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Potential of Herbal Drugs as Antiulcer Agents

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ABSTRACT

The most common gastrointestinal ailment is peptic ulcer. Unbalanced offensive and defensive factors are involved in the pathophysiology of peptic ulcer disease. About 15,000 people die each year from peptic ulcer disease. Peptic ulcers are widespread in India. Antacids and antiulcer medications account for 6.2 billion rupees and 4.3% of the market in the Indian pharmaceutical sector. There are now two primary methods for treating peptic ulcers. The first is a decrease in stomach acid production, and the second is a reinforcement of gastric mucosal protection. Non-steroidal anti-inflammatory medicines (NSAIDs) and *Helicobacter pylori* infection are the two main variables that can impair mucosal resistance to damage. A wide range of disorders, including peptic ulcer, have been studied for the therapeutic potential of numerous natural compounds. There has been much pharmacological research into some substances antiulcer efficacy. In this paper the literature on various medicinal plants and alkaloids with antiulcer action has been reviewed.

INTRODUCTION

An ulcer seems to be an erosion of the stomach or duodenal lining. Basically, it is a swollen tear in the skin or the mucous membrane lining of the digestive tract. When the natural equilibrium is upset by increased aggression or decreased mucosal resistance, ulceration results. Duodenal ulcers make up for 19 out of 20 peptic ulcers. Less frequently, the stomach wall develops gastric ulcers. The stomach mucosa is constantly exposed to substances that could be harmful, including medicines, food ingredients, bacterial products (*Helicobacter pylori*), acids, pepsin and bile acids. These substances, which include increased stomach acid and pepsin secretion, decreased gastric blood flow and motility, suppression of prostaglandin synthesis and cell proliferative growth, have been linked to etiology of gastric ulcers. A wide range of disorders, including peptic ulcer have been studied for the therapeutic potential of numerous natural compounds. There has been much pharmacological research into some substances antiulcer efficacy. We will explore the literature on various medicinal plants and alkaloids with antiulcer action in this paper. This article examines medications made from plants that are more frequently used to treat peptic ulcers worldwide and, when indicated, their antiulcer activity [1-2]. The sole effects discussed in this paper will be antiulcer and gastro-protective.

Types of Ulcers [2]

Table 1: Types of Ulcers

Peptic Ulcer	Peptic ulcers are any ulcers that have been exposed to pepsin. Our stomach or duodenal linings can develop peptic ulcers. In the stomach lining, pepsin and hydrochloric acid are typically present. Use of anti-acids is the most typical form of treatment for peptic ulcers. As part of their Peptic Ulcer treatment, some patients will also need to take antibiotics.
Gastric Ulcer	Gastric ulcers develop in our stomach. The symptoms of stomach ulcers are more specific. This kind of ulcer is brought on by the bacterium *H. pylori*. For the treatment of gastric ulcers, antacids are employed. After utilizing antacids for two to three weeks, the patient typically starts to feel better.
Duodenal Ulcer	Duodenal Ulcer affects the duodenum. This kind of peptic ulcer forms in the small intestine's initial section. Interesting contrasts between some duodenal ulcer symptoms and those of stomach ulcers include some of the symptoms. The most typical type of ulcer in the Western world is a duodenal one. Typically, benign duodenum ulcers occur.
Esophageal Ulcer	Esophageal ulcers are brought on by dangerous bacteria; hence patients are advised to take antibiotics to get rid of these bacteria. Patients with esophageal ulcers occasionally experience excruciating pain, and as the ulcer comes into contact with the stomach's acid, the suffering will worsen.
Bleeding Ulcer	A peptic ulcer that is untreated might result in internal bleeding. This sort of ulcer, which is the most hazardous, is known as a bleeding ulcer when it occurs. It needs to be treated right away.
Refractory Ulcer	Refractory ulcers are straightforward peptic ulcers that have not improved after receiving treatment for at least three months.
Stress Ulcer	A series of lesions (or lacerations) known as stress ulcers can develop in the esophagus, stomach, or duodenum. They are typically only seen in people who are seriously unwell or under a lot of stress.

SYMPTOMS OF ULCERS

The most typical sign of an ulcer is stomach pain between the breastbone and the belly button, there are typically acute pains. Usually, this discomfort appears a few hours after eating. When the stomach is empty, it might also happen late at night or early in the morning. The pain may temporarily subside if you eat anything or take an antacid medicine. Additional ulcer signs and symptoms may include: loss of appetite, sudden, sharp stomach pains, nausea, frequent burping or hiccupping, 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.

Anyone who suspects, they could develop an ulcer should visit a doctor. Untreated ulcers enlarge and deepen over time, which can cause various issues including gastrointestinal bleeding or a hole in the stomach or duodenum wall that can be very sickening.

MEDICINAL PLANTS AS ANTIULCER AGENTS USED IN INDIA

Studies on the pharmacological effects of some medicinal plants are quite rare, despite the fact that, they are one of the well-known medicinal plants used in Indian traditional medicine to treat a variety of diseases. We investigated certain medicinal plants' acute toxicity and antiulcer efficacy. Our research revealed that these medicinal herbs had a dose-dependent ability to prevent ulcer in rats. These medicinal plants did not exhibit any acute toxicity, according to histological investigations [(3)]. This medicinal plant's preliminary photochemical screening revealed the presence of significant secondary metabolites like tannins and flavonoids. Due to their great efficacy and low toxicity, a number of botanical compounds have potential medicinal uses. Finally, it should be highlighted that the majority of anti-inflammatory medicines used in modern medicine are ulcerogenic, making compounds like flavonoids, aescin, aloe gel and many others that have antiulcer activity of particular therapeutic value.

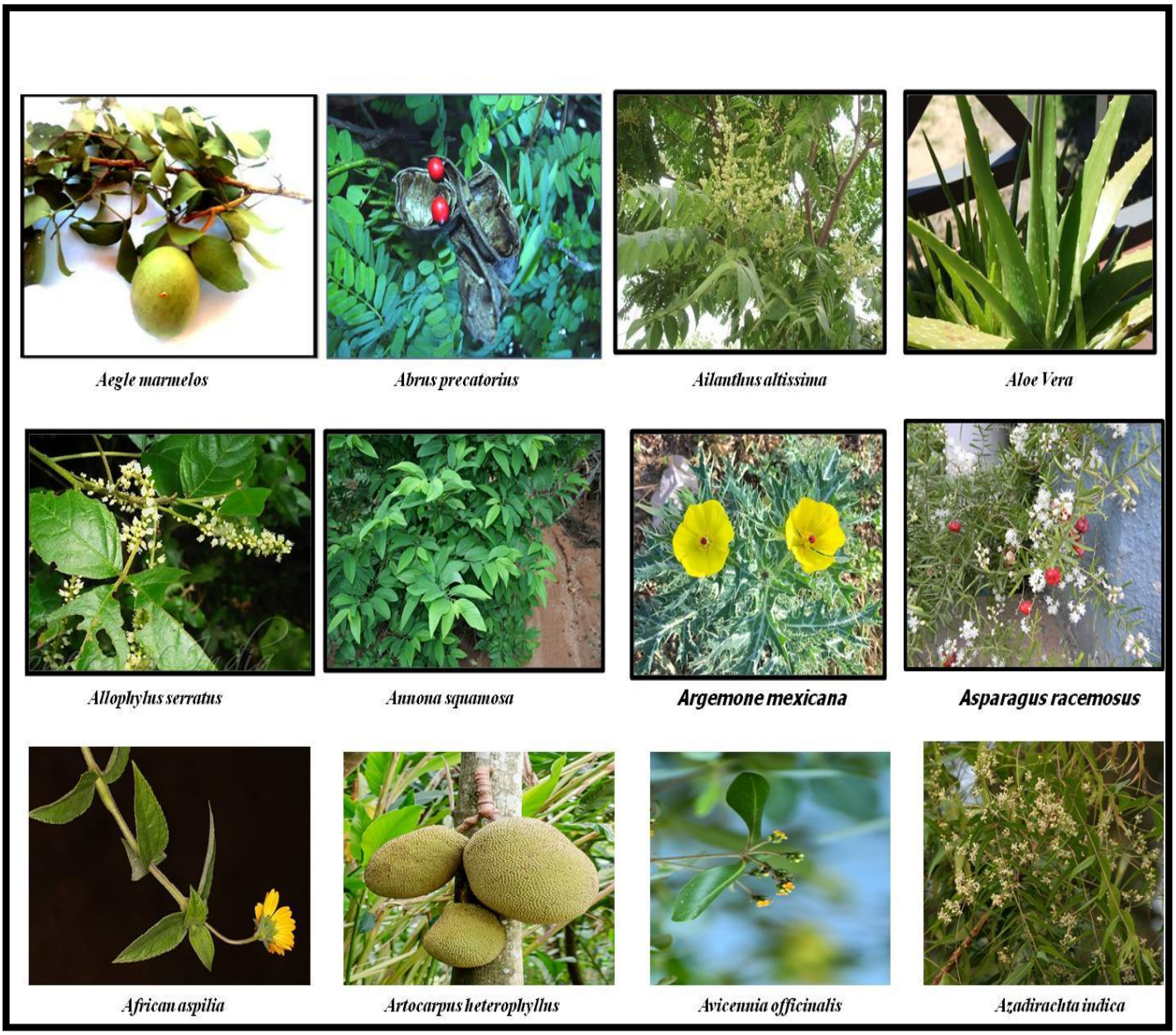

Fig 1. MEDICINAL PLANTS AS ANTIULCER AGENTS USED IN INDIA

Aegle marmelos

It is commonly known as a "bael tree" belonging to the family Rutaceae – rues, rutacées. Chemical constituents in this plant are flavonoids, tannins, and saponins [04]. The fruit of *A. marmelos* is traditionally used for the treatment of ulcer among the kani tribes in Kanyakumari district, Tamil Nadu, India [04]. Ulcers are induced by aspirin plus pylorus ligated gastric ulceration in rats and aqueous extract of leaves is to be administered orally for 21 days, daily

dose of 1 gm/kg. The result indicated a significant reduction in the ulcer lesion count compared to control [05].

***Abrus Precatorius* Linn (Fabaceae)[6]**

It is also known as Gunja, has been utilised for therapeutic purposes. Traditional and folkloric medicine uses the roots, seeds, and leaves. *A. precatorius* has been found to have a variety of biological activities, including those that are antibacterial, anti-cancer, anti-diabetic, anti-fertility, antimicrobial, antioxidant, anti-inflammatory, anti-arthritic, anti-seratonergic, nephroprotective, etc., according to pharmacological studies. The callous ulcer is dressed with seed paste. To cure peptic ulcers, fresh leaf decoction is given three times daily. As an anti-inflammatory poultice, leaves in oil are pulverised.

***Ailanthus altissima* (Simaroubaceae)[7-8]**

At doses of 50 mg/kg and 100 mg/kg, nigakinone and methylnigakinone, indole-alkaloids found in *Ailanthus altissima*, significantly reduce gastric acid or pepsin productions and have an anti-ulcer action.

Aloe Vera [9]

A succulent that is endemic to many warm areas, aloe vera juice demonstrates potent antibacterial activity against *H. pyroli* at 250 and 500 mg/kg and helps to relieve pain and hasten ulcer healing.

***Allophylus serratu*s Kurz (Sapindaceae)[10]**

Allophylus serratus Kurz (has a long history of ethanopharmacology. In Ayurveda, the herb is used to treat oedema, bone fractures, inflammation, and elephantiasis. Sitosterol can be found in plant leaves. Phenacetamide, a substance recognised for its antiulcer properties, is also present in them. Furthermore, flavonoid glycosides that are beneficial against ulcers have been found to be present in aedulis. Once daily oral administration of the ethanolic extract at 400 mg/kg body weight demonstrates.

***Annona squamosa* Linn (Annonaceae)[11]**

A. squamosa aqueous extract exhibits notable anti-ulcer efficacy at 250–500 mg/kg. Omethylarmepavine (2), Nmethylcorydaldine (3), and isocorydine (6) of the 12 compounds (1–12) identified from A. squamosa (+) exhibit promising anti-secretory activity.

***Argemone mexicana* Linn (Papaveraceae) [12]**

The effectiveness of the aqueous extract against ulcers is dose dependent. *A. mexicana's* fresh leaf juice and root paste are used to callous ulcers as a dressing. Seed decoction is employed to treat callous ulcers.

***Asparagus racemosus* (Asparagaceae)[13]**

Shatavarin, one of the active components in *A. recemosus*, has therapeutic benefits. Roots include shatavarins 1-4, which come in four different kinds. The anti-inflammatory, anti-ulcerogenic, and anti-tumor properties of roots are employed. In rats with stomach ulcers treated with indomethacin, the methanolic (crude) extract of *A. racemosus* roots is more efficient at reducing gastric ulcer at a level of 100 mg/kg. Moreover, the amount of gastric output, free acidity, and total acidity are all dramatically decreased by crude extract.

The African aspilia (Asteraceae)[14]

A. africana is a semi-woody herb that grows on wastelands in equatorial Africa and the Savanath area. West Africa's n-hexane and methanolic (0.5–1 gm/kg) extracts, which are produced by HCl/ethanol, have wound-healing and antiulcer properties. When consumed as an aqueous infusion, the leaves of this plant from South Eastern Nigeria are particularly efficient for treating stomach pain and bleeding gastric ulcers.

***Artocarpus heterophyllus* Lam (Moraceae)[15]**

The 70% methanolic extract of the leaves, root bark, and root wood of *A. heterophyllus* has a notable anti-ulcer effect on rat stomach ulcers brought on by alcohol, aspirin, and pylorus ligation.

***Avicennia officinalis* (Acanthaceae)[16]**

Ulcers and stomach volume are reduced by the cold and hot aqueous leaves extract of A. officinalis at a dosage of 62.5-125 mg/kg.

***Azadirachta indica* (Meliaceae)[17]**

It is also called neem. It has a long history of use in Ayurveda for therapeutic purposes. Ulcers are treated with neem leaf methanolic extract. Indomethacin, ethanol, and histamine-induced stomach ulcers are effectively prevented by *A. indica* extract. Through inhibiting H+-K+-ATPase, blocking acid production, and avoiding oxidative damage and apoptosis, neem leaf extract has antiulcer properties. Neem's aqueous extract reduces pepsin activity and stomach output by 63% and 50%, respectively.

***Azeratum conyzoides* Linn (Asteraceae) [18]**

For the treatment of ethanol-induced stomach ulcers, aqueous extract of the leaves of *A. conyzoides* was utilised. Moreover, this plant is utilised as an antioxidant, gastroprotective, anti-inflammatory, and to cure ulcers and wounds.

***Azima tetracantha* Lam (Salvadoraceae) [19]**

Ulcers, inflammation, and fungal infections are all treated with the ethanolic extract of *A. tetacantha* leaves.

***Bauhinia racemosa* (Fabaceae) [20]**

B. racemosa's methanolic extract exhibits strong anti-ulcer properties. The extract lessens peptic activity, acid production, and stomach volume.

***Bauhinia variegata* Linn (Fabaceae)[21]**

Popular names for this tree include mountain-ebony, camel's foot tree, and orchid tree. At doses of 200 and 400 mg/kg, the root and leaf extracts of B. variegata have considerable ulcer-protective properties.

CONCULSION

From this study we can conclude that, studies with plant sources can result in effective treatment of peptic ulcers. The best option for treating ulcers is herbal plants because they are widely accessible and simple to produce in comparison to manufactured medications. Although extract purity is important, selectivity of action and the presence of adverse effects are also important. Hence, the balance between activity and toxicity is the main consideration in how these plants are used. Combining traditional and contemporary enlightenment may lead to better drugs with fewer adverse effects for the treatment of peptic ulcers.

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