 0.10***	8.02	36.36
High Dose	1.40 ± 0.06***	3.2 ± 0.01***	26.2 ± 0.14***	29.19 ± 0.14***	0.38 ± 0.06***	1.99 ± 0.14***	4.8	70.15

values were shown as mean ± SEM and n=6, ### indicates p<0.001 when compared to normal group, ## indicates p < 0.01 when compared to normal group, *** indicates p < 0.001 when compared to control group, ** indicates p < 0.01 when compared to control group.

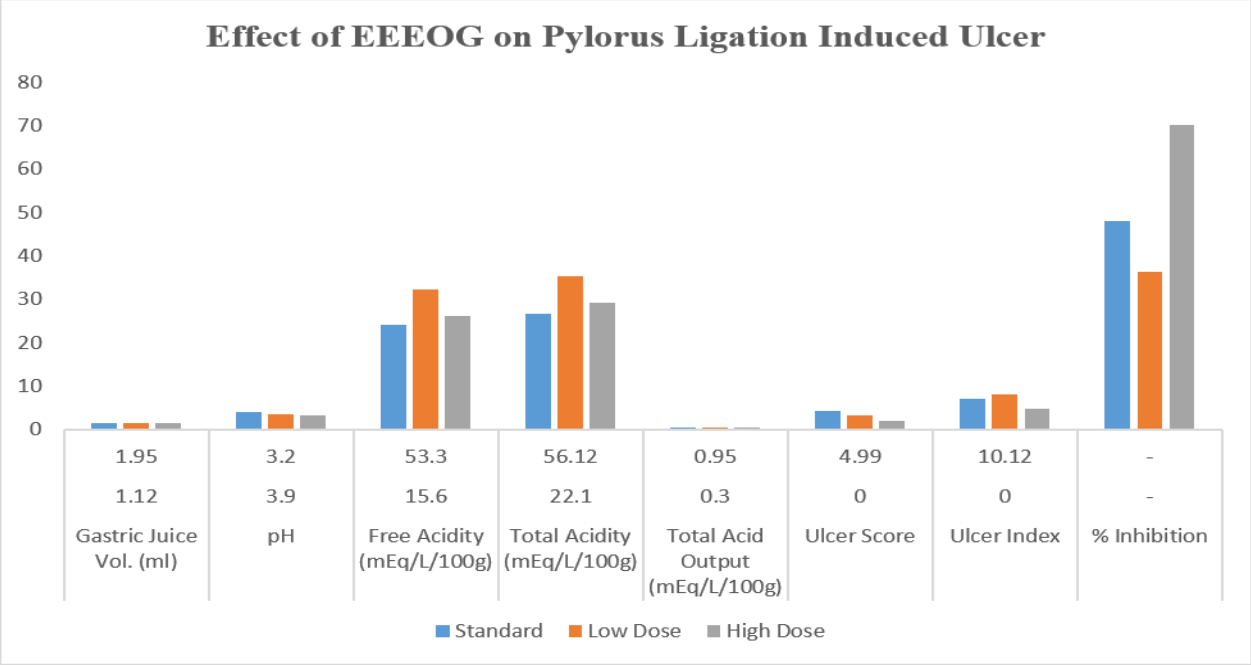

Fig: Effect of EEEOG on Pylorus Ligation Induced Ulcer

Table 2: Effect of EEEOG on Aspirin Induced Ulcer

Groups	Gastric Juice Vol. (ml)	P^H	Free Acidity (mEq/L/100g)	Total Acidity (mEq/L/100g)	Total Acid Output (mEq/L/100g)	Ulcer Score	Ulcer Index	% Inhibition
Normal	1.09 ± 0.01	3.5 ± 0.01	14.12 ± 0.28	20.10 ± 0.14	0.25 ± 0.001	0	0	-
Control	1.15 ± 0.07#	3.2 ± 0.01###	56.52 ± 0.43###	60.15 ± 0.63###	0.70 ± 0.04###	5.10 ± 0.10###	12.60	-
Standard	0.930 ± 0.04*	4.5 ± 0.05***	16.14 ± 0.35***	21.50 ± 0.36***	0.19 ± 0.002***	1.62 ± 0.01***	4.42	70.12
Low Dose	0.95 ± 0.06*	3.5 ± 0.01*	29.2 ± 0.76***	34.12 ± 0.51***	0.32 ± 0.02***	3.12 ± 0.11***	6.81	52.36
High Dose	0.95 ± 0.01**	3.1 ± 0.09***	22.60 ± 0.30***	26.1 ± 0.12***	0.26 ± 0.03***	1.53 ± 0.12***	4.73	69.22

values were shown as mean ± SEM and n=6, ### indicates p<0.001 when compared to normal group, # indicates p < 0.05 when compared to normal group, *** indicates p < 0.001 when compared to control group, ** indicates p < 0.01 when compared to control group, * indicates p < 0.05 when compared to control group.

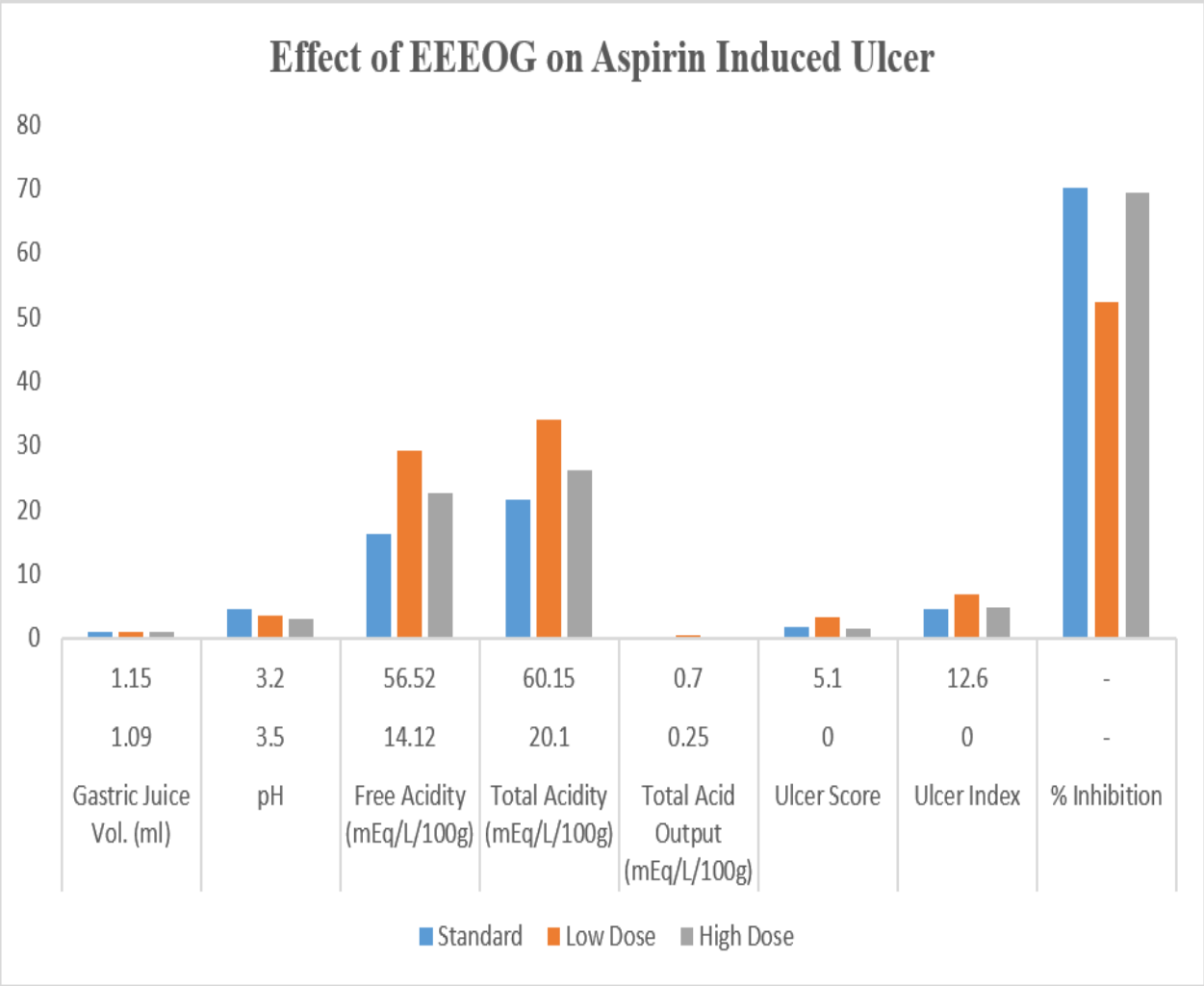

Fig: Effect of EEEOG on Aspirin Induced Ulcer

DISCUSSION:

Peptic ulcer usually occurs as an imbalance between defensive factors and aggressive factors that resists the acid secretion. Peptic ulcer occurs 5 times more commonly in duodenum. Normally, 80-90% of patients reported epigastric pain. A survey was conducted globally, which states that 10% of adults were affected by peptic ulcer. In present study, pylorus ligation model and aspirin induced ulcer model were selected to induce ulcer in animals and *Emblica Officinalis Gaertn* plant was selected to ascertain the antiulcer activity, yet there is no work performed on this plant regarding to ulcer activity.

Acute toxicological studies were performed to determine the lethal effect of EEEOG on experimental animals. Pylorus ligation model is believed to cause the activation of vagus-vagal reflux by stimulation of pressure receptors in the antral gastric mucosa which causes hyper secretion of gastric juice from parietal cells. This may lead to autodigestion of gastric mucosa by gastric acid and breakdown the gastric mucosal barrier which leads to formation of gastric ulcers in rat. Despite aspirin may inhibit the production of prostaglandins by inhibiting COX enzymes which damage the epithelial cells and capillaries. The damaged surface may get swell and form a mucoid cap which allows the protons (H^+) to enter into the mucosa to release various inflammatory mediators, which may lead to the damage of microvascular wall and reduces the mucosal blood flow. It also releases TNFα from mucosal cells, which may cause upregulation of adhesion molecules and release neutrophils. These neutrophils release free radicals, causes infiltration of gastric mucosa, reduces mucosal blood flow, leads to formation of acute erosions which further causes ulcers.

In our study, the EEEOG significantly reduces the ulcer formation in both models by forming a mucosal protecting layer on the epithelial surface of stomach which reduces gastric juice volume, free acidity, total acidity, total acid output, ulcer score, ulcer index and increases the gastric juice p^H when compared to control group of animals as shown in table 1 and 2. This implicates that the

EEEOG suppress gastric acid secretion in stomach by aggressive factors.

Preliminary phytochemical screening of *Emblica Officinalis Gaertn* in ethanol solvent showed the presence of secondary metabolites like alkaloids, flavonoids, terpenoids, saponins, glycosides, acid compounds. Presence of flavonoids plays an important role in the inhibition of ulcer. It is suggested that, flavonoids may inhibit acid secretion from mast cells which results in decrease in the release of histamine. Flavonoids also inhibit H^+/K^+ ATPase pump which results in decrease in the secretion of acid from parietal cells.

These findings indicate that the flavonoids would be able to stimulate prostaglandin secretion which results in increase in mucin and bicarbonate secretion. They counteract with deteriorating effects of reactive oxygen species in gastric region. Based on these mechanisms, we can predict that the ethanolic extract of *Emblica Officinalis Gaertn* may possess antiulcer and antioxidant properties.

CONCLUSION:

The anti-ulcer activity of the plant leaves of *Emblica Officinalis Gaertn* was evaluated by employing Pylorus Ligation and Aspirin Induced ulcer models. These models represent some of the most common causes of gastric ulcer in humans. Many factors and mechanisms are implicated in the ulcerogenesis and gastric mucosal damage induced by different models employed in the present study involving, depletion of gastric wall, mucin mucosal damage induced by nonsteroidal anti-inflammatory drugs and free radical production.

NSAID's like aspirin causes gastric mucosal damage by decreasing prostaglandin levels through inhibition of PG synthesis. Ethanolic extract of the plant of *Emblica Officinalis Gaertn* plant leaves was significantly effective in protecting gastric mucosa against paracetamol induced ulcers at all the dose level studied.

The antiulcer activity of *Emblica Officinalis Gaertn* plant leaves extracts in stress induced model is evident from its significant reduction in gastric volume, ulcer index and increase in pH of gastric juice. Because of animals treated with *Emblica Officinalis Gaertn* plant leaves extracts significantly inhibited the formation of ulcer in the stomach and also decreased both acid concentration, gastric volume and increased the pH values.

It is suggested that *Emblica Officinalis Gaertn* plant leaves extracts can suppress gastric damage induced by aggressive factors. It is generally accepted that gastric ulcers result from an imbalance between aggressive factors and the maintenance of the mucosal integrity through endogenous defense mechanisms. The excess gastric acid formation by prostaglandin (PG) includes both increases in mucosal resistance as well as a decrease in aggressive factors, mainly acid and pepsin. Inhibitions of PG synthesis by aspirin coincide with the earlier stages of damage to the cell membrane of mucosal, parietal and endothelial cells.

The preliminary phytochemical studies revealed the presence of flavonoids in Ethanolic extracts of *Emblica Officinalis Gaertn* plant leaves various flavonoids have been reported for its anti-ulcerogenic activity with good level of gastric protection. So, the possible mechanism of antiulcer action of *Emblica Officinalis Gaertn* plant leaves may be due to its flavonoids content. In this study we observed that *Emblica Officinalis Gaertn* plant leaves provide significant anti-ulcer activity against gastric ulcers in rats.

On the basis of the present results and available reports, it can be concluded that the anti-ulcer activity elucidated by *Emblica Officinalis Gaertn* plant leaves could be mainly due to the modulation of defensive factors through an improvement of gastric cytoprotection and partly due to acid inhibition.

Among the two doses (200 mg/kg and 400 mg/kg) of EEEOG, high dose (400 mg/kg) of EEEOG showed effective results in both models. The satisfactory results were obtained due to the presence of flavonoids which block or inhibit histamine release from mast cells and increase the mucus secretion in the stomach. This proved that the EEEOG possessed antiulcer activity against pylorus ligation induced and aspirin induced ulcers in Albino rats.

REFERENCES:

1. Burks TF. Principles of Pharmacology. United States of America: International Thomson publishing Inc; 1995. p. 1063.
2. Kumar V, Abbas KA, Fausto N. Robbins and Cotran Pathologic Basis of Disease. 7th ed. New Delhi: Elsevier Inc; 2004. p. 817.
3. Peptic ulcer diagram. Available from:www.wanderiner.blogspot.com.
4. Statistics. Available from:http://www.cureresearch.com/p/peptic_ulcer/statscountry.htm
5. Danger of ulcer. Available from:http://www.murrasaca.com/Gastriculcer.htm.
6. Allison MC, Howatson AG, Caroline MG.Gastrointestinal damage associated with the use of nonsteriodal anti-inflammatory drugs. N Engl J Med 1992; 327: 749–54.

7. Lenz HJ, Ferrari-Taylor J, Isenberg JI. Wine and five percent ethanol are potent stimulants of gastric acid secretion in humans. Gastroenterology 1983; 85: 1082-7.
8. Cohen S, Booth GH Jr. Gastric acid secretion and lower-esophageal - sphincter pressure in response to coffee and caffeine. N Engl J Med 1975; 293: 897–9.
9. Feldman EJ, Isenberg JI, Grossman MI. Gastric acid and gastrin response to decaffeinated coffee and a peptone meal. JAMA 1981; 246: 248–50.
10. Dubey P, Sundram KR, Nundy S. Effect of tea on gastric acid secretion. Dig Dis Sci 1984; 29: 202–6.