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EVALUATION OF ANTIULCER ACTIVITY OF *LAGENARIA SICERARIA* IN EXPERIMENTAL RAT MODELS

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Abstract:

Peptic ulcer is the most common gastrointestinal disorder that world faces at present. Lagenaria siceraria is one of the folk plants used by the people to treat various ailments to attain health benefits. Every part of the plant has various activities which can eradicate maximum health issues. The present study is aimed to investigate the gastro-protective and anti-ulcerogenic activity of ethanolic extract of Lagenaria siceraria. The ethanolic extract was tested orally in doses of 200 mg/kg and 400mg/kg which was obtained from the acute oral toxicity studies on gastric ulcerations experimentally induced by pylorus ligation and ethanol in rats. Comparison of the drug effect is done with the effect of standard drugs, omeprazole (30 mg/kg) and sucralfate (100 mg/kg). The parameters like gastric pH, gastric acid volume, total acidity, free acidity and ulcer index are assessed. The ethanolic extract showed an activity in a dose of 200 mg/kg and 400 mg/kg with a reduction in the gastric volume, total acidity, free acidity, ulcer index and raise in the gastric pH when compared to that of ulcer control group. A gastro-protective and anti-ulcerogenic activity is shown by the extract of Lagenaria siceraria both in ethanol induced ulcer model and pylorus ligated ulcer model. At the concluding point, extract of Lagenaria siceraria was found to possess a very good gastroprotective and anti-ulcerogenic property. The results of the study revealed the further uses of the leaves of this plant in the treatment of ulcers in the stomach.

Keywords *Lagenaria siceraria, antisecretory, cytoprotective, gastric ulcer, ethanol induced ulcers and pylorus ligation induced 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.

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 esophagealdisease[1]. In the US, approximately 4 million people have peptic ulcer (duodenal and gastric types), and 350 thousand new patients are diagnosed in each year, around 180 thousand peoples are admitted to hospital and treated with drugs yearly, and about five thousand patients 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 are wound in the lesions that are most often affected in younger to older adults' population, but this may diagnose 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 affects because of bacterial infections with H. Pylori.

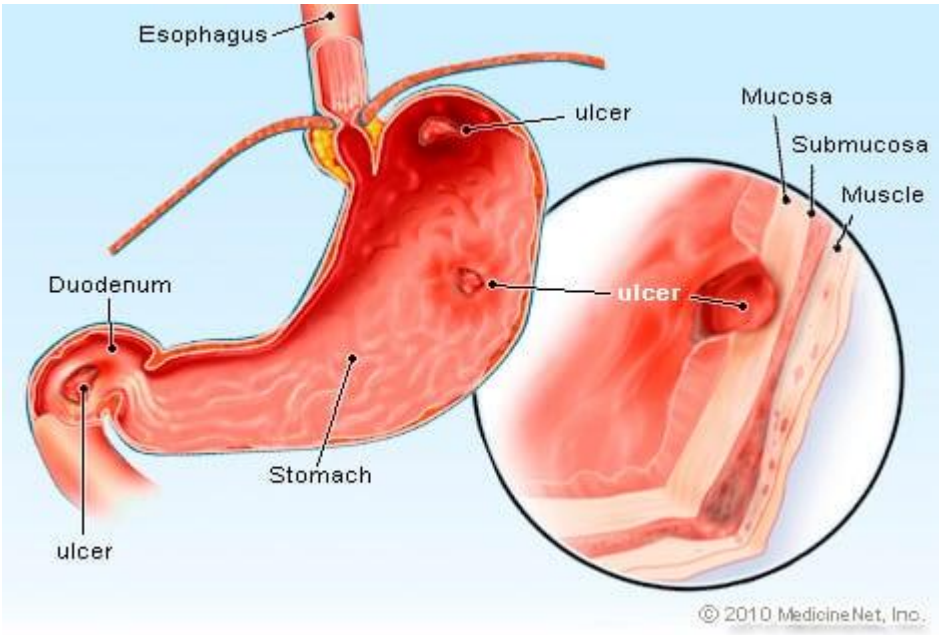


Figure 1-Diagram of Peptic Ulcer[3]

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

Table 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[10] can interfere with the curing of the peptic ulcers. Smoking may also low the ulcer healing process[11]. People with ulcer symptom have been evaluated to had more carbohydrate than people with no ulcers,[12] from this route may occur with a genetic susceptibility for the ulcer pathogenis[13].
Sugar has also been reported to increase stomach pH[14]. Salt may cause the stomach and intestine irritation. Large uptakes of salt have been linked to higher risk of stomach ulcer[15]
One of the amino acids Known as Glutamine, is the important source in the energy in cells which cover the stomach and intestine[16]. It is also preventing 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,

7. 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 plant, 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.

7.1 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 Drugs and Chemicals

S.No	*Materials*	*Company Name*
1.	Ranitidine	Cipla
2.	Omeprazole	Cipla
3.	Alcohol	Merck

7.2. 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 plant 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.

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.

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.

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

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

Lead acetate Test: Extracts were treated with few drops of lead acetate solution. Formation of yellow Colour precipitate indicates the presence of flavonoids.

Plant Material Collection and Preparation

The fruits of *Lagenaria siceraria* were collected from Local market Hyderabad, India. The plant was then authenticated by Department of Botany. The fruits are then dried and coarse powdered for extraction. The powdered dry fruit materials are subjected for repeated extraction. Ethanol is used as the solvent for successive extraction. The dried, coarse powdered material was kept in an extraction chamber along with the ethanol as the extracting solvent for around 7 days with occasional stirring. This content is then filtered by using a muslin cloth and the filtrate obtained is subjected to distillation under minimum pressure to remove the ethanolic fractions from the filtrate. The concentration of the drug left behind is further concentrated to obtain a thick slurry. This slurry is further dried and then stored in desiccators for future use.

Selection of Animals

Albino Wistar rats of either sex, 4 - 6 weeks old weighing about 180-250 g was taken. Animals are obtained from the central animal house, NCARE, Paneer, Mangalore. These rats were properly housed in different cages under the temperature conditions in dark and light for 12 hours. Animals were provided with standard food and water ad libitum.

Drug Treatment and Acute oral Toxicity Studies

In order to assess the acute pharmacological and drug safety, an initial pharmacological study was

conducted. Acute oral toxicity studies were carried out to determine the lethal dose, i.e., LD50 of the extract of Garcinia cambogia. These studies were conducted on albino Wistar rats of 150-200g body weight by using "Up and Down Method" as per OECD 425 guidelines. The procedure of the test minimizes the number of animals required to estimate the acute oral toxicity studies of the extract. The suspension of extract (2000 mg/kg) was administered orally to the rats which were fasted overnight. These animals are watched once in 30 minutes interval for about 4 hours in order to check any behavioral and neurological changes and finally till the death after 24 hours of administration.

Selection of Doses

To evaluate the anti-ulcer activity of *Lagenaria siceraria* fruit, two dose levels have to be selected. Let the two doses to be mid dose and a higher dose. Selecting the mid dose from the acute toxicity studies, the mid dose will be 1/10th of the maximum dose given in the acute oral toxicity studies which is 2000 mg/kg.so, 1/10th of 2000 mg/kg will be 200 mg/kg of rat body weight which is taken as mid dose. The higher dose will be double that of 1/10th dose, that is, 400 mg/kg body weight of rat.

Ethanol Induced Ulcer Model

Experimental design

Albino Wistar rats weighing about 180-200 g were randomly divided into 6 groups containing 6 rats each. The animals were categorized into different groups are described in the table below:

The animals were fasted overnight before conducting the experiment. Absolute alcohol was administered irrespective of the weight of animal, orally at a dose of 1 ml per animal one hour after the administration of the drugs. These animals are sacrificed after one hour of ethanol administration and their stomachs were isolated and cut opened along the greater curvature then pinned on thermocol board. This isolated stomach was exposed and examined for ulcerations and determined.

Pylorus ligation Induced Ulcer Model

Experimental design

Albino Wistar rats of weight 180-200 g are arbitrarily divided into 5 groups of 6 animals each. The different groups are given in the table below:

The albino Wistar rats were fasted overnight. During this time, the rats were sheltered in individual cages with raised bottoms of wide wire mesh in order to avoid coprophagy and cannibalism. Access to drinking water ad libitum was provided. The rats were anaesthetized after one hour of drug treatment and the mid line incision of 1cm long is made in the abdomen below the sternum. The stomach is identified and the pyloric sphincter is tied with a sterile thread and a knot is applied, which was done without causing any damage to the blood supply of the stomach. The abdomen wall was sutured and these rats were allowed to recover back and were stabilized in single cages. Animals were deprived of water during post-operative period. Group 1 animals are served as normal. These animals were sacrificed by cervical decapitation method, 6 hours after the pylorus ligation. The stomachs were removed and cut along the greater curvature and observed for the ulcerations. The gastric juice of the stomach is collected. Its volume, pH, free acidity and total acidity are determined. The pH is determined using pH meter. The ulcerations in the stomach were observed and noted. With the help of hand lens (10x), the severity of the ulcer scores were recorded macroscopically and is compared with that of the standard drug. The ulcer index is determined.

Table 1. Experimental design of ethanol induced ulcer model

Groups	Treatment
Group I	Normal control
Group II	Ulcer control (Absolute alcohol, 1 ml) p.o
Group III	Standard (sucralfate, 100mg/kg) p.o
Group VI	*Lagenaria siceraria* extract (200mg/kg)
Group V	*Lagenaria siceraria* extract (400mg/kg)

Table 2. Experimental design of pylorus ligation induced ulcer model

Groups	Treatment
Group I	Normal control
Group II	Ulcer control (Absolute alcohol, 1 ml) p.o
Group III	Standard (Omeprazole 30mg/kg) i.p
Group VI	*Lagenaria siceraria* extract (200mg/kg)
Group V	*Lagenaria siceraria* extract (400mg/kg)

Biochemical Estimations

Estimation of Ulcer Index (UI)

The abdomen was removed and cut open along the greater curvature, pinned on a soft board. The severity of ulcer scores is observed and noted with the help of hand lens (10X) and the standard ulcer scores are given below.

Table 3. Scores for ulcer index

Observation	Score
Normal stomach	0
Red colouration	0.5
Spot ulcer	1.0
Hemorrhagic streaks	1.5
Ulcers	2.0
Perforations	3.0

He ulcer index was calculated by using the formula:

UI = UN + US + UP × 10-1

Where, UI - Ulcer Index.

UN - Average of number of ulcers per animal.

US - Average of severity scores.

UP – Percentage animals with ulcers.

Then the percentage of ulcer protection was determined as given:

%protection = control mean ulcer index – test mean ulcer index x100 Control mean ulcer index

Estimation of free acidity and total acidity

The stomach was removed, cut along the greater curvature and the gastric juice was collected in a test tube. It was then centrifuged at 3000 rpm (rotation per minute) for about 10 minutes. From this, 1 ml of the supernatant (gastric juice) was pipetted into a 100 ml conical. The collected supernatant was diluted with 10 ml of distilled water. The pH of the solution is noted and to that 2-3 drops of topfers reagent (dimethyl-amino azo-benzene with phenolphthalein) is added. This solution was titrated against 0.01 N NaOH till the solution turns to orange as end point. The quantity of alkali added was recorded which gives the free acidity. The titration is further continued to obtain total acidity. The titration is continued further till the solution regains pink color. The complete volume of NaOH is noted, which corresponds to the total acidity.

Gastric acidity can be expressed by using the formula given below:

Acidity = volume of NaOH × Normality of NaOH × 100 mEq/L/100g 0.1

Statistical Analysis

All the data's exhibited as, mean ± SEM and were subjected to the one – way Analysis of Variance test (ANOVA). This was followed by the Post hoc Scheffe's test using SPSS computer software version 10. The p value < 0.05 is considered as statistically significant.

8. RESULTS:

Phytochemical screening test

The freshly prepared extract of the fruits of *Lagenaria siceraria* 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, saponins and glycosides in crude extract of *Lagenaria siceraria* as depicted in Table 8.1.

Table 8.1: Result of chemical group tests of the ethanolic Extract of *Lagenaria siceraria*

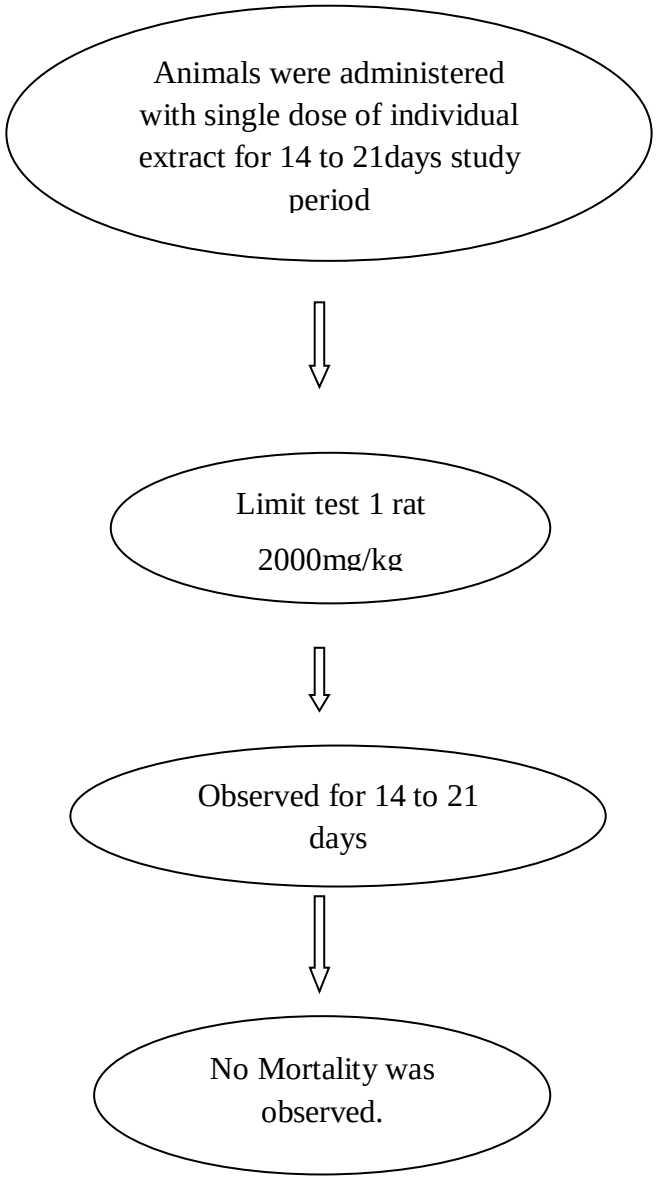
Test	Ethanolic Extract
Carbohydrates	-
Tannins	+
Flavonoids	++
Saponins	+
Phenols	++
Steroids	+
Alkaloids	++
Glycosides	+

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

ACUTE TOXICITY STUDY

Administration of the *Lagenaria siceraria* extracts *in* rats at doses of 2000 mg/kg by oral gavage did not reveal any adverse effects or signs of toxicity. Observations twice daily for fourteen days also did not reveal any drug related observable changes or mortality. Accordingly, the acute oral LD50 of the extractives was concluded to exceed 2000 mg/kg body weight, the highest dose tested in the study.

CHART FOR ACUTE ORAL TOXICITY



Ethanol Induced Ulcer Model

Ethanol is a strong solvent which digests the gastric mucosa forming lesions in the mucosal barrier. It also inhibits the release of bicarbonates and synthesis of mucus. The impacts can be because of the various activities taking place in the biological system like lipid peroxidation, depolarization, free radical generation and intracellular oxidative stress. Oral administration of alcohol can produce a necrotizing effect on the gastric mucosa. Pathogenesis of ethanol induced gastric ulcers include mediators like lipoxygenase, oxygen derived free radicals and cytokinins. The result of this study revealed that the fruit extract produced significant antiulcer activity because of the chemical content present in it. It was understood that the *Lagenaria siceraria* fruit extract reduced the gastric ulcerations (table 1) in rats. Extract 200mg/kg and 400mg/kg produced an ulcer index of 8.15 and 5.10 when compared with ulcer control group (12.92). The percentage protection produced by extracts 200mg/kg and 400mg/kg is 15.41% and

55.12% respectively and standard sucralfate (30mg/kg) produced 82.10% protection on ethanol induced ulcers in rat (Table).

Pylorus Ligation Induced Gastric Ulcer in Rats The most acceptable model for the evaluation of gastric ulcer is pylorus ligation induced gastric ulcer in rats. Pylorus ligation leads to the accumulation of large quantity of gastric acid which results in the production of gastric volume, free acidity, total acidity and reduction in the gastric pH. The accumulation of large volume of gastric juice leads to the self-digestion of the gastric mucosa and lead to breakdown of the mucosal barrier forming gastric ulcers. *Lagenaria siceraria* fruit extract produced an anti-ulcerogenic activity in a dose dependent manner. Doses 200mg/kg and 400 mg/kg produced a good antiulcer activity by reducing the gastric acid volume, free Acidity total acidity and rise in gastric pH. The extract 200mg/kg and 400mg/kg produced an ulcer index of 6.14 and 3.63 when compared with ulcer control group (10.15) and standard group treated with omeprazole (2.20). At a dose of 200 and 400mg/kg, the extract produced a percentage protection of 37.12% and 60.36% respectively whereas the standard drug omeprazole produced a percentage protection of 84%. The result reported that the extract at 400mg/kg produced a significant effect than 200mg/kg. (Table).

Table 4. Effect of ethanolic extract of *Lagenaria siceraria* on Ethanol induced ulcer model.

Groups	**Treatment**	**Ulcer index**	**%Protection**
Group I	Normal control	0^{b}	-
Group II	Ulcer control	12.92 ± 0.1^{ac}	-
Group III	Sucralfate (100 mg/kg)	1.20 ± 0.3^{b}	82.10%
Group IV	Extract (200 mg/kg)	8.15 ± 0.2^{ac}	15.41%
Group V	Extract (400 mg/kg)	5.10 ± 0.3^{abc}	55.12%

The values are expressed as Mean ± SEM, (n=6). a = $p<0.05$ when compared to Normal Control group, b = $p<0.05$ when compared to the Ulcer Control group, c = $p<0.05$ when compared to Standard group.

Table 5. Effect of ethanolic extract of *Lagenaria siceraria* on pylorus ligated ulcer model

Groups	**Treatment**	**Gastric volume**	**Gastric pH**	**Free acidity (mEq/L)**	**Total Acidity (mEq/L**	**Ulcer index**	**% Protection**
Group I	Normal control	1.10 ± 0.19^{b}	2.95 ± 0.21^{bc}	45 ± 1^{bc}	75.60 ± 2.1^{bc}	0^{bc}	-
Group II	Ulcer control	5.1 ± 0.2^{bc}	2.56 ± 0.04^{ac}	91.1 ± 5.2^{ac}	94.21 ± 1.2^{ac}	10.15 ± 0.02^{ac}	-
Group III	Omeprazole (30mg/kg)	2.9 ± 0.1^{b}	5.96 ± 0.10^{ab}	25 ± 1.9^{aB}	45.26 ± 2.1^{ab}	2.20 ± 0.01^{ab}	84
Group IV	Extract(200mg/kg)	2.60 ± 0.19^{b}	5.56 ± 0.14^{bc}	43.12 ± 1.4^{bc}	64.51 ± 1.9^{abc}	6.14 ± 0.2^{abc}	37.12
Group V	Extract(400mg/kg)	1.9 ± 0.01^{bc}	6.1 ± 0.99^{ab}	35.20 ± 1.6^{abc}	56.30 ± 2.8^{abc}	3.63 ± 0.70^{abc}	60.36

Further study can be conducted to confirm which among these might be responsible for the action shown study was undertaken to investigate the anti-ulcerogenic activity of ethanolic extract of *Lagenaria siceraria* from the preliminary phytochemical investigation, the extract of *Lagenaria siceraria* was found to contain flavonoids, alkaloids, reducing sugars, proteins, steroids, saponins and tannins. The ethanolic extract of the drug is proved to be safe up to 2000mg/kg from acute oral toxicity studies. The dose of the drug extract showed a significant activity in a dose dependent manner in both ethanol induced gastric ulcer model and pylorus ligated gastric ulcerations in rats. At a dose of 400mg/kg of the extract, there was a reduction in the gastric volume, total acidity, free acidity, ulcer index and an increase in the gastric pH when compared to standard drug. The result clearly reveals that the drug has got some significant amount of antiulcer activity. Thus, according to the proof from the study, it can be concluded that the ethanolic fruit extract of *Lagenaria siceraria* possesses a significant activity; hence can be utilized as an anti-ulcerogenic drug for its gastro protective and anti-ulcer activity.

8. DISCUSSION:

The etiology of peptic ulcer is unknown in most of the cases; it is generally accepted that gastric ulcer

results from an imbalance between aggressive factors and the maintenance of the mucosal integrity through the endogenous defense mechanism. Different therapeutic agents are used to inhibit the gastric acid secretion or to boost the mucosal defense mechanisms by increasing mucosal production, stabilizing the surface epithelial cells or interfering with the prostaglandin synthesis. The prostaglandins can provide gastric cytoprotection in rats against strong necrotizing irritants without reducing gastric acid secretion.

The causes of gastric ulcer by pyloric ligation are believed to be due to stress induced increase in gastric hydrochloric acid secretion and/or stasis of acid and the volume of secretion is also an important factor in the formation of ulcer due to exposure of the unprotected lumen of the stomach to the accumulating of acid. The ligation of the pyloric end of the stomach causes accumulation of gastric acid in the stomach. This increase in the gastric acid secretion causes ulcers in the stomach. The lesions produced by this method are located in the lumen region of the stomach.

Ethanol induced gastric lesion formation may be due to stasis in gastric blood flow which contributes to the development of the haemorrhage and narcotic aspects of tissue injury. Alcohol rapidly penetrates the gastric mucosa apparently causing cell and plasma membrane damage leading to increased intra cellular membrane permeability to sodium and water. The massive intracellular accumulation of calcium represents a major step in the pathogenesis of gastric mucosal injury. This leads to cell death and exfoliation in the surface epithelium.

In the present study EELS showed protection against gastric lesions in the experimental rats, reduced gastric volume, free acidity, total acidity and ulcer index thus showing the anti-secretory mechanism involved in the extracts for their anti-ulcerogenic activity. Ulcer index parameter was used for the evaluation of anti-ulcer activity since ulcer formation is directly related to factors such as gastric volume, free and total acidity.

The protection of EELS against characteristic lesions may be due to both reductions in gastric acid secretion and gastric cycloprotein or enhancement of the mucosal barrier through the increase production of prostaglandin and this may be due to the presence of glycosides. Further studies are needed for their exact mechanism of action on gastric acid secretion and gastric cytoprotection.

The effects in all the 2 models studied were dose dependent. In conclusion, to the best of our knowledge for the first time, we have demonstrated that Hence *Lagenaria siceraria* extract has gastro protective activity against experimentally induced ulcers in rats. The mechanism of gastro protective action can be attributed to its antisecretory and cytoprotective property. However further experiments are required to establish and elaborate the molecular mechanism(s) of its Anti-ulcer activity.

CONCLUSION:

Peptic ulcer disease is one of the most common gastrointestinal disorders. It mainly involves an imbalance between the offensive and defensive factors. Many synthetic drugs such as H2 blockers, gastro protective and proton pump inhibitors are available in the market but they are showing many side effects. Medicinal plants and their products are considered to less side effects and more efficacy when compared to synthetic drugs. Many medicinal plants and natural analogues showed prominent anti-ulcer and gastro-protective activities. Based on this literature review the plant *Lagenaria siceraria* was selected for screening antiulcer activity.

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

Pyloric ligation induced gastric ulcer and Ethanol-induced gastric ulcer model ethanolic extract of *Lagenaria siceraria* at a dose of 150 and 300mg/kg body weight p.o was found to exhibit significant cytoprotective action when compared to control (pyloric ligation) group using Omeprazole 20mg/kg p.o as a standard drug

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

These observations lend a pharmacological proof and support on the traditional use of *Lagenaria siceraria* as an anti-ulcer agent. In future, this work can be extended by adding more number of ulcer models to confirm the anti-ulcer potency of *Lagenaria siceraria* fruits plus the isolation and characterization of the phyto constituents responsible for the pharmacological activity can also be attempted. Toxicological studies can also be done to know more about the toxic and non-toxic nature of the drug.

Recommendations:

The Research work can be extended:

- ✓ This study confirmed the claim in Ethiopian traditional medicine that the plant has therapeutic value in stomach ulcers. So, it needs further in-depth investigation by using other models, isolation, and characterization of the active principles responsible for the anti-ulcer activity and to elucidate the exact mechanism action of this plant. Evaluation of its anti-ulcer efficacy in case of co-morbid illness in those previously reported.

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.

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