



SOME OF THE MEDICINAL PLANTS WITH ANTIULCER ACTIVITY: A COMPREHENSIVE REVIEW.

**KRANTI R. MIRASE , DR.SWATI S. RAWAT , MR. SANDIP V. PHOKE , FARIYA SAYYED ,
MR. SUNIL JAYBHAYE**

Student , Principal M. Pharm Phd, Asst. Professor, Student , Vice Principal

Institute of Pharmacy , Badnapur (2596)

Institute of Pharmacy , Badnapur , India.

ABSTRACT:

The aim of this review is to know more about the anti – ulcer property of the medicinal plants^[1]. Nowadays acidity and ulcer very common causing huge suffering to humans with ulcers being a matter of concern due to high chances of recurrence and mortality. Peptic ulcers have mortality of 30% and morbidity upto 50% ^[2]. Ulcer is a common gastrointestinal disorder which is seen among many people. It is basically an inflamed break in the skin or the mucus membrane lining the alimentary tract. Ulceration occurs when there is a disturbance of the normal equilibrium caused by either enhanced aggression or diminished mucosal resistance. It may be due to the regular usage of drugs, irregular food habits, stress, and so forth ^[3]. 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^[4]. This article reviews the features of some of the plants like *Acacia arabica* , *Adansonia digitata* , *Allium sativum* , *Aloe vera* , *Carica papaya* , *Ficus religiosa* , *Hibiscus Rosa sinensis* , *Jasminum grandiflorum* , *Mangifera Indica Linn* , *Mimosa pudina* , *Musa paradisiacal* , *Ocimum sanctum Linn* , *psidium guyava* , *Zingiber officinalis roscoe* are reported to possess antiulcer and ulcer healing properties^[1].

KEYWORDS: EROSION, HELICOBACTER PYLORI, DUODENUM, GASTROINTESTINAL MUCOSAL TISSUE , PEPTIC ULCER, GASTRIC ULCER, AGGRESSIVE FACTORS, DEFENSIVE FACTORS, ABDOMINAL PAIN, MEDICINAL PLANTS[1] .

INTRODUCTION:

Ulcer is erosion on the skin or on the mucous membrane specified by outward inflamed dead tissue. The word ulcer is derived from Latin word “ulcus”(genitive: ulceris) which stands for sore, wound or an ulcer^[2].

Ulcers are an open sore of the skin or mucus membrane characterized by sloughing of inflamed dead tissue. Ulcers are lesions on the surface of the skin or mucous membrane characterized by a superficial loss of tissue. Ulcers are most common on the skin of the lower extremities and in the gastrointestinal tract, although they may be encountered at almost any site. There are many types of ulcer such as mouth ulcer, esophagus ulcer, peptic ulcer, and genital ulcer. Of these peptic ulcer is seen among many people. The peptic ulcers are erosion of lining of stomach or the duodenum. The two most common types of peptic ulcer are called “gastric ulcer” and “duodenal ulcer.” The name refers to the site of ulceration^[3].

Peptic ulcer is a chronic disease affecting up to 10% of the world’s population. The formation of peptic ulcers depends on the presence of gastric juice pH and the decrease in mucosal defences^[6].

Non-steroidal anti-inflammatory drugs (NSAIDs) and Helicobacter pylori (H. pylori) infection are the two major factors disrupting the mucosal resistance to injury. Peptic ulcer disease (PUD) is characterized by discontinuation in the inner lining of the gastrointestinal (GI) tract because of gastric acid secretion or pepsin^[7].

SYMPTOMS:

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

SOME MEDICINAL PLANTS HAVING ANTI-ULCER ACTIVITY:

1. Acacia arabica :

- **Family :** Mimosaceae
- **Common name :** Babool , Karuvelam
- **Useful part :** Bark , leaves
- **Chemical constituents :** This plant are gum containing arabic acid combined with calcium, magnesium, and potassium and also small quantity of malic acid, sugar, moisture 14%, and ash 3-4%. Bark contains a large quantity of tannin; pods contain about 22.44% tannin^[3].



figure – 1 : acacia arabica

- **Antiulcer Activity:**

In Ayurvedic. As gargle it is useful as wash in haemorrhagic ulcer and wounds. Bruised tender leaves formed into a poultice and applied to ulcersact as stimulant and astringent^[9].

- **Active Constituents:** Phenolic compounds, tannins, and flavonoids areconsidered^[10].

2. Adansonia digitata :

- **Family :** Malvaceae
- **Common name :** Boabab tree
- **Useful parts :** Leaves , fruit and roots.
- **Chemical constituents :** this plant are Pulp that contains phobaphenes,mucilage and gum, glucose, tartrate and acetate of potash, and other salts. A leaf contains wax, glucose, salts, gum, and albuminoids. Bark contains wax, soluble and insoluble tannin, acid gum, albuminouscarbonate and chloride of sodium and potassium, and a glucosideadansonin^[3].

Adansonia digitata is locally known as “papara - puli.” It is one of the largest and long-lived trees in the world, met with chiefly in Bombay, Gujarat, and Coromandal Coast and Ceylon^[11]



figure – 2: adansonia digitata

- **Antiulcer Activity :** Ayurvedic. Fresh juice of the leaves mixed with powdered ginger together with the expressed juice of the fresh root of *Salvadora indica* is applied with considerable benefit to indolent syphilitic ulcer. Leaves are used as fomentations and poultices for irritable inflammatory ulcers. *Adansonia digitata* (AD) Linn has been used to cure PU in Ayurveda but its efficacy has not been validated^[3].

3. *Allium sativum* :

- **Family :** Liliaceae
- **Common name :** Garlic
- **Useful part :** Whole plant
- **Chemical constituents :** This plant contains acrid volatile oil which is the active principle, starch, mucilage, albumen, and sugar. Seeds yield aromatic oil. The juice, more particularly its oil constituents, is rich in organically bound sulphur, iodine, and salicylic acid combinations, apart from important nutrient and complementary substances containing vitamins^[3].



figure -3 : *allium sativum*

- **Antiulcer Activity :** The effect of raw *Allium sativum* Linn. bulb juice on gastric and duodenal ulcers was evaluated by using different gastric ulcer methods and cysteamine induced duodenal ulcer model in rats^[12].

Mustard or coconut oil in which garlic has been fried is an excellent application for maggots infesting ulcers, ulcerated surfaces, and wounds. Garlic juice mixed with 3 or 4 parts of ordinary or distilled water has been used as a lotion for washing wounds and foul ulcers^[3].

- **Active constituents :** Volatile oil, alliin, and allicin are considered.

4. Aloe Vera:

- **Family :** Liliaceae
- **Common name :** Gritkumari
- **Useful part :** Leaves

- **Chemical constituents** : This plant are aloin, isobarbaloin, and emodin^[5].



figure -4 : aloe vera

Aloe Vera gel is a beneficial treatment and cost effective for patients with chronic ulcers. 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^[13].

- **Antiulcer Activity** : Leaves are being used successfully in America

in the local treatment of chronic ulcers. First the pain diminishes and after a few weeks the ulcers heal^[3]. The results of the present study prove that the Aloe vera juice and its combination with banana stem juice and banana flower juice are beneficial in curing gastric ulcers^[4].

- **Active constituents** : Barbalin, isobarbolin, and saponins are considered^[3].

5 . Carica papaya :

- **Common name** : Papaya
- **Useful part** : Fruit , leaves , seeds
- **Chemical constituents** : this plant are Papain, chymopapain, pectin,carposide, carpaine, carotenoids, and antheraxanthin^[14].



figure -5 : carica papaya

- **Antiulcer Activity** : It is largely used in tropical folk medicines. The ripe fruit is edible and unripe can be eaten cooked for indolent ulcer. The unripe fruit can be cooked as parts of salads, jellies, and stews while the ripe fruits are usually eaten raw without the skin or seed. Intake of the unripe fruit of the plant has been linked with an antiulcer effect^[3]. Carica papaya is an important fruit with its seeds used in the treatment of ulcer in Nigeria^[14].
- **Active constituents** : Chymopapain and papain are widely known as being useful for digestive disorders and disturbances of the gastrointestinal tract^[3].

6. Ficus religiosa :

- **Family** : Moraceae
- **Common name** : Peepal
- **Useful part** : Stem , bark , leaves , tender shoots^[2].
- **Chemical constituents** : Triterpenoids, Flavonoids, Saponins, Steroids, Tannins and Phenolic compounds, Carbohydrate, Protein^[6].



figure – 6 ficus religiosa

- **Antiulcer Activity** : Bark is useful in ulcers in infusion or decoction (simple kashayam) with a little honey^[3]. Ficus religiosa is being used in Ayurvedic and Malay traditional medicine for the treatment of various diseases including gastric ulcer. Antiulcer potential of F. religiosa stem bark and support the traditional uses of the plant for the treatment of gastric ulcer^[15].
- **Active Constituents** : Bioactive compounds like flavonoids, saponins, and tannins are considered^[16].
- **In Recent Studies** : The hydro alcoholic extract leaves of F. religiosa werestudied at two dose levels (250 and 500 mg/kg, oral) in rats against absolute ethanol, aspirin, and pylorus ligation induced gastric ulcer. The extract significantly decreases the ulcer index value when compared to control^[3].

7. Hibiscus Rosa Sinensis :

- **Family**: Malvaceae
- **Common name** : Changing rose , chembaruthi
- **Useful parts** : Roots , leaves

- **Chemical constituents** : This plant are flavonoids, anthocyanins, quercetin, cyanidin, kaempferol, and hydrocitric acid^[3].

figure – 7 : hibiscus rosa sinensis



- **Antiulcer Activity** : The root of Hibiscus Rosa sinensis is traditionally used for the treatment of ulcer among the kani tribes in Kanyakumari district, Tamil Nadu, India^[3]. The antiulcer activity of various extracts of Hibiscus sinensis leaves was evaluated in pyloric ligation induced gastric ulcer in albino rat^[17].

Oral administration of aqueous and alcohol extracts (200 and 400 mg/kg) of Hibiscus rose sinensis leaves were evaluated for antiulcer Activity and compared with the standard drug, omeprazole (50 mg/kg). Hibiscus rosa sinensis L. (malvaceae) flower extracts were selected and evaluated for gastroprotective activity by using Pylorus ligation, aspirin induced and ethanol induced ulceritis in rats^[18].

- **Active constituents** : Flavonoids and quercetin are considered^[19].

8 . *Jasminum grandiflorum* :

- **Family** : Oleaceae
- **Common name** : Chameli , Jasmine
- **Useful parts** : Leaves , flower , roots^[2].

- **Chemical constituents** : Alkaloids, Terpenoids, Steroids, Fatty acids, Flavonoids methyl anthranilate, indole, benzyl alcohol, benzyl acetate and the terpenes linalool and linalyl acetate^[6].

figure – 8 : *Jasminum grandiflorum*



‘Jasminum’ is a Latinized form of the Persian word ‘yasmin’ for sweetly scented plants. ‘Grandiflorum’ is a Latin term meaning large, showy flowers. *J. grandiflorum* grow in shrubs that are semi-spreading. These plants have green, woody, pubescent stems that are either angular or grooved shape^[20].

- **Antiulcer activity:** The leaves and Roots of *Jasminum grandiflorum* L. is used in folk medicine for treating ulcerative stomatitis, skin diseases, ulcers, wounds, etc ^[21].
- **Active constituents** : Phenolics , flavonoids , carotenoids^[2].
- **Use** : Ulcerative stomatitis, skin diseases, ulcers, wounds healing, antibacterial, antioxidant^[6].

9. *Mangifera Indica* Linn :

- **Family** : Anacardiaceae
- **Common name** : Mango
- **Useful parts** : Flower , leaf , seeds
- **Chemical constituents** : plant are alkaloids, sterols, saponins, tannins, and flavonoids^[3].

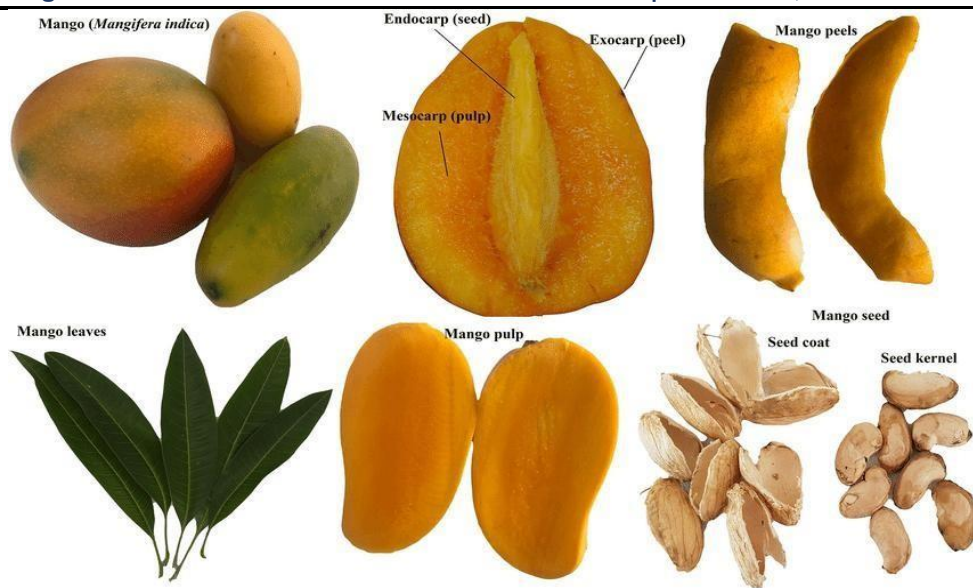


figure – 9 : mangifera indica

- **Antiulcer activity :** Leaf extracts were dissolved in rice bran oil and given orally for ulcer. Traditionally the plant is reported to have antiulcer activity^[3]. The flower decoction was administered in the doses of 250, 500, and 1000 mg/kg orally, in rats with gastric lesions in dose-dependent manner. Thus, the extract significantly reduced the gastric juice volume and gastric acidity^[3].

The petroleum ether and ethanol plant leaf extracts reported antiulcer activity. The effects of mangiferin on gastric mucosal damage were assessed by determination of changes in mean gastric lesion area or ulcer score in mice and on gastric secretory volume and total acidity in 4-h pylorus-ligated rats^[1].

- **Active constituents :** Mangiferin is considered^[3].

10. Mimosa Pudica :

- **Family :** Fabaceae
- **Common name :** Chue mue , shameplant
- **Useful parts :** Leaves , seeds ^[2].
- **Chemical constituents :** this plant are flavonoids, quercetin, naringin, saponins, tannins, gums, and mucilage^[3].



figure – 10 : mimosa pudina

Mimosa pudica L. is a creeping annual or perennial herb. It has been identified as lajjalu in Ayurveda and has been found to have antiasthmatic, aphrodisiac, analgesic, and antidepressant properties. *M. pudica* is known to possess sedative, emetic, and tonic properties, and has been used traditionally in the treatment of various ailments including alopecia, diarrhea, dysentery, insomnia, tumor, and various urogenital infections^[22].

Phytochemical studies on *M. pudica* have revealed the presence of alkaloids, non-protein amino acid (mimosine), flavonoids C-glycosides, sterols, terpenoids, tannins, and fatty acids^[23].

- **Anti-ulcer activity** : Decoction of the fresh leaves and seeds are consumed for intestinal ulcer^[3].
- **Active Constituents** : Alkaloid mimosine is considered^[3].

11. *Morus Alba* Linn :

- **Family** : Moraceae
- **Common name** : white mulberry
- **Useful part** : leaves
- **Chemical constituents** : The leaves of *M. alba* species are rich in protein, carbohydrates, fiber, and vitamins. Studies have also found that the leaves contain a high amount of important minerals such as calcium (Ca), potassium (K), magnesium (Mg), zinc (Zn), and many others^[24].



figure – 11 : morus alba linn

- **Antiulcer activity :** The plant leaf extracts reported antiulcer activity in experimentally-induced gastric ulcers in rats. The white mulberry has a long history of medicinal use in Chinese medicine; Almost all the parts of the plant are used as Medicine. The mulberry leaves are richest source of phytochemicals, which are beneficial for the health and can be used as vegetable. The leaves of mulberry contains higher amount of quercetin which is responsible for reduction of oxidation process in vivo and in vitro^[1].

- **Active constituents :** ascorbic acid and β -carotene^[1].

12. Musa Paradisiacal :

- **Family :** Musaceae
- **Common name :** Banana
- **Useful parts :** Roots , leaves , trunk , peels^[1].
- **Chemical constituents :** Carbohydrates, Catechol amines such as norepinephrine, serotonin, dopamine tryptophan, indole compounds.

Important ingredients in banana fruit: fructose and glucose, potassium (350 mg), carotene (provitamin A), vitamins B-complex, pectin, malic acid. Banana is rich in potassium, a key mineral that helps normalize blood pressure, heart function, work cells, nerves and muscles^[1].

figure – 12 : musa paradisiacal



- **Antiulcer activity** : Ripe bananas contain compounds that act in two ways: by activating the epithelial cells lining the stomach to produce a thick protective layer of mucus, which is stomach acid barrier and eliminate the bacteria from the stomach (especially *Helicobacter pylori*) for which it is known to cause ulcer. Plant parts like peels, stalks, fruits, roots and leaves of banana plants have been consumed orally or topically for the medication of diarrhea and dysentery. However, the antiulcerative activity in banana is due to the presence of natural flavonoids and this activity may vary in different varieties of banana due to the different levels of these natural active components^[25].

13. Ocimum Sanctum Linn :

- **Family** : Lamiaceae
- **Common name** : Tulsi
- **Useful parts** : Leaves^[2].
- **Chemical constituents** : This plant contains alkaloids, tannins, saponins, flavonoids, and sterols^[3].

figure -13 : ocimum sanctum linn



- **Antiulcer activity** : Indian materia medica describes the use of the plant in a variety of ailments. The fresh leaves are taken as Prasad by millions of Indians for many years. A tea prepared with the leaves of Tulsi is commonly used for intestinal disorder^[3].

The fixed oil significantly possessed antiulcer activity due to its lipoxygenase inhibitory, histamine antagonistic and antisecretory effects. Reported pharmacological activities of the plant are anti-bacterial, anti-inflammatory, antihypertensive, cardioprotective, central nervous system depressant, anti-oxidant, chemopreventive, immunomodulatory, analgesic, antipyretic, anti-fertility, anti-arthritis, anti-stress, anti-cataract, anticoagulant, hepatoprotective, radioprotective^[1].

- **Active Constituent:** Fixed oil eugenol is considered^[3].

14. Psidium Guyava :

- **Family :** Myrtaceae
- **Common name :** Guava
- **Useful parts :** Roots , bark and leaves^[3].
- **Chemical constituents :** this plant are bark that contains tannin 27.4%, resin, and crystals of calcium oxalate. Leaves contain resin, fat, cellulose, tannin, volatile oil, chlorophyll, and mineral salts^[6].



- The leaves is employed in unhealthy ulcers and is an efficacious gargle for swollen gums and ulceration of the mouth^[3]. The methanol leaf extract of *P. guyava* was administered at the doses of 500 and 1000 mg/kg orally, in rats for 10 days against ethanol induced gastric ulcer. The extract significantly decreases in ulcer indices compared to control^[3].
- **Use :** Hepatoprotective anti-diarrheal, anti- hypertensive, hepatoprotective, antioxidant, anti-microbial, hypoglycemic and antimutagenic activities^[6].
- **Active constituents :** Quercetin, guaijaverin, flavonoids, and galactose- specific lecithins are considered^[3].

15. Zingiber officinalis roscoe :

- **Family :** Zingiberaceae
- **Common name :** Ginger
- **Useful part :** Ginger powder
- **Chemical constituents :** Gingerol , shogaol^[2].



figure – 15 : zingiber officinalis roscoe

Zingiber officinale Roscoe (Ginger) is a very potent Indian medicinal herb medicine very renowned treatment of gastrointestinal tract disorder^[26]. 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^[4].

- **Anti-ulcer activity:** Several anti-ulcer compounds have been isolated from ginger, including 6-gingsulphonic acid(25), 6- shogaol and ar-curcumene(26). Most notable is 6- gingsulphonic acid, which showed weaker pungency and more potent anti-ulcer activity than 6- gingerol and 6-shogaol(27-29).The antiulcer activity of ginger may also be due to the potent thromboxane synthetase inhibition(30).High doses of ginger probably act as a gastric irritant^[1].

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^[4].From this study we can conclude that studies with plant sources can result in novel and effective pattern of treatment.Current stalemates of modern medicine in the management of various ailments incline research tendencies to traditional medicine. In this respect, traditional medicine has introduced good protocols for treatment of various gastrointestinal disorders.All of the remedies presented here had adequate evidence from traditional or scientific source for their efficacy in management of ulcers^[3].

Our review results show that above-mentioned medicinal plants could prevent ulcer with the principle on dose-dependent. A variety of botanical products have been reported to possess antiulcer activity. Finally, it should be noted that substances such as flavonoids and tannins that possess antiulcer activity are of particular therapeutic importance. The results of this study indicate that extracts of leaves and plants extracts of some medicinal plant have good potentials for use in peptic ulcer disease^[6].

This article reviews drugs derived from plants which are used for the treatment of peptic ulcer and it is evident that plant extracts have significant antiulcer activity in animal models. This article presents a review on medicinal plants with potential anti-ulcer activity. *Acacia arabica*, *Adansonia digitata*, *Allium sativum*, *Aloe vera*, *Carica papaya*, *Ficus religiosa*, *Hibiscus Rosa sinensis*, *Jasminum grandiflorum*, *Mangifera Indica Linn*, *Mimosa pudina*, *Musa paradisiacal*, *Ocimum sanctum Linn*, *psidium guyava*, *Zingiber officinalisroscoe* etc., are popular all over the world as medicinal plants for the treatment of ulcer^[1].

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