



## Study of Anti-Ulcer Activity of Indian Medicinal Plants

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### ABSTRACT:

Ulcers, common gastrointestinal disorders, result from a disturbance in the stomach's balance. Traditional herbal remedies, combined with modern medicine, offer potential for effective, low-side-effect treatments. Research explores medicinal plants for ulcer prevention and treatment in both Ayurvedic and modern practices.

### Introduction:

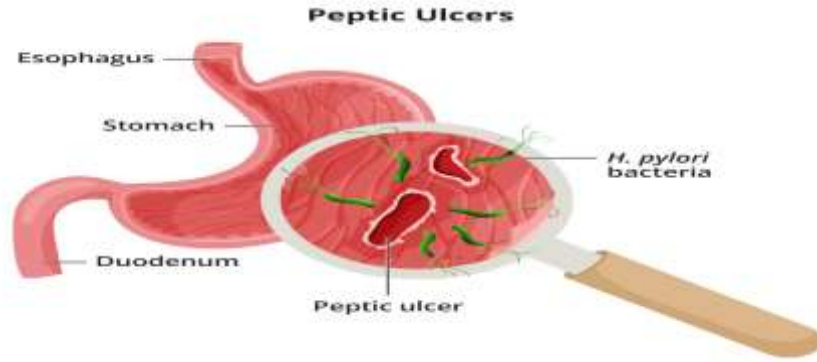
Ulcers are characterized by breaks in the skin, lining of organs, or tissue surfaces, resulting from erosion. They commonly occur on the skin of the lower extremities and within the gastrointestinal tract. Various types include mouth ulcers, esophageal ulcers, peptic ulcers, and genital ulcers, with peptic ulcers being particularly prevalent. Peptic ulcers manifest in the gastrointestinal tract, primarily in areas exposed to gastric acid and pepsin, such as the stomach and duodenum. The exact cause of peptic ulcers remains unclear. However, they often stem from an imbalance between defensive factors (e.g., gastric mucus secretion, prostaglandins, mucosal blood flow) and aggressive factors (e.g., acid, pepsin, NSAIDs, bile, H. pylori infection).



### Classification:

The two most common types of peptic ulcer are called “gastric ulcer” and “duodenal ulcer.”The gastric ulcer or duodenal ulcer may at same time to any people.

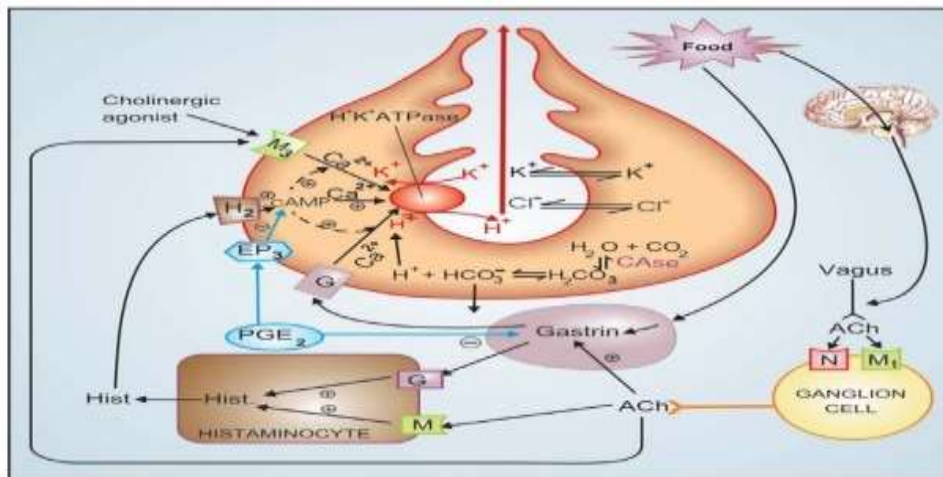
1. Gastric ulcers that occur on the inside of the stomach and characterized by pain; ulcers are common in older age group. Eating may increase pain rather than relieve pain.
2. Duodenal ulcers that occur on the inside of the upper portion of your small intestine (duodenum) and are characterized by severe pain with burning sensation in upper abdomen that awakens patients from sleep.



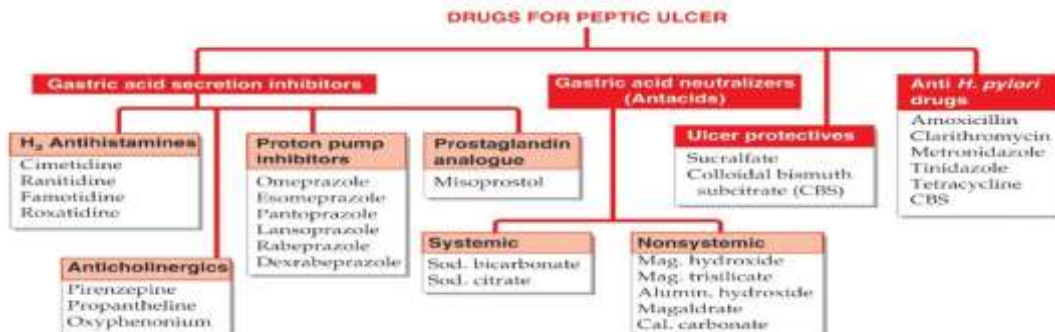
The most common symptom of a peptic ulcer is stomach pain. In some cases, peptic ulcer can be life threatening with symptoms like bloody stool, severe abdominal pain, and cramps along with vomiting blood. Peptic ulcer disease can also occur if you have a rare condition called Zollinger-Ellison syndrome (gastrinoma). This condition forms a tumor of acid-producing cells in the digestive tract. These tumors can be cancerous or noncancerous. The cells produce excessive amounts of acid that damages stomach tissue.

**Pathophysiology:**

Peptic ulcer disease arises from an imbalance between stomach acid, pepsin, and Helicobacter pylori, and defensive factors like mucin and prostaglandins. Its main causes are H. pylori infection and NSAID use, not spicy food or stress. Most ulcers are duodenal, affecting 10% globally. India has a significant demand for antacids and antiulcer drugs.



**Drugs used in the treatment of peptic ulcer**



**Experimental Models Used for Peptic Ulcer:**

Several models are used experimentally for testing or evaluating anti-peptic ulcer activity of drugs/agents and these include the following:

- (i) water-immersion stress or cold-water-restraint or cold-restraint stress,
- (ii) NSAIDs- (indomethacin, aspirin, and ibuprofen) induced gastric ulcers,
- (iii) ethanol-induced gastric ulcers,
- (iv) acetic acid-induced gastric ulcers,
- (v) histamine-induced gastric ulcers,
- (vi) reserpine-induced gastric ulcers,
- (vii) serotonin-induced gastric ulcers,
- (viii) pylorus-ligated-induced peptic ulcers,
- (ix) diethyldithiocarbamate- (DDC)-induced peptic ulcers,
- (x) methylene blue-induced ulcers,
- (xi) Ischemia-reperfusion- (I-R-) induced gastric ulcers,
- (xii) cysteamine-induced duodenal ulcers,
- (xiii) indomethacin-histamine-induced duodenal ulcers.
- (xiv) ferrous iron-ascorbic acid-induced gastric ulcers
- (xv) acetic acid-H. Pylori-induced ulcers

#### ***NSAIDs Induced Mucosal Damage***

NSAIDs such as indomethacin, aspirin, and ibuprofen are used to create gastric ulcer models in rats for studying antiulcer treatments. They cause ulcers by inhibiting prostaglandin synthesis, reducing protective mechanisms, and damaging the gastric mucosa.

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## **Literature Review**

### **Medicinal Plants Showing Antiulcer Activity**

<b>Sr No.</b>	<b>Name</b>	<b>Type of extract</b>	<b>Active constituents</b>
01.	Acacia arabica	Gum	Phenolic compounds, tannins and flavonoids
02.	Adansonia digitata	Pulp, leaves	Phobaphene, mucilage contain tannins
03.	Allium sativa	Juice	Volatile oils, allin, allicin
04.	Aloe vera	Gel	Barbalin, isobarbalin, saponins
05.	Azadiracta indica	Seeds	Stearic acid and palmitic acid
06.	Ginseng	Roots, leaves, stem	Polysaccharides, triterpenoids, flavonoids
07.	Annona squamosa	Seeds	Tannic acid
08.	Swertia chirata	Whole plant	Tannins, flavonoids
09.	Zingiber officinalis	Roots	Phenolic compounds
10.	Curcuma longa	Rhizomes	Phenolic compounds, flavonoids

#### **1. Acacia Arabica**

Scientific name: Vachellia nilotica

Common name: Babool

Family: Fabaceae

Antiulcer Activity: stress-induced gastric ulcer

**2. Adansonia digitata**

Scientific name: *Adansonia digitata*

Common name: baobab tree

Family: Malvaceae

Antiulcer Activity: prevent intestinal ulcer

**3. Allium sativum**

Scientific name: *Allium sativum*

Common name: Garlic

Family: Amaryllidaceae (Liliaceae) Antiulcer Activity: gastric and duodenal ulcers

**4. Aloe vera**

Scientific name: *Aloe barbadensis miller*

Common name: Aloe vera

Family: Asphodelaceae

Antiulcer Activity: *A. vera* enhance mucous resistance and resulted in decrease of ulcer

**5. Azadirachta indica**

Scientific name: *Azadirachta indica*

Common name: Neem tree

Family: Meliaceae

Antiulcer Activity: inhibits gastric lesions induced by restraint-cold stress, indomethacin and ethanol. In stress ulcer mode

**6. Ginseng**

Scientific name: *Panax ginseng*

Common name: Ashwagandha

Family: Araliaceae

Antiulcer Activity: gastro protective activity

**7. Annona squamosa**

Scientific name: *Annona squamosa*

Common name: Custard Apple

Family: Annonaceae

Antiulcer Activity: Reduce ulcer

**8. Swertia chirata**

Scientific name: *Swertia*

Common name: Bhunimba, bitter stick, Chiaravata, Chiraita, Anaryatikta, Chirayta

Family: Gentianaceae

Antiulcer Activity: Protection of gastric ulcer

**9. Zingiber officinalis**

Scientific name: *Zingiber officinale* Rosc

Common name: ginger

Family: Zingiberaceae

Antiulcer Activity: ulcer-preventive properties

### 10. *Curcuma longa*

Scientific name: *Curcuma longa*

Common name: turmeric

Family: Zingiberaceae

Antiulcer Activity: neutralizing and inhibiting the secretion of stomach acid

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### Traditional uses of plants:

#### ➤ *Acacia Arabica*

This herb has traditional uses in Ayurvedic medicine, such as gargling to treat haemorrhagic ulcers and using poultices of bruised leaves for ulcers, acting as a stimulant and astringent.



#### ➤ *Adansonia Ddigitata*

. Fresh juice of leaves mixed with powdered ginger and the juice of *Salvadora indica* root can help indolent syphilitic ulcers. Leaves are also used for relieve pain and poultices on inflammatory ulcers.



#### ➤ *Allium Sativum*

. Garlic, fried in mustard or coconut oil, is a traditional remedy in Ayurvedic medicine for treating ulcers with maggots. Garlic juice diluted with water is also used to wash wounds and foul ulcers.



➤ **Aloe Vera**

It's interesting how Ayurvedic leaves are effectively used in America to treat chronic ulcers, reducing pain and promoting healing over a few weeks.



➤ **Azadirachta indica**

In Ayurveda, a paste of leaves and sesame seeds is applied to treat ulcers effectively. It's been used to protect against cold restraint stress against gastric ulcer in rats.



➤ **Ginseng**

Over time, this root has been used to address a range of health issues like weakness, heart conditions, blood disorders, sexual dysfunction, high blood pressure, liver problems, and digestive issues, as well as to alleviate symptoms related to aging, cancer, menopause, and cognitive decline.



➤ ***Annona squamosa***

In Ayurveda, the bark of *Bauhinia variegata* is used as a wash for ulcers, and a pill called *kanchanara guggula*, containing several ingredients including this bark, is taken daily for ulcer treatment, usually with a decoction of *Sphaeranthus mollis*, *Triphala*, or *catechu*.



➤ ***Swertia chirayita***

This substance, found in Ayurvedic medicine, has various uses: it's anti-inflammatory, helps with skin diseases, lowers blood sugar, aids digestion, fights malaria, and supports liver health.



➤ ***Zingiber officinale***

Ginger, from the *Zingiber officinale* Roscoe plant, is a traditional herbal remedy often used for treating digestive problems such as dyspepsia, nausea, and diarrhea..



➤ **Curcuma Longa**

Turmeric, or *Curcuma longa*, has been a traditional remedy for inflammation, gastritis, and gastric ulcers for generations.




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## Discussion

Diet's role in duodenal ulcers is limited, but a regimen including milk, butter, fruits, and vegetables is recommended. Studies are exploring neem's potential benefits due to its gastro-protective effects, possibly inhibiting histamine. Neem contains compounds like alkaloids and flavonoids, showing promise in treating ulcers, but further research is needed for a better understanding.

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## Conclusion

The research indicates that investigating plant-based sources for treatment can yield innovative and efficacious approaches, particularly in addressing gastrointestinal disorders such as ulcers. Given the current challenges in modern medicine for managing these ailments, there is a growing inclination towards exploring traditional medicine. Traditional remedies, supported by evidence from both traditional practices and scientific research, offer promising protocols for ulcer management. By integrating insights from Ayurveda with modern scientific methodologies, it becomes feasible to identify, characterize, and standardize active compounds from herbal sources for their antiulcer properties, potentially resulting in more potent drugs with reduced adverse effects.

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