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AN REVIEW ARTICLE ON THE ANTI-ULCER ACTIVITY OF SOME MEDICINAL PLANTS

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Abstract:

Peptic ulcer is one of the most common gastrointestinal diseases. The exact causes of peptic ulcer disease are not known but it may be result from an imbalance between acid-pepsin secretion and mucosal defence factors. Peptic ulcer disease occurs mainly due to consumption of NSAIDs, infection by H. pylori, stress, or due to a pathological condition such as Zollinger –Ellison Syndrome. Nature provides a number of medicines and perhaps all solutions for human illnesses. So far, nature supplies many clinically useful drugs. Ulcer is a major increasing health problem. Nowadays, there are several synthetic medications available for the treatment of peptic ulcers, but these drugs are expensive and are likely to produce more side effects than herbal drugs. Certain antiulcer drugs such as proton pump inhibitors and H2 receptor antagonists are used to treat peptic ulcers. However, these drugs have shown disease relapse, side effects, and even drug interactions. Numerous medicinal plants have anti-ulcer activity and are useful in the treatment of peptic ulcers. The aim of this review is to find out more about the anti-ulcer properties of herbal medicines. The present article reviews the antiulcerogenic and ulcer healing property of Ocimum sanctum, Allophylus serratus, Desmodium gagenticum, Azadirachta indica, Hemidesmus racemosus, Asparagus racemosus, and Musa sapientum. We have brought to light some of the important plants reported for their anti-ulcer and ulcer healing properties. Ayurvedic knowledge supported by modern science is necessary to isolate, characterize and normalize the active components of herbal sources for antiulcerative activity.

KEYWORDS: *Antiulcer activity, Ethanolic extract, Aspirin-induced ulcer model, NSAIDs.*

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INTRODUCTION:

Peptic ulcer is an excoriated area of stomach caused principally by the digestive action of gastric juice, upper small intestinal secretions. It is basically an inflamed break in the skin or the mucus membrane lining the alimentary tract. Prolonged use of non-steroidal anti-inflammatory drugs (NSAIDs) and Helicobacter pylori infection are two major factors that can disrupt mucosal resistance. It mainly occurs in the stomach and proximal duodenum but lower esophagus, distal duodenum, or jejunum may involve the. General and inexpensive measure like introducing healthy lifestyle, stopping smoking and taking antacid should be promoted. The possibility of malignant disease should be considered in all patients over the age of 40 years.

The incidence of duodenal ulcers has dropped significantly during the last few decades, while the incidence of gastric ulcers has shown a small increase in recent years, which is mainly caused by the widespread use of NSAIDs. The two most important developments associated with the overall decreased rats of peptic ulcer disease are the discovery of effective and potent acid suppressants and the identification of H. pylori as the main causative agent. In essence, as the infectious cause of gastric ulceration is being successfully fought, a higher percentage of the U.S. population is succumbing to gastritis and ulceration from the chronic consumption of medication, primarily NSAIDs.

SYMPTOMS:

- Burning stomach pain
- Feeling of fullness, bloating or belching
- Intolerance to fatty foods
- Heartburn
- Nausea

The most common peptic ulcer symptom is burning stomach pain. Stomach acid makes the pain worse, as does having an empty stomach. The pain can often be relieved by eating certain foods that buffer stomach acid or by taking an acid-reducing medication, but then it may come back. The pain may be worse between meals and at night.

Many people with peptic ulcers don't even have symptoms. Less often, ulcers may cause severe signs or symptoms such as:

- Vomiting or vomiting blood — which may appear red or black
- Dark blood in stools, or stools that are black or tarry
- Trouble breathing
- Feeling faint
- Nausea or vomiting
- Unexplained weight loss
- Appetite changes

CLASSIFICATION:

A. By region/area:

1. Duodenum (called duodenal ulcer)
2. Esophagus (called esophageal ulcer)
3. Stomach (called gastric ulcer)
4. Meckel's diverticulum (called Meckel's diverticulum ulcer; is very tender with palpation)

B. Modified Johnson classification of peptic ulcers:

- **Type I:** Ulcer along the body of the stomach, most often along the lesser curve at incisura angularis along the locus minor is resistant. Not associated with acid hypersecretion.
- **Type II:** Ulcer in the body in combination with duodenal ulcers. Associated with acid over secretion.
- **Type III:** In the pyloric channel within 3 cm of pylorus. Associated with acid over secretion.
- **Type IV**: Proximal gastroesophageal ulcer.
- **Type V:** Can occur throughout the stomach associated with chronic use of NSAIDs (such as aspirin).

DIFFERENT MODEL OF PEPTIC ULCER

The different models for inducing ulcers and screening of antiulcer drugs:

A. Gastric ulcers

1 Pylorus ligated rat model

This model involves ligating the pyloric end of 24-36 hrs fasted albino rats(150-200gm) for six hours. Then gastric content is collected centrifuged and subjected to analysis for pH, free and total acidity and the stomachs are observed for severity for ulcers. The method has great predicted value for anti-ulcer agents in the human disease though, the ulcers in this model are localized in the ruminal area of the stomach whereas in the human disease the glandular stomachs and duodenal region are most involved.

2. Stress ulcers

a. Restraint ulcers
In this method, 36 hours fasted albino rats are used. The limbs of these rats are put together in a pair and tightened with adhesive tape so that the animals cannot move. At the end of 24 hrs animals are sacrificed, stomachs are examined, ulcer index was scored.

b. Water immersion-induced restraint ulcer
In this method male Wistar rats, fasted for 24 hrs are immobilized in a stress cage and then immersed to the level of xiphoid process in a water bath (23C) for 16 hrs. The animals are sacrificed and stomachs by a blow on the head, each stomach is removed, filled with 1% formaline and then put into for 10 minutes. The ulcer index can be estimated by measuring the total length of lesions and the test drugs and administered 30 minutes prior to stress.

c. Cold and restraint ulcer
In this method Wistar rats are deprived of for 12 hrs. They are then immobilized in a stress cage and forced to remain in a cold room (4-6 C) for 3 hrs. The animals are sacrificed by a blow on the head and the ulcer index calculated, as described for restraint ulcer. The test drugs are administered 30 min before immobilizing the animals.

d. Restraint + aspirin
Male Wistar rats are deprived of food for 24-36 hrs. Aspirin (50mg/kg p.o.) in CMC in administered 30 min before restraint. The test drug is given 1 hour before the restraint. The rats are subjected to restraint, after 6 hours the animals are sacrificed, and intensity of gastric lesions determined.

e. Swimming stress ulcers

Male Wistar rats fasted for 24-36 hrs are forced to swim inside the vertical cylinder containing water up to 15cm height, maintained at 23C. 3 hrs after the stress, they are removed from cylinders and sacrificed, ulcer index is determined.

f. Activity stress ulcers
Rats are individually housed in running wheel activity cage, allowing continuous access to the wheel, and fed only one hour each day, some of these animals will die within 4-16 days. An interesting feature of this phenomenon is that rats, demonstrating high levels which die, reveal extensive lesions in the glandular stomach. Since these lesions resembled the "stress ulcer".

g. Haemorrhagic shock induced gastric ulcers
In this method the rats are an anesthetized with I.P. urethane (125mg/ 100g). After 20-30 min of stabilization and base line measurements, 13ml/kg of blood is removed every 1-2 min, from a canula inserted into the carotid artery, producing hypotension to a mean arterial pressure of 30-40 mm Hg. A transducer in connected via a three way stop cock to the same arterial line to monitor the arterial blood pressure. 20 min after the shock, the animals are killed, the stomachs are removed, and intensity of the macroscopic lesions is graded by a suitable method.

3. Chemically induced ulcer model
a. Histamine induced gastric ulcer in guinea pigs
Male guinea pigs weighing 300-400g are fasted for 36 hrs (water allowed). Gastric ulceration is induced by injecting 1 ml of histamine acid phosphate (50 mg base) i.p., promethazine hydrochloride 5 mg is injected i.p., 15 min before and 15 min after histamine to protect the animals against toxicity. The drugs under investigation are given p.o. or s.c. 30-45 min before histamine injection. The animals are sacrificed 4 hrs after histamine administration and the stomach is dissected out. The gastric contents are subjected to analysis and the stomach is cut open and the degree of ulceration is graded.

b. Acetic acid induced chronic gastric ulcer model
By injection of acetic acid (1-30%, 0.05 ml per rat), into submucosal layer of stomach, which closely resembles that of human peptic ulcer disease. On the other application of 100% acetic acid upon the serosa surface of rat produces penetrating duodenal ulcers as well as gastric ulcer at a low perforation in rate.

c. Gastric mucosal damage by NSAID in rats
Gastric ulceration in rats is induced by drugs and the ability of several agents to either protect against or aggravate this ulceration is observed. The ulcerogenesis routinely used are aspirin (500mg/kg, p.o.) phenylbutazone (100 mg/kg, p.o/i.p), indomethacin (10mg/kg,p.o.) and ibuprofen (200 mg/kg, p.o.).

The animals are sacrificed after prescribed period which may vary with different agents and the stomachs are examined for the presence of mucosal lesions.

d. Reserpine induced solitary chronic gastric ulcers
Animals are deprived of solid food for 24 hrs with water ad libutum. They are administered reserpine 5

mg/kg/day for 5 days and sacrificed after two weeks and ulcer index determined.

e. Serotonin-induced gastric mucosal lesions
The animals are fasted for 24 hrs prior to experiment, water being provided ad libitum. Serotonin creatinine sulphate is dissolved in saline and injected to rats. The 20 mg/kg dose of serotonin is found to induce a moderate but evident gastric lesion. In gross observation, gastric lesions are scarily noticed at 0.5hr after serotonin injection, but are obviously distinguishable at 1 hr and reach maximum intensity at 4 hrs. The lesions are located mainly at the side of the greater curvature of corpus. The ulcer index decreases to 8 to 8 hrs and maintained to this level up to 24 hrs after serotonin injection.

f. Dimaprit induced gastric ulcer
Dimaprit was administered i.p. or i.v. to 24 hrs fasted rats and animals were sacrificed 4 hrs after the injection for calculating ulcer index. The drugs for studying their gastroprotective effects were given 30 min before dimaprit.

g. Endotoxin induced gastric mucosal damage
The moderate degree of gastric lesions is produced by injecting the endotoxin (20 mg/kg i.p) to anaesthetized rats. The observation is based on the experiments in anaesthetized rats following the withdrawal of blood from the circulation.

B. Gastric cyto-protection
The gastric cytoprotective action is evaluated on rats of either sex, by damaging the gastric mucosa using various necrotizing agents like 30mg of aspirin suspended on 0.15M HCL. Absolute alcohol, 0.6M HCL, 0.2 M NaoH, 25% NaCL, 80mM of sodium tourochlate, and boiling water (thermal injury).

C. Duodenal ulcers studies
As outlined above, there are number of procedures for producing gastric ulcers or erosions in the rat and many are used as ulcer model for investigation of the etiology of gastric ulcer and evaluation of the anti-ulcer agents.

1. Cysteamine (mercaptamine) induced ulcers
Cysteamine induced duodenal ulcer in the rats is widely used as a model of peptic ulcer disease. In rats, cysteamine Hcl (10% solution in normal saline) in the dose 40 mg/100g, 2 times at interval of 4 hrs orally and sacrificed at first dose after 28 hrs or 60 mg/10 g s.c. as a single dose and sacrificed after 18 hrs, calculated for ulcer index.

2. Duclerozine induced duodenal ulcer in rats
In this model, duclerozine is administered to rats at dose of 300 mg/kg s.c. suspended in 5% gum Arabic solution as single dose. After 18 hrs animals are sacrificed and ulcer index was calculated.

3. Dimaprit induced ulcer in guinea pigs
Here, the dimaprit is injected 2 mg/kg s.c. every hr, for 6 times a day to the 24 hour fasted guinea pigs and animals are sacrificed. 1 hour following the last injection. The animal's stomachs are examined, and ulcer index determined.

4 Duodenal ulcers following s.c. injection of Penta gastrin and carbachol
Female rats are immobilized in individual Bollman cages and secretion is stimulated by 24 hrs s.c. injection of enterogastric (1 mg/kg/min) plus carbachol (0.5 mg/kg/min) in physiological saline (0.01 mg/min). the animals are sacrificed at the end of 24 hrs and the intensity of duodenal ulcers graded by suitable method.

5 Indomethacin+ Histamine induced duodenal ulcers in rats
Indomethacin (5mg/kg) is administered subcutaneously to 24 hrs fasted rats and subsequently histamine dihydrochloride (40mg/kg) is given 3 times at 2.5 hrs intervals, beginning 30 minutes after the injection of indomethacin. The animals are sacrificed, and stomachs are examined, and ulcer index are calculated.

6 MPTP induced duodenal ulcers in rats
In this method, duodenal ulcer is produced by parkinsonism induced agent 1-methyl-4-phenyl-1,2,3,6 tetra pyridine (MPTP) given in a dose of 20 mg/ kg, subcutaneously 3 times a day for 4 days, the animals are sacrificed 5thday and stomachs are examined, and ulcers induces are calculated.

D. Antisecretory studies
Anti-gastrin test in rats
The overnight fasted male rats are anesthetized with 25% urethane solution (0.6ml/100g intramuscular) trachea and external jugular vein are cannulated by a midline in incision. The pyloric end of stomach is exposed and cannulated. A flexible polyethylene tube is passed down the oesophagus and tied in the cervical resign. The stomach is washed thoroughly by-passing distilled water through the tube and allowing it to come out of the pyloric cannula. The stomach is then perfused continuously at a uniform rate (1 ml/min) win N/4000 sodium hydroxide by using a peristaltic pump. The concentration of NaOH

may be adjusted so that the perfusate under basal condition has a pH 6.0 to 6.5. The perfusate after merging out of the pylorus baths a micro flow glass electrode connected to a direct reading pH meter which in turn is connected to an ink recorder.

E. Gastric secretion in pylorus ligated rats

Male albino rats are deprived of food for 24-36 hrs. under ether anaesthesia, the abdomen of each and animal is opened by midline incision and the pyloric end portion of the stomach is ligated. The animals are killed 4-6 hrs after operation under the overdose of aesthetic ether and the gastric contents are collected. After centrifugation (3000 rpm, 10 min). The gastric contents of each animal are individual assayed for volume of gastric secretion, free acid production by titration to pH 3.5 with 0.01N sodium hydroxide using Toepler's reagent as an indicator and total acid production by titration to pH 8.0 with 0.01N NaOH using phenolphthalein as an indicator.

F. Estimation of dissolved muco-substances

Estimation of dissolved muco-substances is done by determining the total carbohydrate (sum of total hexoses, hexosamine fructose and sailic acid) and protein in 95% ethanol precipitate of gastric juice. The total carbohydrate: protein (C:P) ratio has been accepted as a reliable index of mucus secretion mucosal resistance.

This paper outlines the properties of some medicinal plants that exhibit antiulcer activity. Although extensive research has been conducted in this area, recent studies with significant findings involving Cynodon dactylon, Ocimum sanctum, Glycyrrhiza glabra, and Ficus religiosa, Aloe, Terminalia Chebula, Vetiveria Ziziinoides, Ginseng, Capsicum are emphasized here.

MEDICINAL PLANTS HAVING ANTI-ULCER ACTIVITY:

Cynodon dactylon:

Cynodon dactylon (L.) pers. is a creeping grass found in warm climates all over the world (Singh et al., 2009). It belongs to the family Poaceae. It is also known as Durva grass, Bermuda grass, Dog's Tooth grass, Bahama grass, Devil's grass, Couch grass, Indian Doab, Scutch grass, Dhub, Doob and Durba in different regions (Oudhia, 2003). It is the most sacred plant of India next to tulsi. The plant contains crude proteins, carbohydrates, mineral constituents, oxides of magnesium, phosphorous, calcium, sodium, potassium, vitamin-c, carotene, hydroquinone, levoglucosenone, furfural, hexadecanoic acid, ethyl ester, linolenic acid, ethyl ester and d-mannose (Shabi et al., 2010). The plant has been long used in the traditional medicines to treat various ailments such as cancer, convulsions, cough, cramps, diarrhea, dropsy, dysentery, epilepsy, headache, hemorrhage, hypertension, hysteria, measles, rubella, snake bite, sores, stones, tumors, urogenital disorders, warts and wounds (Chopra et al., 1999, Pal, 2009). Advanced studies on this plant have been reported that it possesses antiulcer, antidiabetic, antidiarrheal, diuretic, antimicrobial, immunomodulatory, antiepileptic, anti-inflammatory, antiarrhythmic, antibacterial, chemoprotective, and hepatoprotective activities (Parekh et al., 2005, Patil et al., 2005, Parekh et al., 2005, Singh et al., 2007, Najifi et al., 2008, Surendra et al., 2008, Kumar et al., 2004, Ravindra et al., 2009, Baskar and Ignacimuthu, 2010, Kumar et al., 2010, Santhi and annapoorani, 2010, Garg and paliwal, 2011). Alcoholic extract of C. dactylon was screened for antiulcer activity in albino rats at a dose level of 200,400 and 600 mg kg-1 b.wt (Patil et al., 2005). The extract at 400 mg kg-1 and 600 mg kg-1 showed significant (>0.001) antiulcer activity as compared to the standard drug ranitidine. The alcoholic extract inhibited ulceration by inhibiting output volume and total acidity. The ulcer healing activity of the plant extract may be due to antisecretory property associated with an enhancement of the local healing process. Aerial parts of Bermuda grass herb are reported to contain flavonoids (Nair, 1995). The preliminary phytochemical investigation of the alcoholic extract of bermudagrass showed the presence of flavonoids, which may be responsible for the antiulcer property. It is hoped that C. dactylon would serve as a useful tool for the researchers for proper evaluation of the plant and for the development of new, safer, potent, and cost-effective drugs in the future.

Ocimum sanctum:

Ocimum sanctum, commonly known as Tulsi is the most popular member of the genus Ocimum and is considered a sacred plant by the Hindus in India (Singh et al., 2011). The name tulsi is derived from 'Sanskrit' which means "matchless one" (Bansod and Rai, 2008). The plant grows wild in India but it is widely cultivated in home and temple gardens. There are about 160 species in this genus broadly dispersed over the warm region of the globe Ocimum sanctum, Ocimum gratissimum (Ramtulsi), Ocimum (Dulaltulsi), Ocimum basilicum (bantulsi), kilimandscharicum, Ocimumum americanum, Ocimum camphora, Ocimum miranthum are examples of known important species of genus Ocimum which grows in different parts of the world and has been used extensively used in traditional

medicine for a wide range of ailments (Shahedur et al., 2011, Vinod et al., 2011).

Glycyrrhiza glabra:

Glycyrrhiza glabra is the most commonly used herb in western and eastern herbal medicine and has been used in the management of various diseases for more than 4000 years. The name glycyrrhiza is derived from the ancient Greek term "glykos" meaning sweet, and "rhiza" meaning root (Lakshmi et al., 2011). It is commonly known as licorice root, reglisse (French), lacrosse (German), sweet wood. It is from the Leguminosae family which belongs to the genus containing fourteen species. Liquorice also contains amino acids, asparagine, bitters, essential oil, fat, female hormone estrogen, glycosides, gums, mucilage, protein resin, saponins, starches, steroids, sterols, tannin, volatile oil, flavonoids including liquiritin, isoliquirtin, liquiritigenin, and rhamnoliquirilin and other present flavonoids are glucoliquiritin, apioside, prenyllicoflavone A, shin flavanone and shinptero carpen glycosides, female hormone estrogen, protein resin, saponins, sterols, yellow coloring matter- the yellow color is due to the presence of anthoxathin glycoside known as isoliquiritin (Isbrucker RA and Burdock GA, 2006). The root of G. glabra contains the chief constituent known as glycyrrhizin which is 60 times sweeter than sugar. In the traditional Siddha system of medicine, liquorice is used as a demulcent, expectorant, antitussive, laxative, and sweetener.

Ficus religiosa:

Ficus religiosa, commonly known as the "peepal tree" is one of the foremost plants utilized from antiquity till to date (Ghani, 1998). It is also known by various other names such as bo tree, bodhi tree, Buddha tree, sacred tree, etc. It belongs to the family Moraceae (Hamed, 2011). The bark of F. religiosa is reputed to have a number of chemical constituents. It contains tannins, saponins, flavonoids, steroids, terpenoids, and cardiac glycosides (Ruby et al., 2000). The bark has also been reported to contain bergapton, bergaptol, lanosterol, β- sitosrerol, stigmasterol, lupen-3-one, βsitosterol-α-glucoside (phytosterolin), vitamin K1, lupeol, lupeol acetate, α-amyrin acetate (Joseph and Justin, 2010). Ficus religiosa has been extensively used in traditional medicine for the management of various types of diseases like diarrhea, asthma, cough, toothache, migraine, in gastric problems, haematuria, diabetes, diarrhea, leucorrhoea, anxiety, cardiac tonic, vomiting (Pandit et al., 2010, Khan et al., 2011). F. religiosa possess a wide range of pharmacological activities anti-ulcer activity, anticonvulsant activity, anti-inflammatory activity, anti-microbial activity, anti-anthelmintic activity, anti-asthmatic and anti-amnesic (Malhotra et al., 1960, Viswanathan et al., 1990, Hemaiswarya et al., 2009, Kaur et al., 2010, Khan et al., 2011, Patil et al., 2011, Sawarkar et al., 2011).

Aloe vera:

Liquorice extracts have been used to treat chronic hepatitis, and have therapeutic benefits against other viruses, including human immunodeficiency virus (HIV), cytomegalovirus (CMV) and Herpes simplex. Topical Liquorice preparations have been used to sooth and heal skin eruptions, such as psoriasis and herpetic lesions (Kumar Anil et al., 2012) The most common medical use of liquorice is for treating upper respiratory ailments including coughs, hoarseness, sore throat, and bronchitis (Lakshmi et al.,2011) Aloe vera has been used externally to treat various skin conditions such as cuts, burns, and eczema. Aloe has been marketed as a remedy for coughs, wounds, ulcers, gastritis, Diabetes, Cancer, headaches, arthritis, immune-system deficiencies, and many other conditions when taken internally (Rajeswari et al., 2012). The PHF (Aloe Vera and Liquorice) is used for the treatment of abdominal cramps and gastroprotective effect (Metowogo et al., 2011). The aim of the present study was to evaluate the antiulcerogenic properties of marketed polyherbal formulation (PHF).

Terminalia catappa:

Terminalia catappa family Combretaceae moreover known as the Indian almond was a large, spreading tree scattered throughout the tropics in coastal environments in India. Anti-ulcer activity of ethanolic extract of T. catappa (250 and 500 mg/kg b.w) was examined on a pyrrolic ligated induced ulcer model in rats. Omeprazole was used as standard. The anti-ulcer activity of T. catappa was evaluated with the help of ulcer index and histopathological examination. Preliminary phytochemical screening and acute toxicity studies of T. catappa were also carried out. The extract showed a significant ($p < 0.001$) reduction in pH, gastric volume, free acidity, total acidity and ulcer index in a dose-dependent manner as compared to control. The extract did not produce any toxic effects even at high doses. The anti-ulcer activity was probably due to the presence of flavonoids.

Terminalia chebula:

Terminalia chebula Retz. (Combretaceae) is a medium-sized tree that grows in the wild throughout India. T. chebula has been extensively used in

Ayurveda, Unani, and homeopathic medicine. The fruit has been used as a traditional medicine as a household remedy against various human ailments. Traditionally T. chebula is used to cure chronic ulcers, gastritis, and stomach cancers.

Andrographis paniculata:
Andrographis paniculata (AP) is an important medicinal herb generally called the "King of Bitters." One of the most active isolated compounds forms AP andrographolide, a bicyclic diterpenoid lactone. Andrographolide is used in autoimmune disorders such as ulcerative colitis.

Phyllanthus niruri*:*
Phyllanthus niruri L**.** belongs to the family Euphorbiaceae utilized as a part of conventional medicine to treat ulcers. Phyllanthus niruri leaves extract (ethanol*)* give a significant result on ulcer causes by the ethanol-induced model. This plant extract at the dosage of 200 mg and 400 mg/kg body wt gives the best result. The methanolic and aqueous extracts of P. niruri fruits are also very effective in inhabiting the lipid peroxidation level. The fruit extract is very effective in normalizing the elevated enzyme level such as glutamate pyruvate transaminase carbon tetrachloride, glutamate oxaloacetate transaminase, *etc*. in carbon tetrachloride-induced ulcer model.

Trichopus zeylanicus:
Trichopus zeylanicus belong to the family Dioscoraceae, is a small, rare herbaceous plant generally found from tropical forests of Malaysia, Sri Lanka, and southern India. In the Ayurvedic system of medicine Trichopus, zeylanicus is generally used as immune boost up medicine. In ancient times people used Trichopus zeylanicus for relieving from ulcer, liver disorder and for improving sexual performance. From the phytochemical study, it was found that methanolic extract of Trichopus zeylanicus gives the positive result for the presence of, alkaloids, flavonoids, steroids, triterpenoid saponins, *etc*. From the experiment, it was found that this plant leaves extract (100 mg per kg body weight) and leaves suspension (1000 mg per kg body weight) both are very affecting to reduce the elevated body serum level in rat ulcer caused by paracetamol administration. Histopathological study of rat group treated by *T.* zeylanicus gives positive result

***Syzygium aromaticum* L:**
The herbal drug Syzygium aromaticum L. (Family Myrtaceae) generally called as clove used as flavoring agents. Reported chemical constituents present in this plant are tannins, sterols, triterpenes, flavonoids. From the different literature survey, it was found an *n*-butanol extract of dried flower buds of clove is very effective for the treatment of ulcer and gastric disorder in rats. From the father study, it was clear that the ulcer activity of this plant is due to the one of the main ingredient eugenol. The pharmacological study suggests, eugenol stimulate the synthesis of mucus; as a result, the mucus layer became thick. Thus, the eugenol act as a gastroprotective drug.

Zingiber officinale:
Zingiber officinale Roscoe (Ginger) is a very potent Indian medicinal herb medicine very renounce treatment of gastrointestinal tract disorder. This herb is also famous for treatment for diarrhea nausea vomiting and dyspepsia. In ayurvedic system of medicine, Ginger is commonly used as antispasmodic, aromatic, and for prevention of gas formation in. It found that if we compare the effect ginger extract (hydroalcoholic) with dose (100, 350, 700 mg/kg) with standard drug ranitidine (50 mg/kg), it gives the positive result. As a result, larger doses of extract (350 and 700 mg/kg) were effective to the ulcer.

SOME OTHER MEDICINAL PLANTS HAVING ANTI-ULCER ACTIVITY:

S. no.	Name of the Plant and family	Extraction solvent	Chemical constituent	Uses
1	Eucalyptus maculata (Myrtaceae)	Methanolic extract	• Quercetin	• Cold • Dry skin • Pain
2	Genista rumelica (Fabaceae)	Methanolic extract	• Genistin • Luteolin-7-glycoside	• Digestive functions • Liver stimulant • Colds and flu
3	Glycyrrhiza glabra (Fabaceae)	70% v/v ethanol Extract	• Flavonoids • Glabra	• Inflammation • Throat infection • Abdominal pain

4	Hibiscus rosa (Malvaceae)	Methanolic extract	• Flavonoids • Anthocyanins	• Anemia • Mouth ulcers • Menstrual bleeding
5	Moringa oleifera (Moringaceae)	Alcoholic extract	• Alkaloids • Flavonoids • Saponin • Tannins • Zeatin • Quercetin • Kaempferol • Terpenoid	• Asthma • Diabetes • Obesity • Ulcers
6	Murrya koenigii (Rutaceae)	Methanolic extract	• Monoterpenes • Monoterpene hydrocarbons sesquiterpenes	• Stomachaches • Anti-inflammatory
7	Ocimum sanctum (Lamiaceae)	Alcoholic extract	• Alkaloids • Tannins • Saponins • Lavonoids (Apigenin)	• Respiratory diseases • Digestive diseases • Skin diseases
8	Pycnanthus angolensis (Myristicaceae)	Ethanolic extract	• Flavanones-genkwainin • 8 hydroxykanzakiflavone-2 • Liguiritigentin (–)-epicatechin and (+)-catechin	• Coughs • Malaria • Infertility • Infection
9	Rhamnus procumbens (Rhamnaceae)	Aqueous and ethanolic extracts	• Kaempherol	• Infection • Skin disease
10	Sophora subprostrata (Fabaceae)	Alcoholic extract	• Sophoradin	• Sore throat • Large intestinal disorder
11	Silybum marianum (Asteraceae)	Methanolic extract	• Silymarin	• Liver Cirrhosis • Hepatitis • Cancer
12	Alstonia scholaris (Apocynaceae)	Ethanolic extract	• Alkaloids, • Coumarins • Flavonoids • Phlorotannin • Phenolic • Steroids • Saponins • Tannins	• Purify blood • Respiratory disorders • Fevers • Skin ailments • Restoring the digestive system
13	Anacardium accidentate (Anacardiaceae)	Hydroethanolic extract	• Catechins	• Chest pain • Digestive disorders • Skin conditions • Low self-esteem
14	Asparagus racemosus (Asparagaceae)	Methanolic extract	• Shatavarin • Flavonoid	• Upset stomach • Constipation • Stomach spasms • Stomach ulcers

15	Azadirachta indica (Meliaceae)	Aqueous extract	• Flavonoids, • Tannins • Carbohydrates • Proteins	• Abdominal disease • Skin disease • Dental disease • Aphthous ulcer • Hair fall
16	Bauhinia variegate (Fabaceae)	Aqueous extract, ethanolic extract	• Flavonoids	• Ulcer • Inflammations • Intestinal worms • cough
17	Boswellia serrata (Burseraceae)	Petroleum ether	• Squalene, • Polyprenol • *β*-sitosterol • Lutein • *β*-carotene	• Inflammation. • Joint pain. • Asthma. • Ulcerative colitis. • Cancer.
18	Butea foandosa (Fabaceae)	Chloroform and ethanolic extract	• Butrin • Flavonoids	• Diarrhea • Intestinal worms • Diabetes • Sore throat
19	Cucarbita pepo (cucurbitaceae)	Methanolic extract	• Glycoside terpenoids • Cucurbitacian	• Increases appetite • Cures leprosy • Purifies blood
20	Cynodon dactylon (Poaceae)	Alcoholic extract	• Flavonoids	• Digestion • Fatigue • Eliminate toxins • Insomnia • Skin disease

CONCLUSION:

India is enriched with a wide variety of herbal plants with medicinal activity, and these can be converted in a pharmaceutical preparation that can be used in various diseases. The present study confirms the antiulcer activity of WC as it produced significant antiulcer properties by their anti-secretory, cytoprotective, and proton pump inhibitory properties. Further studies are needed to isolate the chemical moiety responsible for the antiulcer activity of this extract.

According to the old hypothesis, acid secretion was thought to be the sole cause of ulcer formation and reduction in acid secretion was thought to be the major approach to therapy. However, in the light of recent evidence this concept has changed. Now, treatment of ulcers mainly targets the potentiation of the defensive system along with lowering of acid secretion. Chemical substances derived from plants have been used to treat human diseases since the dawn of medicine. Roughly 50% of new chemical entities introduced during the past two decades are from natural products. Recent technological advances have renewed interest in natural products in drug discovery. Therefore, efforts should be directed towards isolation and characterization of the active principles and elucidation of the relationship between structure and activity furthermore, detailed analysis of the active constituents of natural drugs should be directed towards clinical relevance. Although the clinical efficacy of this preparation is reported by traditional practices, they have not been scientifically validated. Ayurveda, the oldest medicinal system in the world provides leads to finding therapeutically useful compounds from plants. Therefore, ayurvedic knowledge supported by modern science is necessary to isolate, characterized, and standardize the active constituents of the herbal source. This combination of traditional and modern knowledge can produce a better anti-ulcer drug with fewer side effects. Herbs are widely available in India and other countries.

Flavonoids have a gastric anti-secretarial and much-protective activity. Also, out of several leads obtained from plants containing potential hepatoprotective and antiulcer agents, silymarin, kaempferol, quercetin, apigenin, salvigenin, and luteolin have been established to have potent hepatoprotective and antiulcer properties. Silymarin is very much effective in the treatment of, alcohol-associated liver disease,

and hepatitis. Poly-phenolic flavonoids can protect cells against injury due to the oxidation of low-density lipoproteins.

Despite inspiring data on the possibility of discoveries in the future, evidence on the treatment of peptic ulcer hepatitis or other chronic liver diseases by natural medications is not sufficient. Therefore, medications discovered from natural sources should be recommended for conducted more clinical trials. More confidence, better training, and a little bit of awareness of natural medicine are necessary for both patients and physicians.

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