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A REVIEW ON GASTRIC ULCER REMEDIES USED IN AYURVEDIC SYSTEM OF MEDICINE

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ABSTRACT

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The medicinal plants are widely used by the traditional medical practitioners for curing various diseases in their day to day practice. In traditional systems of medicine, different parts (leaves, stem, flower, root, seeds and even whole plant) have been recommended for the treatment of gastric ulcer bronchitis, bronchial asthma, malaria, diarrhea, dysentery, skin diseases, arthritis, painful eye diseases, chronic fever, insect bite etc. Peptic ulcer disease (PUD) is a serious gastrointestinal disorder that requires a well targeted therapeutic strategy. A number of drugs including proton pump inhibitors and H₂ receptor antagonists are available for the treatment of peptic ulcer, but clinical evaluation of these drugs has shown incidence of relapses, side effects, and drug interactions. This has been the rationale for the development of new antiulcer drugs and the search for novel molecules has been extended to herbal drugs that offer better protection and decreased relapse. Drugs of plant origin are gaining popularity and are being investigated for a number of disorders, including peptic ulcer. The present article reviews 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 standardize the active constituents from herbal sources for antiulcer activity.

INTRODUCTION

For over a century, peptic ulcer disease has been one of the leading causes of gastrointestinal surgery, with high morbidity and mortality rates. The prevalence of gastrointestinal ulcers differs around the world duodenal ulcers are dominant the Western populations and gastric ulcers are more frequent in Asia. As the prevalence of this disease increases over time, one would expect peptic ulcers to continue to have a significant global impact in the basic health and economic systems and in patients' life quality¹.

Peptic ulcers are a deep gastrointestinal erosion disorder that involves muscular mucosa². For decades it was believed that gastrointestinal ulcerations were caused by the excessive secretion of gastric acid, but many patients presenting such ulcerations had normal acid secretion rates³. Then, researchers reported that peptic ulcers were been caused by an imbalance between the aggressive factors and a number of known defense mechanisms. Exogenous aggressive factors such as smoke, anti-inflammatory drugs, alcohol, stress, fatty foods and *Helicobacter pylori* infections triggered tissue necrosis through mucosal ischemia, free radical generation and cessation of nutrient delivery, hydrochloric acid together with pepsin, pancreatic enzymes and bile decreased the defense mechanisms of gastrointestinal mucosa such as the intercellular junctions, local blood flow, mucus/bicarbonate secretion and cellular growth^{4,5}.

Recently, there has been a rapid progress in the understanding of the pathogenesis of peptic ulcer. Most of the studies focus on newer and better drug therapy. These have been made possible largely by the availability of the proton pump inhibitors, histamine receptor blockers, drugs affecting the mucosal barrier and prostaglandin analog⁶. However, the clinical evaluation of these drugs showed development of tolerance and incidence of relapses and side effects that make their efficacy arguable. This has been the rationale for the development of new antiulcer drugs, which includes herbal drugs. Indian Medicinal plants and their derivatives have been an invaluable source of therapeutic agents to treat various disorders including PUD⁷. An indigenous drug possessing fewer side effects is the major thrust area of the present day research, aiming for a better and safer approach for the management of PUD. This article summary the features of some of these plants reported to possess antiulcer and ulcer healing properties.

***Bauhinia variegata* Linn.**

Bauhinia variegata Linn. is belongs to family - fabaceae, it contains the active constituents like the seeds yield fatty oil, the bark yields fiber. Five flavonoids isolated from the different organs of *B. variegata* were identified as Quercetin, rutin, Quercetin, apigenin and apigenin 7-oglucoside. Saponins, steroids, flavonoids, alkaloids, tannins, sugars are also present. The bark is astringent, tonic and anthelmintic. It is useful in scrofula and skin diseases. It is also used for ulcers and leprosy. A decoction of the bark is taken for dysentery. The dried buds are used for diarrhea, dysentery and hemorrhoids. It is also used for ulcers and leprosy. The stem bark is employed in drug formulations considered useful in ulcers, scrofula and asthma and skin diseases. It is used to remove intestinal worms and to prevent the decomposition of the blood in tumors. The root is carminative, and is used in dyspepsia and flatulence. A decoction of the root is reported to prevent obesity⁸.

***Allophylus serratus* Kurz**

Allophylus serratus Kurz (Synonym *Allophylus cobbe* Raeuschel; *Allophylus edulis* Radlk), is one of the largest genus of family *Sapindaceae* and carries a strong ethnopharmacological background. The plant is used in Ayurveda, to treat problems like inflammation, elephantiasis, oedma, and fracture of bones. It is also used in several gastrointestinal disorders including dyspepsia, anorexia, and diarrhea^{9, 10}. Pharmacognostic studies and phytochemical screening of *Allophylus serratus* (AS) showed the presence of various chemical compounds in different parts of AS plant. Leaves of the plant contain β -sitosterol. They also contain phenacetamide, a chemical known for its antiulcer activity¹¹. An *edulis* has also been reported to contain two flavonoid glycosides that are effective against ulcer^{12, 13}.

***Alstonia scholaris* R. Br.**

Alstonia scholaris R. Br. Is belongs to family Apocynaceae, it contains the Active constituents like Alkaloids, coumarins, flavonoids, phlobatannin, reducing sugars, simple phenolic, steroids, saponins and tannins. Of this various phytochemicals estimated, lipid and saponin were found in larger amounts than others, whereas the alkaloid is 0.86%. The above different chemical compounds detected in *A. scholaris*, could make the plant

useful in treating different ailments and have the potential for providing useful drug for human use. This is because the pharmacological activity of any plant is usually traced to particular compound. The presence of tannins and other phenolic compounds, which have antiseptic properties, could explain the use of this plant for the treatment of various diseases. It has also been mentioned that the antioxidant activity of plants might be due to their phenolic compounds. Flavonoids are a group of polyphenolic compounds with known properties that include free-radical scavenging, inhibition of hydrolytic enzymes and anti-inflammatory action. The saponins and flavonoids are used in ulcer treatments ¹⁴.

Asparagus racemosus

Asparagus racemosus (AR), belonging to the family *Liliaceae*, is a well-known ayurvedic rasayana. AR is reported to be antidiarrhoeal, antibacterial, antilithiatic and antiulcer ^{15, 16, 17, 18}. Sairam *et al.*, have reported antiulcerogenic activity of methanolic extract of fresh roots of *Asparragus racemosus* in the cold restraint (CRU), alcohol (AL), aspirin (ASP), and pyloric ligation (PL) induced gastric ulcer models and cysteamine induced duodenal ulcer model ¹⁹. AR was found to be effective in the CRU, AL, and cysteamine induced ulcer models, but was ineffective in PL and ASP models. The plant did not show any significant effect on acid and peptic activity, but it increased mucin secretion tremendously, suggesting cytoprotective property as the possible mechanism. The plant did not show any effect on acid secretion. However, its effect in the CRU model, apart from its effect on defensive mucosal factors, was attributed to its adaptogenic activity ²⁰, this defensive system showed protection in the PL induced model. In the ASP model, both local and systemic effects produced ulcers ²¹. It may be possible that AR was not able to overcome all the factors that play a role in ulcerogenesis. Along with the above-mentioned properties, AR was also reported to have antioxidant effect ^{22, 23}. Apart from finding AR to be antiulcerogenic, authors found that it accelerated gastric ulcer healing in 10 days of treatment. Overall, AR has shown gastroduodenal ulcer protecting and gastric ulcer healing effects, which are mainly due to increase in mucosal defensive factors.

Aspilia Africana

Aspilia africana is a semi wood herb occurring throughout the regions of the savannah and tropical Africa on waste lands. The plant has been reported to possess antimicrobial activity, haemostatic, antifertility, anti inflammatory activity, the West Africa have reported the wound healing and antiulcer activity of its n-hexane and methanolic extracts. tnsiuth eastern Nigeria,leaves of this plant is to be effective in the treatment of stomachache and bleeding gastric ulcers specially when taken as an aqueous decoction ²⁴.

Azadirachta indica

Azadirachta indica A. Juss, commonly known as “Neem,” has been extensively used in India as an ayurvedic medicine for the treatment of various diseases, such as, leprosy, intestinal helminthiasis, and respiratory disorders in children ^{25, 26, 27}. Bandyopadhyay *et al.* have reported the gastroprotective property of dried bark extract of *Azadirachta indica* (AI) in the mercaptomethylimidazole, PL, CRU, indomethacin, AL, and Histamine (HST) induced ulcer models. It acts mainly by inhibiting acid secretion and blocking oxidative damage of the gastric mucosa ²⁸. Inhibition of acid secretion was confirmed by inhibition of $H^+K^+ATPase$ activity, while blockade of oxidative damage of gastric mucosa was evident from blocking of lipid peroxidation and scavenging of endogenous hydroxyl radical (OH^\cdot). Furthermore, they compared the bark extract with known antiulcer drugs, ranitidine and omeprazole in the PL and the stress ulcer models and found that the extract was almost equipotent to the standard drugs. The bark extract exhibited more antioxidant activity than a variety of known antioxidants. Garg *et al.*, have also reported an antiulcer effect of neem leaf extract and the prevention of mucus depletion and mast cell degranulation as possible mechanism ²⁹. A phenolic glycoside has been isolated by Bandyopadhyay *et al.*, as an active constituent, whose characterisation and mechanism are under investigation. Therefore, *Azadirachta indica* offers another option for a safer and an effective antiulcer drug.

Benincasa hispida

Benincasa hispida is commanly known as Bhuru kolu belongs to family cucurbitaceae. It mainly contains the active constituents like flavonol and steroids, triterpenes, flavones, beta- sitosterol. Fruits of this plant are traditionally used as a laxative, diuretic, ulcers,

tonic ,aphrodisiac, cardiotonic, urinary calculi, insanity, epilepsy, and also in case of jaundice, fever, menstrual disorders ³⁰.

Hemidesmus indicus

Hemidesmus indicus var. *indicus* (family Asclepiadaceae), is a widely distributed medicinal plant in India. It has been used in various diseases and disorders, such as, antinociceptive, antidiarrhoeal, renoprotective, antiatherogenic, and skin carcinogenesis ³¹⁻³⁶. Jain and Singh have reported that *Hemidesmus indicus* (HI) is employed in traditional medicine for gastric ailments ^{37, 38} have recently studied the aqueous ethanolic extract of HI and have reported that the doses of 300 and 450 mg/kg are effective in the PL, cysteamine, and aspirin induced ulcer models in rats. The antiulcerogenic effect of HI was mainly because of its high mucoprotective activity, depicted by a selective increase in prostaglandin content. *Hemidesmus indicus*, therefore, provides another alternative for ulcer treatment. It aims at enhancing the defensive factors so that the normal balance between offensive and defensive factors is achieved.

***Centella asiatica* (linn)**

Centella asiatica is an ethnomedicinal plant used in different countries by diverse ancient cultures and tribal peoples. It is one of the local herbs that is claimed to possess various physiological effects and it is used as in the place of indigenous system of medicine as a tonic in skin diseases and leprosy. This plant is having different uses like for wound healing, memory improvement, bronchitis, asthma, mental fatigue, dysentery, arthritis, leucorrhea and toxic fever and also this plant having anti ulcer activity, antioxidant activity, anticancer activity, anti bacterial activity, anti inflammatory activity ³⁹.

***Carica papaya* L.**

Carica papaya L. is belongs to family Caricaceae, it contains the active constituents like Main chemical components are papain, chymopapain, pectin, carposide, carpaine, pseudocarpaine, crypto glavine, cis-violaxanthin and antheraxanthin. Papaya latex is very much useful for curing dyspepsia and is externally applied to burns and scalds. The fruit and seeds have anthelmintic activity. It contains many biologically active compounds. Two important compounds are chymopapain and papain, which are widely known as being useful for digestive disorders and disturbances of the gastrointestinal tract ⁴⁰.

CONCLUSION

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 towards therapy. However, in the light of recent evidences this concept has changed. Now, treatment of ulcer 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 characterisation 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. Standardisation is indispensable to maintain reproducible quality in biological evaluation. Although the clinical efficacy of these preparations is reported by traditional practices, they have not been scientifically validated.

Ayurveda, the oldest medicinal system in the world, provides leads to find therapeutically useful compounds from plants. Therefore, ayurvedic knowledge supported by modern science is necessary to isolate, characterise, and standardise the active constituents from herbal source. This combination of traditional and modern knowledge can produce better antiulcer drugs with fewer side effects. Herbs are widely available in India and other countries. The wide spectrum makes them attractive candidates for further research.

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