



A Review on Some Promising Medicinal Plants Having Antiulcer Activity

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ABSTRACT

Ulcer means open sore of the mucous membrane or skin characterized by sloughing of inflamed dead tissue, although they may be encountered at almost any site. Peptic ulcer is a lesion on the surface of mucous membrane of stomach or duodenum in which gastric acid and pepsin plays a major role in genesis of ulcer. It is chronic disease arises when the normal mucosal mechanisms (mucus, mucosal blood flow, formation of HCO₃ and PGE₂, PGI₂) are impaired or overpowered by the damaging factors (acid, pepsin, NSAIDs and Helicobacter pylori). A number of synthetic drugs are available to treat ulcer but they produces more side effect when compared to herbal medicines. Therefore, herbal medicines are becoming popular. Medicinal plant containing active chemical constituents are useful in prevention and in treatment of various diseases. Active constituents such as flavonoids, tannin, and ascorbic acid show antiulcer activity. The goal of treating ulcer disease is to relieve pain, heal the ulcer and prevent ulcer recurrence by using medicinal plants. Present review focus on medicinal plants which are traditionally used as gastroprotective and healing agent in Ayurveda resources and beside that to gather evidence for their effectiveness and biological mechanisms in modern investigation.

Keywords: Peptic ulcer, Gastroprotective, Ayurveda, Pharmacological evidence.

INTRODUCTION

Ulcers means open sore of the mucous membrane or skin characterized by sloughing of inflamed dead tissue, although they may be encountered at almost any site.¹ There are many type of ulcer such as mouth ulcer, esophagus ulcer, peptic ulcer. Of these peptic ulcer is more commonly seen in people.² Peptic ulcer is a lesion on the surface of mucous membrane of stomach or duodenum in which gastric acid and pepsin plays a major role in genesis of ulcer.³ There are two type of peptic ulcer such as Gastric ulcer and Duodenum ulcer. In gastric ulcer, generally acid secretion is normal or low. In duodenum ulcer, acid secretion is high in half of the patients but normal in the rest.²

In pathophysiology, peptic ulcer arises when the normal mucosal mechanisms (mucus, mucosal blood flow, formation of HCO₃ and PGE₂, PGI₂) are impaired or overpowered by the damaging factors (acid, pepsin, NSAIDs and H. pylori).⁴ It is chronic disease which can be associated with serious and life threatening complications such as bleeding/ perforation that necessitate surgery and if untreated it can cause death.⁵ Although there are many drugs are available for treatment of peptic ulcer includes antacids, anti-cholinergics, histamine H₂ antagonist and proton pump inhibitor etc. and most of these drugs produce several adverse reaction.⁶ Because of toxicity and side effects of synthetic drugs, herbal medicines are becoming popular. Hence Medicinal plant containing active chemical constituents are useful in prevention and in treatment of various disease. Active

constituents such as flavonoids, tannin, ascorbic acid shows antiulcer activity. Therefore Ayurveda knowledge supported by modern science is necessary to isolate, characterize and standardize the active constituent from herbal sources. Many research interpreted that the herbal medicines are used for various ulcerative conditions to improve health/suffer.

Ayurvedic knowledge provides the traditional plant remedies to treat ulcer and in recent year, investigation have been carried out to provide experimental evidence to conforming that many of plant have antiulcer activity. The goal of treating ulcer disease is to relieve pain, heal the ulcer and prevent ulcer recurrence. Present review focus on medicinal plants which are traditionally used as gastroprotective and healing agent in ayurvedic resources and beside that to gather evidence for their effectiveness and biological mechanisms in modern investigation. This review has attention on their medicinal part, screening methodology, dose of extract, type of extract used to investigate. Following compiled data suggest that medicinal plant are traditionally mentioned as antiulcer activity and in modern science this plants are experimentally evaluated and proved by many researcher for its antiulcer activity.

1. *Adansonia digitata* Linn

It is commonly known as “Baobab, Brahmamlika”. It belongs to family Malvaceae. Reported constituents of this plant are vitamin C, steroids, flavonoids, epicatechin, tocopherol, adansonin, amino acid.



Ayurveda – mixture of juice of leaves, powder of ginger and juice of fresh root of *Soladora indica* is applied to indolent syphilitic ulcer. Leaves are used as fermentations and poultices for inflammatory ulcers.⁷

Pharmacological evidence– The aqueous and ethanol extract of *Adansonia digitata* leaves was administered at the doses of 100 and 200mg/kg orally in rats against ethanol induced ulcer.⁸

2. *Alstonia scholaris*

It is commonly known as “Blackboard tree”. It belongs to family Apocynaceae. Reported constituents of *Alstonia scholaris* are glycosides, saponins, tannins, alkaloids, triterpenoids, and flavonoids.⁹

Ayurveda- The tender leaves roasted and pulverized and made into poultices, act as a local stimulant to unhealthy ulcers with foul discharges.¹⁰

The milk juice of *Alstonia scholaris* is has been applied to treat ulcers.¹¹

Pharmacological evidence– Nil

3. *Annona squamosa*

The plant *Annona squamosa* Linn is commonly known as “Custard apple” there is two varieties are Ramphal and Sitaphal. It belongs to the family Annonaceae. Reported constituents of this plant are steroids, saponins, tannins, phenolic compound and flavonoids.

Ayurveda – The paste is made from leaves without adding any amount of water and applied to unhealthy ulcers.¹² In Brazil leaves are applied as a poultice over boils and ulcers.¹³

Pharmacological evidence- The ethanolic extract of *Annona squamosa* leaves was administered at the doses of 50, 100mg/kg p.o. in wistar rats in which ulcer is induced by aspirin and pylorus ligation. Gastric lesion inhibited by *Annona squamosa* leaves.¹⁴

4. *Bauhinia variegata linn*-

The plant *Bauhinia variegata* Linn is commonly known as “Kachnar”. It belongs to the family Caesalpiniaceae. Reported constituents of this plant are 5-7 dimethoxy and dihydroxy flavonone 4-O-L-rhamnopyranosyl-β-D-glucopyranosides, lupeol, β-sitosterol and quercetin.

Ayurveda- Decoction of the bark is useful to wash ulcers¹⁵ and decoction of root is given in dyspepsia.¹⁶

Pharmacological evidence - The alcoholic extract of *Bauhinia variegata* Linn was administered at the dose of 250 mg/kg p.o. for 8 days in rats in which ulcer is induced by aspirin and pylorus ligation. The extract reduced the basal gastric acid secretion.¹⁷

5. *Holarrhena antidysentrica*

The plant *Holarrhena antidysentrica* is commonly known as “Kurchi”. It belongs to the family Apocynaceae.

Reported constituents of this plant are alkaloids are conessine, steroidal alkaloids.¹⁸

Ayurveda- The leaves are astringent used to treat ulcers.¹⁹ Take of *Holarrhen antidysentrica* seed 5, long pepper 4, dried slices of the root of long pepper 4, Solanum jacquini 3, Apium graveolens 4 parts. Mix it and make a powder. Dose is 10 to 15 grains. Used to check vomiting and in dyspepsia.²⁰

Pharmacological evidence– Nil

6. *Euphorbia neriifolia* Linn-

The plant *Euphorbia neriifolia* Linn is commonly known as “Snoohi, vajra”. It belongs to the family Euphorbiaceae. Reported constituents in this plant are sugar, tannins, flavonoids, alkaloids, triterpenoids and saponin.

Ayurveda- To treat ulcers, juice of *Euphorbia neriifolia* given with fresh butter.^{21, 22}

Pharmacological evidence- Extract showed prominent protection against ethanolic induced and pylorus ligation induced ulceration in rat is in dose dependent manner.²³

7. *Ficus religiosa*-

It is commonly known as “Sacred fig”. It belongs to family Urticaceae. Reported constituents of this plant are tannin, caoutchouc (cochtone)

Ayurveda –Tender and fresh leaves of *Ficus religiosa* may be used along with ghee or tailam to cover the inflamed areas and ulcers according as the wound requires samana or shodhana treatment and root bark also useful to cleanes ulcer.^{24, 25}

Pharmacological evidence– The hydro alcoholic extract of *Ficus religiosa* leaves administered at the doses of 250, 500 mg/kg p.o.in rat in which ulcer is induced by absolute ethanol, aspirin and pylorus ligation. The extract significantly decreased ulcer index value compared to control.²⁶

8. *Glycyrrhiza glabra*-

It is commonly known as “Licorice root”. It belongs to family Leguminosae. Reported constituents are triterpenoids, saponin, flavonoids (liquiritin and isoliquiritin).²⁷

Ayurveda - The root is sweet, slightly bitter useful in ulcer healing. The presence of flavonoids which cause antigastric effect and useful in peptic ulcer treatment.²⁸

Pharmacological evidence- *Glycyrrhiza glabra* was administered at the doses of 250, 500, 750mg/kg orally, in adult male albino mice for 7 days against aspirin induced gastric ulcer. The extract showed reduction in ulcer score, gastric volume while the PH of gastric mucosa increases significantly at the dose of 750mg/kg.²⁹



9. *Hibiscus rosa sinensis*-

It is commonly known as “China rose”. It belongs to family Malvaceae. Reported constituents are quercetin, cyaniding, thiamine, ascorbic acid.

Ayurveda- The root of of *Hibiscus rosa sinensis* is traditionally used for the treatment of ulcer among the kani tribes in Kanyakumari district, Tamil Nadu, India.³⁰

Pharmacological evidence- The aqueous and alcoholic extract of *Hibiscus rosa sinensis* flower possessed significant antiulcer activity in pylorus ligation, aspirin induced and ethanol induced ulceritis in rats at the doses of 250 and 500 mg/kg. Extract having flavonoids (Quercetin) and tannin are reported as a good gastroprotective and antioxidants.³¹

10. *Mangifera indica*

It is commonly known as “Mango”. It belongs to family Anacardiaceae. Reported constituents of this plant are tannins (procatechuic acid and catechin), mangiferin, alanine, glycine.³²

Ayurveda- Leaf juice of *Mangifera indica* given for ulcer. It is being used in ayurveda and indigenous medical systems for the treatment of gastric ulcer.³³

Pharmacological evidence - The ethanolic extract of *Mangifera indica* seed kernel was administered at the doses of 400 mg/kg orally in rats against alcohol induced gastric ulcer. The extract showed significant reduction in the ulcer index, total acidity and protein level.

Flavonoids, tannins, phenolic compound having antiulcer activity.³⁴

11. *Mimosa pudica*-

It is commonly known as “Touch me not”. It belongs to family Fabaceae. Reported constituent of this plant are flavonoids, quercetin, neringin, saponin, gums, mucilage and tannins.

Ayurveda – Decoction of the fresh leaves and seeds are consumed for intestinal ulcer.³⁵

Pharmacological evidence– The methanolic, chloroform and diethyl ether extract of *Mimosa pudica* was administered in rat against aspirin induced, pylorus ligation and alcohol induced gastric ulcer. The alcoholic extract decreases volume of gastric acid secretion, free and total acidity, ulcer index with respect to control.³⁶

12. *Morinda citrifolia*-

It is commonly known as “Noni”. It belongs to family Rubiaceae. Reported constituents of this plant are vitamin C, scopoletin, terpenoids, β -sitosterol, carotene, vitamin A, flavone glycosides, linoleic acid.

Ayurveda- Leaves applied to wounds and ulcers have a healing effect.³⁷

Pharmacological evidence - The effect of ethyl acetate extract of fruit of *Morinda citrifolia* Linn was investigated in rats to evaluate antiulcer activity by four models i.e. Gastric ulcers were induced by oral administration ethanol, aspirin and pylorus ligation and duodenal ulcers were induced by oral administration of cysteamine HCL and duodenal ulceration at the doses of 200 and 400mg/kg orally in rat.³⁸

13. *Nigella sativa* Linn

It is commonly known as “Kala-jira”. It belongs to family Ranunculaceae. Reported constituents of this plant are flavonoids of trigillin quercetin-3-glucoside, alkaloids nigellicin, nigellidin, tannin, steroid.

Ayurveda- *Nigella sativa* Linn 15 tola, white piper and black piper each 3 $\frac{1}{2}$ tolas, cinnamon bark $\frac{1}{2}$ tolas, leaves of graveolens 4 $\frac{1}{2}$ tolas, ginger conserve 12 tolas, myrobalans conserve 18 tolas. Dose is 1 $\frac{1}{2}$ tolas, three times a day used in dyspepsia, it removes foul breath and watering from mouth.³⁹

Pharmacological evidence–The alcoholic extract of *Nigella sativa* Linn was administered at the doses of 150mg/kg orally for 8 days in rats against pyloric ligation and aspirin induced gastric ulcer. The extract significantly decreases the volume of gastric acid secretion, free acidity, total acidity and ulcer index with control.⁴⁰

14. *Peucedanum grande*-

It is commonly known as “Wild carrot”. It belongs to family Umbelliferae. Reported constituents of this fruit are essential oil.

Ayurveda – Infusion (1 in 10) of fruit is used in doses of $\frac{1}{2}$ to 1 ounce like that of fennel seeds as carminative, gastric and intestinal disorders.⁴¹

Pharmacological evidence– Nil

15. *Solanum nigrum*-

It is commonly known as “Black nightshade”. It belongs to family Solanaceae. Reported constituents of this plant are β -carotene, vitamin C, steroids, triterpenoids, saponins, flavonoids, tannin.

Ayurveda – Juice and decoction of the herb was made into ointment for foul ulcers.⁴²

Pharmacological evidence– The aqueous extract of *Solanum nigrum* leaf and berry was administered at the doses of 80mg/kg, 250mg/kg and 50mg/kg respectively in rats against aspirin induced pylorus ligation and ethanol induced gastritis. The berry extract show more protection against gastritis than the leaf extract.⁴³

16. *Terminalia Chebula*

It is commonly known as “Haritki”. It belongs to family Combretaceae. Reported constituents of this plant are chebulagic acid, chebulic acid, tannic acid, gallic acid, ellagic acid.



Ayurveda – Ashes of triphala mixed with siddhu salt (saindhava i.e. nitricum) are dusted over syphilitic ulcers for washing away the exudation from the ulcers.⁴⁴

Pharmacological evidence– Ethanolic extract of *Terminalia chebula* fruit was administered at the doses of 0.5mg/kg and 1mg/kg orally for 7days in rat against stress induced cold restraint ulcers. The extract significantly reduced gastric mucosal lesions, mucosal content, volume of gastric juice, free acidity and total acidity when compared to control.⁴⁵

CONCLUSION

Present review represents the data of different reported antiulcer medicinal plants which includes botanical name, family, extract used along with doses and phytoconstituents. It concludes that the some plants possesses antiulcer activity and it has been proved by different animal models but the Pharmacological evidences of *Alstonia scholaris*, *Holarrhena antidysentrica*, *Peucedanum grande* need to be screened, which gives many links to develop the future trial.

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