ANTIULCER HERBAL DRUGS – A COMPILATION

Sri Siddhartha Pharmacy College, Ammavarithota, Nuzvid, Andhra Pradesh, India.

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Peptic Ulcer, Types of Ulcer, Medicinal Plants, Antiulcer Activity.

ABSTRACT

Peptic ulcer is most prevalent gastrointestinal disorder. The pathophysiology of peptic ulcer disease involves an imbalance between offensive and defensive factors. Approximate 15,000 deaths occur with peptic ulcer disease. In India, peptic ulcer is common. In the Indian Pharmaceutical industry, antacids and antiulcer drugs share 6.2 billion rupees and occupy 4.3% of the market share. Today, there are two main techniques for treating peptic ulcer. The first is reducing the production of gastric acid and the second is re-enforcing gastric mucosal protection. There are two major factors that can disrupt the mucosal resistance to injury: non-steroidal anti-inflammatory drugs (NSAIDs) and Helicobacter pylori infection. Numerous natural products have been evaluated as therapeutics for the treatment of a variety of diseases, including peptic ulcer. There has been considerable pharmacological investigation into the antiulcer activity of some compounds. In this work, we shall review the literature on different medicinal plant and alkaloids with antiulcer activity. This article reviews drugs derived from medicinal plant more commonly used in the world for peptic ulcer and, if reported, the antiulcer activity. This article will be concerned only with the antiulcer and gastro-protective effects.
INTRODUCTION [1-2]:
An ulcer is erosion in the lining of the stomach or duodenum. 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. About 19 out of 20 peptic ulcers are duodenal. Gastric ulcers, found in the stomach wall, are less common. The gastric mucosa is continuously exposed to potentially injurious agents such as acid, pepsin, bile acids, food ingredients, bacterial products (Helicobacter pylori) and drugs. These agents have been implicated in the pathogenesis of gastric ulcer, including enhanced gastric acid and pepsin secretion, inhibition of prostaglandin synthesis and cell proliferation growth, diminished gastric blood flow and gastric motility.

Most Common Types of Ulcers [2]

1. **Peptic Ulcer**
   Any ulcer that is exposed to pepsin is referred to as peptic ulcers. Peptic ulcers are found in the lining of our stomach or duodenum. Pepsin is normally present along with hydrochloric acid in the stomach lining. Most common type of treatment used for Peptic Ulcer is to use anti acids. Some patients will also have to take antibiotics as a treatment for Peptic Ulcer.

2. **Gastric Ulcer**
   When a peptic ulcer occurs in our stomach, it is called a gastric ulcer. The symptoms of gastric ulcers are more defined than other ulcers. The bacterium called H. pylori cause this type of Ulcer. Antacids are used as a treatment option of Gastric Ulcer. Usually the patient starts to feel well after two or three weeks of using antacids. Also the Ulcer patients are advised not to use too much oily and greasy food and also asked to limit the consumption of foods that are acidic.

3. **Duodenal Ulcer**
   When a peptic ulcer is in your duodenum, it is called a duodenal ulcer. This type of peptic ulcer develops in the first part of the small intestine. Some of the symptoms of a duodenal ulcer are interestingly quite opposite to those of gastric ulcers. Duodenal ulcers are the most common ulcers found in the Western world. Duodenum ulcers are usually benign.

Lesser Known types of Ulcers [2]

1. **Esophageal Ulcer**
   This type of ulcer occurs in the lower end of our esophagus. Esophageal ulcers are often associated with a bad case of acid reflux, or GERD as it is commonly called (short for Gastro Esophageal Reflux Disease). Esophageal ulcers as other types of Ulcers are caused by the harmful bacteria and that is why patients are advised to use antibiotics to kill these harmful bacteria. Esophageal Ulcer patients also feel a lot of pain some times and this pain will increase as the Ulcer will come in contact with the acid present in the stomach.
The patient also sometimes feels difficulty in swallowing and may not eat normally. If this is the case than one must have to be more careful and chew the food very thoroughly before eating as it can be extremely painful in the throat.

4. **Bleeding Ulcer**

Internal bleeding is caused by a peptic ulcer which has been left untreated. When this happens, it is referred to as a bleeding ulcer this is the most dangerous type of ulcer. It requires an immediate treatment.

5. **Refractory Ulcer**

Simple peptic ulcers that have not healed after at least 3 months of treatment are called refractory ulcers.

6. **Stress Ulcer**

Stress ulcers are a group of lesions (or lacerations) found in the esophagus, stomach or duodenum. These are normally only found in critically ill or severely stressed patients.

**Signs and Symptoms**

Stomach pain is the most common symptom of an ulcer. It usually feels like sharp aches between the breastbone and the belly button. This pain often comes a few hours after eating. It can also happen during the night or early in the morning, when the stomach is empty. Eating something or taking an antacid medication sometimes makes the pain go away for awhile. Other symptoms of ulcers can include:

- loss of appetite
- sudden, sharp stomach pains
- nausea
- frequent burping or hiccuping
- weight loss
- vomiting (if blood is in the vomit or the vomit looks like coffee grounds, which only happens with severe ulcers, call a doctor right away)
- bloody or blackish bowel movements (this could indicate a serious problem, so call a doctor right away if you see this)

Anyone who thinks he or she may have an ulcer needs to see a doctor. Over time, untreated ulcers grow larger and deeper and can lead to other problems, such as bleeding in the digestive system or a hole in the wall of the stomach or duodenum, which can make someone very sick.

**The potential medicinal plants used in India [3-5]**

In spite of being one of the well-known medicinal plants used in Indian traditional medicine to treat several ailments, studies pertaining to the pharmacological properties of some medicinal
plants are very scarce. We studied the antiulcer activity and acute toxicity of some medicinal plants. Our investigation showed that these investigated medicinal plants could prevent ulcer in rats in a dose-dependent manner. Histological studies revealed that these medicinal plants did not show any acute toxicity. Preliminary photochemical screening of this medicinal plant identified the presence of important secondary metabolites like tannins and flavonoids.

A variety of botanical products have been reported to possess antiulcer activity but the documented literature has entered primarily on pharmacological action in experimental animals. Except for a few phytogenic compounds (i.e. aloe, liquorice and chilly), limited clinical data are available to support the use of herbs as gastro-protective agents and thus, the data on efficacy and safety are limited. Despite this, there are several botanical products with potential therapeutic applications because of their high efficacy and low toxicity. Finally, it should be noted that substances such as flavonoids, aescin, aloe gel and many others, that possess antiulcer activity are of particular therapeutic importance as most of the antiinflammatory drugs used in modern medicine are ulcerogenic.

1. *Abrus precatorius* Linn (Fabaceae) [6]

*Abrus precatorius* commonly known as Gunja has been used for therapeutic purposes since vaidic period. The Roots, seeds and leaves are used in traditional & folklore Medicine. The pharmacological studies have shown that *A. precatorius* possesses a number of biological activities such as anti-bacterial, anti-cancer, anti-diabetic, anti-fertility, antimicrobial, anti-oxidant activity, anti-inflammatory, anti-arthritic, anti-seratonergic, nephroprotective etc. Seed paste is applied for dressing over callous ulcer. The decoction of fresh leaves is taken 3 times per day to treat peptic ulcer. Leaves crushed with oil are used as a poultice as an anti-inflammatory.

2. *Ailanthus altissima* or *P.ailanthoides* (Simaroubaceae) [7-8]

Nigakinone and methylnigakinone are indole-alkaloid present in *Ailanthus altissima* show significant anti-ulcer effect associated with decrease in gastric acid or pepsin secretions and protects the mucous membrane at doses of 50mg/kg and 100mg/kg.

3. *Aloe vera* (Xanthorrhoeaceae) [9]

The juice of the *Aloe vera* plant, a succulent native to many warm climates, exhibits strong antimicrobial activity against *H.pyroli* at 250, 500mg/kg and aids in pain relief and speeds healing of ulcers.

4. *Allophylus serratus* Kurz (Sapindaceae) [10]

*A.serratus* Kurz (synonym:Allophylus cobbe Raeuschel, Allophylus edulis Radlk), is one of the largest genus, carries a strong ethanopharmacological background. The plant is used in
Ayurveda to treat inflammation, elephantiasis, oedema and fracture of bones. Leaves of plant contain β-sitosterol. They also contain phenacetamide, a chemical known for its antiulcer activity. Aedulis has also been reported to contain flavonoid glycosides that are effective against ulcer. The ethanolic extract at 400 mg/kg body weight, once daily, orally shows significant effect in cold restraint stress, aspirin (ASA, 150 mg/kg body weight, orally), alcohol (AL, 1 ml/200 gm of absolute alcohol) and pyloric ligation induced gastric ulcers.

5. Annona squamosa Linn (Annonaceae) [11]
Among the 12 compounds (1-12) isolated from A. squamosa (+) Omethylarmepavine (2), N-methylcorydaldine (3), isocorydine (6) shows promising anti-secretory activity.250-500mg/kg of aqueous extract of A.squamosa shows significant anti-ulcer activity.

6. Argemone mexicana Linn (Papaveraceae) [12]
The aqueous extract shows potency against ulcers in dose dependent manner. The fresh leaves juice and root paste of A. mexicana is used for dressing in callous ulcer. The decoction of seeds is used for washing callous ulcer.

7. Asparagus racemosus Wild (Asparagaceae) [13]
A. racemosus contains active constituents exhibiting medicinal properties are Shatavarin. Four types of shatavarins, shatavarin 1-4 are present in roots. Roots are used as anti-inflammatory, anti-ulcerogenic, anti-tumour activity. The methanolic (crude) extract of A. racemosus roots at a dose of 100mg/kg is more effective in reducing gastric ulcer in indomethacin-treated gastric ulcerative rats. Crude extract also significantly reduces the volume of gastric secretion, free acidity and total acidity.

8. Aspilia africana (Asteraceae) [14]
A. africana is a semi wood herb occurring throughout the regions of Savanath and tropical Africa on waste lands. West Africa have wound healing and antiulcer activity of its n-hexane and Methanolic (0.5-1gm/kg)extracts induced by HCl/ethanol. South eastern Nigeria, leaves of this plant is effective in the treatment of stomach pain and bleeding gastric ulcer specially when taken as an aqueous decoction.

9. Artocarpus heterophyllus Lam (Moraceae) [15]
The anti-ulcer activity of 70% methanolic extract of leaves, root bark and root wood of A. heterophyllus possess significant anti-ulcer activity against alcohol, aspirin and pylorus ligation induced ulcers in rat.

10. Avicennia officinalis (Acanthaceae) [16]
The cold and hot aqueous leaves extract of A. officinalis at a concentration of 62.5-125mg/kg of decreases ulcers and also gastric volume.
11. *Azadirachta indica* (Meliaceae) [17]
*Azadirachta indica* commonly known as Neem. It has been widely used for therapeutic purpose in Ayurveda. The methanolic extract of neem leaves is used to treat ulcer. *A. indica* extract significantly inhibits gastric ulcers induced by Indomethacin, ethanol and histamine. Neem leaf extract offers antiulcer activity by blocking acid secretion through inhibition of H+–K+–ATPase and by preventing oxidative damage and apoptosis. The aqueous extract of neem inhibits the gastric secretion and pepsin activity by 63% and 50% respectively.

12. *Azeratum conyzoides* Linn (Asteraceae) [18]
Aqueous extract of *A. conyzoides* leaves are used for the treatment of ethanol induced gastric lesions. This plant is also used as anti-inflammatory, purgative, gastroprotective, antioxidant, and in treating ulcers, wounds.

13. *Azima tetracantha* Lam (Salvadoraceae) [19]
The ethanolic extract of the leaves of *A. tetracantha* are used in the treatment of ulcer, inflammation and fungal infections.

14. *Bauhinia racemosa* (Fabaceae) [20]
The methanolic extract of *B. racemosa* produces significant anti-ulcer activity. The extract reduces gastric volume, acid output, peptic activity.

15. *Bauhinia variegata* Linn (Fabaceae) [21]
Common names include Orchid tree, Camel's Foot Tree and Mountain-ebony. The ethanolic and aqueous extracts of *B. variegata* root and leaf at a dose of 200 and 400mg/kg possesses significant ulcer protective activity.

16. *Bacopa monniera* (Plantaginaceae) [22]
The extract of *B. monniera* shows significant ulcer healing activity and the activity is due to its effect on various mucosal offensive and defensive factors. *Bacopa monniera* shows anti-Helicobacter pylori activity and increases prostanoids (PGE and PGI2) in human colonic mucosal incubates factors which may contribute to anti-ulcer activity.

17. *Benincasa hispida* Cogn (Cucurbitaceae) [23]
*Benincasa hispida* commonly known as Bhurukolu or Safedkolu. The petroleum ether and methanolic extract of the fruit at a dose of 20mg/kg possess antiulcer activity. The methanolic extract of *Benincasa hispida* seeds inhibits gastric ulceration by decreasing the gastric volume, free and total acidity.

18. *Bidens pilosa* Linn. (Asteraceae) [24]
The ethanolic extract effectively inhibits gastric haemorrhagic lesions induced by ethanol, and with an effective dose of 2gm/kg. The extract exerts a cytoprotective effect in addition to its gastric anti-secretory activity.
19. Brassica oleracea (Brassicaceae) [25]
It is commonly known as cabbage. The hydroalcoholic extract of Brassica oleracea displays antiulcer activity induced by HCl, alcohol, NSAID’s.

20. Butea frondosa (Fabaceae) [26]
The Petroleum ether, Chloroform, Ethanol and Water extracts of B. frondosa at a doses of 100,200,400mg/kg are used to treat ulcers.

21. Calotropis procera Wild (Asclepiadaceae) [27]
The shade dried leaves powder of C. procera is used for treating callous ulcer. The decoction of leaves is used for washing purpose.

22. Calligonum comosum (Polygonaceae) [28]
The 10% ethanol extract of aerial parts of C. comosum at doses of 100,200,400mg/kg shows significant decrease in acute gastric ulcers induced by phenylbutazone, indomethacin, 0.2 N NaOH and 80% ethanol.

23. Cannabis sativa Linn (Cannabinaceae) [29]
One female whole plant with fruits decoction of C. sativa is used 4 times a day for treating peptic ulcer.

24. Cassia tora Linn., (Casealpiniaceae) [30]
The methanolic extract of C. tora seeds shows significant decrease in NSAID’s induced ulcers. A glycoside, 9-beta-methyl-19-norlanosta-5-ene cucurbitane is responsible for anti-ulcerogenic activity.

25. Catharanthus roseus Linn (Apocynaceae) [31]
The ethanolic extract of C. roseus significantly reduces Cold Restraint Ulcer, Aspirin, Alcohol and Pyloric ligation induced ulcers. The decoction of leaves is used thrice a day for treating peptic ulcer.

26. Centella asiatica (Mackinlayoideae) [32]
The gotu kola water extract, ethanolic extracts and asiaticoside, an active constituent shows significant decrease in acetic acid induced ulcers in dose dependent manner with a concomitant attenuation of myeloperoxidase activity at the ulcer tissues.

27. Calotropis procera (Apocynaceae) [33]
The n-hexane, chloroform, 1-butanol, ethyl acetate extracts of stem-bark of C. procera at a dose of 20mg/kg shows significant anti-ulcer activity.

28. Convolvulus pluricaulis Linn (Convolvulaceae) [34]
The 5-10ml of C. arvensis root decoction is taken 3 times a day in peptic ulcer until the disease is cured. This plant has been shown to have scientific potential for CNS depression for its
anxiolytic, tranquillising, antidepressant, antistress, neurodegenerative, antiamnesic, antioxidant, hypolipidemic, immunomodulatory, analgesic, antifungal, antibacterial, antidiabetic, antiulcer, anticatatonic and cardiovascular activity.

29. *Coptis chinensis* Franch., *Rhizo macoptidis* (Ranunculaceae) [35-37]

*Coptidis* is the rhizome part of the root structure that is used in Chinese herbal medicine. Isoquinoline alkaloids isolated from *Coptidis* rhizome, coptisine and 8-oxocoptisine, shows protection of gastric mucosa similar to that offered by gastroprotective medicines such as cimetidine, berberine and sucralfate.

30. *Cucumis sativus* (Cucurbitaceae) [38]

The 9-beta-methyl-19-norlanosta-5-ene cucurbitane glycoside present in *Cucumis sativus* shows maximum antiulcer activity against pylorous ligation, water immersion induced, NSAID’s induced ulcers.

31. *Daucus carota* (Apiaceae) [39]

Carrot juice has beneficial effects in gastro duodenal ulcer as well as in hyperacid gastritis. It is very effective cholangue and choleretic. Methanol extract of *D. carota* shows significant protection against ethanol induced gastric ulcer at a dose of 250 mg/kg body weight.

32. *Emblica officinalis* (Phyllanthaceae) [40]

An ethanol extract of amla shows significant anti-secretory, anti-ulcer activity and cytoprotective activities. The effects of various doses (125, 250, 500 and 1000mg/kg,) of Pepticare shows significant decrease on gastric secretion and gastric ulcers in pylorus-ligation and on ethanol-induced gastric mucosal injury.

33. *Enantia chlorantha* Oliv (Annonaceae) [41-42]

A new type of protoberberine alkaloid obtained from the bark of *Enantia chlorantha*, accelerates ulcer-healing and increases the gastric mucus production after the lesions have been caused by acetic acid, HCl/ethanol or absolute ethanol.

34. *Erythroxylum cocoa* (Erythroxylaceae) [43]

Well known tropane alkaloid cocaine from *E. cocoa* leaves shows antiulcer activity against ulcers induced by reserpine at a dose of 10 mg/kg by oral route of administration.

35. *Eurycoma longifolia* (Simaroubaceae) [44-45]

Alkaloids such as Cantin-6-one and 4-methoxycantinone which are effective against gastric lesions induced by ethanol and indomethacin. These are also popularly used for the treatment of gastrointestinal disorders, obesity, anti-inflammatory stimulant of the intestinal motility and central nervous system activities.
36. *Ficus arnottiana* Miq. (Moraceae) [46]
The methanolic extract of *F. arnottiana* at a dose of 250-500mg/kg shows significant inhibition of ethanol induced ulcers. The extract is non-toxic even at high concentrations. It had mucoprotective activity and gastric anti-secretary activity.

37. *Ficus racemosa* Linn., (Moraceae) [47]
The fruit extract of *F. racemosa* shows anti-ulcer activity in pylorous ligation induced gastric ulcers, Aspirin induced gastric ulcers, ethanol induced gastric ulcers, cold-stress induced gastric ulcers.

38. *Ficus religosa* L (Moraceae) [48]
*F. religosa* is a large deciduous tree with few or no aerial roots has anthelmintic, anti-bacterial, anti-diabetic and antioxidant, wound healing, anti-inflammatory, analgesic, anti-ulcer, anti-lipid peroxidation. It possess anti-secretory as well as acid-neutralizing effect. The ethanolic extract of *F. religosa* leaves and stem bark at a dose of 200 and 400mg/kg possess significant anti-ulcer activity on cold restrained stress induced gastric ulcer. The anti-ulcer activity is due to presence of bio-active compounds like flavonoids, saponins and tannins.

39. *Geranium maculatum* (Geraniaceae) [59]
The root of *G. maculatum* is used medicinally to treat stomach ulcers. *Geranium* is a tonic that helps to calm the inflamed tissues, including the stomach mucosa; it is useful in the treatment of nearly all cases of inflammation and swelling.

40. *Glycyrrhiza glabra* Linn. (Papilionaceae) [40]
The effects of various doses (125, 250, 500 and 1000mg/kg,) of Pepticare shows significant decrease on gastric secretion and gastric ulcers in pylorus-ligation and on ethanol-induced gastric mucosal injury.

41. *Gymnospora rothiana* (Celastraceae) [50]
The petroleum ether extract of the leaves of *Gymnospora rothiana* at dose of 250 mg/kg is most effective against ulcers due to high levels of terpenoids like β amyrin, lupeol, friedelin. The methanolic extract of *Gymnospora rothiana* at a dose of 500 mg/kg heals ulcers.

42. *Iris germanica* (Iridaceae) [51]
The methanol extract of root of *Iris germanica* shows potent anti-ulcer activity.

43. *Jasminum grandiflorum* L (Oleaceae) [52]
The leaf extract of *J. grandiflorum* shows anti-ulcer activity against aspirin and alcohol induced gastric ulcers.
44. **Malva sylvestris** Linn (Malvaceae) [53]

The aqueous extract of *M. sylvestris* shows significant anti-ulcerogenic effect. The leaves in particular have potent anti-inflammatory, antioxidant, anti-complementary, anticancer and skin tissue integrity activity.

45. **Musa paradisiaca** (Musaceae) [54-55]

The unripe, mature, green plantain banana obtained from Musa sapientum shows significant anti-ulcerogenic activity. Musa sapientum has an active compound, a monomeric flavonoid (leucocyanidin) with anti-ulcerogenic activity. The aqueous extract of unripe plantain bananas show significant decrease in ulcers. The unripe banana powder in the dose of 3gm/kg and 4gm/kg shows significant decrease in aspirin induced ulcers and protects mucosa of GIT.

46. **Nerium indicum** Mill (Apocynaceae) [57]

The methanolic extract of *Nerium indicum* leaves and flowers possesses significant anti-ulcer activity at doses of 500 and 1000mg/kg in which gastric ulcers were induced by oral administration of indomethacin and pylorus ligation in rats.

47. **Nicotiana tabacum** Linné (Solanaceae) [58]

A well known pyridine alkaloid is nicotine, mainly found in the dried leaves of the tobacco plant *N. tabacum*. This alkaloid protects the stomach from damage induced by aspirin by decreasing hemorrhages and increasing the pH gradient/gastric fluid volume.

48. **Osmium sanctum** Linn (Labiatae) [48]

*O. sanctum* is a sacred plant commonly known as Tulasi (hindi). It is highly effective in wide spectrum of diseases and reported to possess anthelmintic, anti-carcinogenic, antiseptic, anti-rheumatic, anti-stress and antibacterial properties. Fixed oil of *O. sanctum* shows the potency against ulcer induced by aspirin, indomethacin, histamine, serotonin, alcohol, reserpine and stress. The strong antiulcer effect of *O. sanctum* was possibly due to inhibition of 5-lipoxygenase in aspirin, alcohol induced ulcer. The antiulcer activity is due to its antihistaminic, anticholinergic and anti-secretory properties.

49. **Operculina turpethum** Linn. (Convulvulaceae) [59]

Ulcer preventive and ulcer protective activities of hydroalcoholic and methanolic stem bark extracts of *Operculina turpethum* at a dose of 100 mg/kg shows anti-ulcer activity in aspirin + pylorus ligation model.

50. **Pachysandra terminalis** (Buxaceae) [60]

Pachystermine A, pachysamine A, epipachysamine A, pachysandrine A and spiropachysine obtained from *Pachysandra terminalis* used in Ainu folk medicine for gastrointestinal diseases, are used to treat gastric lesions induced by water-immersion stress in mice.
51. *Pausinystalia yohimbe* (Rubiaceae) [61]

Yohimbine, obtained of *Pausinystalia yohimbe* (Rubiaceae), is active in the reduction of gastrointestinal ulceration.

52. *Picrasma quassioides* (Simaroubaceae) [62-63]

Nigakinone and methylnigakinone are indole alkaloids present in *Picrasma quassioides* show significant anti-ulcer effect associated with decrease in gastric acid or pepsin secretions and protects the mucous membrane.

53. *Polygonum barbatum* Linn (Polygonaceae) [64]

The aqueous and methanolic extracts shows significant anti-ulcer activity in aspirin pylorus ligation induced ulcer. It shows significant decrease in acid volume and increase in pH of gastric content and this is due to the presence of flavonoids and tannins. The decoction of dried roots and shoots is used to treat callous ulcer and leaves paste is used for dressing callous ulcer.

54. *Quassia amara* (Simaroubaceae) [65]

Alkaloids such as Cantin-6-one and 4-methoxycantinone which are effective against gastric lesions induced by ethanol and indomethacin. These are also popularly used for the treatment of gastrointestinal disorders, obesity, anti-inflammatory stimulant of the intestinal motility and central nervous system activities.

55. *Rocket “Erucasativa”* L. (Brassicaceae) [48, 66]

Rocket Erucasativa L is commonly known as Jarjeer, used as a salad by herbal practitioners. Ethanolic extract of the Rocket possesses significant anti-secretory, anti-ulcer, cytoprotective properties at doses of 250 and 500mg/kg.

56. *Rubia cardifolia* Linn (Rubiaceae) [48, 67]

*R.*cardifolia is a climber, commonly known as Manjith (hindi) growing in the northwest Himalaya and other hilly regions of India. The methanolic extract of the roots of *R.*cardifolia at a dose of 400mg/kg shows significant anti-ulcer activity on ibuprofen and cold resistant stress and pyloric ligation induced gastric lesions.

57. *Solanum paniculatum* (Solanaceae) [68]

The extract prepared from *S.* paniculatum is used for treatment of ulcers. It also acts as gastro protective, carminative, digestive stimulant.

58. *Sophora flavescens* (Fabaceae) [69-73]

The quinazoline alkaloids such as matrine, 13-alpha-hydroxymatrine and oxy-matrine present in *S.*flavescens are used for the treatment of pylorus ligated ulcers, those alkaloids decrease acid secretion and intestinal motility.
59. *Senecio brasiliensis* (Asteraceae) [74]
The pyrrolizidine alkaloids such as integerrimine, retrorsine, senecionine, usaramine and seneciphylline which are present in *Senecio brasiliensis* possess significant activity in acute and chronic gastric ulcers in the dose of 12.5 mg/kg. These alkaloids increases free mucus and prostaglandin in the mucosal gastric activity.

60. *Sesbania grandiflora* L (Fabaceae) [75-76]
In traditional books, it was mentioned that *Sesbania grandiflora* L. leaves has antiulcer activity. The petrol ether, chloroform and hydro-alcoholic solvent extracts of *Sesbania grandiflora* L are used to treat ulcer. The anti-ulcer activity may be due to the presence of phytochemical constituents such as alkaloids, flavonoids, triterpenes, steroids, glycosides and tannins. The ethanolic extract of *Sesbania grandiflora* L. prevents acute gastric injury in rats.

61. *Simaba feruginea* (Simaroubaceae) [65]
Alkaloids such as Cantin-6-one and 4-methoxycantinone are effective against gastric lesions induced by ethanol and indomethacin. These are also popularly used for the treatment of gastrointestinal disorders, obesity, anti-inflammatory stimulant of the intestinal motility and central nervous system activities.

62. *Tamra bhasma* [55]
Tamra bhasma shows ulcer protective activity against gastric ulcers induced by immobilization stress, aspirin and histamine. The activity is due to both, decrease in offensive acid-pepsin and increase in defensive mucin secretion.

63. *Tinospora cordifolia* (Menispermaceae) [40]
The effects of various doses (125, 250, 500 and 1000mg/kg,) of Peptic are shows significant decrease on gastric secretion and gastric ulcers in pylorus-ligation and on ethanol-induced gastric mucosal injury.

64. *Uncaria rhynchophylla* Miq (Rubiaceae) [61]
Alkaloids such as hirsutine, hirsuteine, and rhynchophylline present in *U. rhynchophylla* are active in the dose of 60mg/kg against gastric lesions. They also shows mild central depressive, anti-spasmodic and hypotensive effects in mice or rats.

65. *Zingiber officinale* Roscoe (Zingiberacae) [48-55]
Zinger consists of near and underground rhizomes of *Z. officinale*. It’s use is recorded in early Sanskrit and chinese texts and is also documented in ancient Greek, Roman and Arabic medical literature. Powdered rhizome of zinger root has been used as a traditional remedy of gastrointestinal complaints including in treating peptic ulceration despite the fact that zinger
promotes gastric secretions. Several antiulcer compounds have been isolated from zinger including 6-gingesulphonic acid, 6-shogoal and curcumene. Most notable is 6-gingesulphonic acid which shows weak pungency and more potent antiulcer activity than 6-gingerol and 6-shogoal. The antiulcer activity of the zinger may also due to the potent thromboxane synthetase inhibition.

CONCLUSION
The abundance of availability and ease of production when compared to the synthetic drugs makes the herbal plants the best choice for the treatment of ulcer. Although purity of extracts, the selectivity of action and occurrence of side effects are the matters of concern. Therefore the use of these plants is primarily done on basis of balance between activity and toxicity.

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