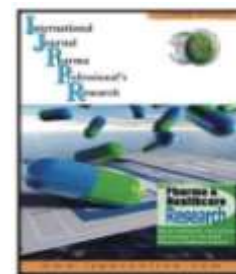




**INTERNATIONAL JOURNAL OF  
BIOPHARMACEUTICAL  
& TOXICOLOGICAL RESEARCH**



**A REVIEW ON MEDICINAL PLANT WHICH MAY EFFECTIVE IN THE TREATMENT OF ULCER OR WHICH SHOW ANTI ULCER ACTIVITIES**

**Avinash Saurabh\*, Anant Shekher Mishra, Sourabh Gupta**

Teerthanker Mahaveer College of Pharmacy, TMU, Moradabad, UP, INDIA

**Keywords:**

Peptic ulcer, Digestive system, NSAIDs, Species, Helicobacter pylori, Anti ulcer.

**Corresponding Author-**

Avinash Saurabh  
Teerthanker Mahaveer College  
of Pharmacy Teerthanker  
Mahaveer University  
Moradabad, UP  
Phone no:- +91-812-6561361  
Email id:-  
avinash.saurabh@gmail.com

**ABSTRACT:**

Herbal drug are traditional method of treating the disease in worldwide, the plant having ability to treat the diseases also known as medicinal plant. Several types of medicinal plants are existing in the nature and effective in different type of diseases. In this review of medicinal plant we are focusing on the medicinal plant classification and also included about the medicinal plant which has potential to treat peptic ulcer can say the drug having anti ulcer activities. Peptic ulcer is the disease of digestive system which affects the stomach, duodenum and jejunum. The excessive presence of acid and peptic activity in gastric juice plusa gets breakdown in mucosal defenses. NSAIDs and Helicobacter pylori infection these are two major factors that can disrupt the mucosal resistance to injury. The extract of herbal plant or whole plant or and part of plant has numerous therapeutic activities for the treatment of a variety of diseases. The main purposes for the treatment of peptic ulcer are to relive pain, healing of ulcer, and to minimize the reoccurrence of ulcer. About 75% of patients of peptic ulcer disease are due to infected by Helicobacter pylori. This article reviews drugs derived from herbal plant which are more commonly used in the world for treatment of peptic ulcer can say as anti-ulcer activity and having gastro- protective effects.

**Introduction:**

Herbal medicine -- also called botanical medicine or phytomedicine -- refers to using a plant's seeds, berries, roots, leaves, bark, or flowers for medicinal purposes. Herbalism has a long tradition of use outside

of conventional medicine. It is becoming more mainstream as improvements in analysis and quality control along with advances in clinical research show the value of herbal medicine in the treating and preventing disease.

**CLASSIFICATION OF MEDICINAL PLANTS [2]**

The 2,50,000 higher plant species on earth, more than 80,000 species are reported to have at least some medicinal value and around 5000 species have specific therapeutic value. They are classified according to the part used, habit, habitat, therapeutic value etc, besides the usual botanical classification.

**1. Based on part used:**

- |                 |  |
|-----------------|--|
| i) Whole plant: | <i>Boerhaavia diffusa</i> ,<br><i>Phyllanthus neruri</i>                 |
| ii) Root:       | <i>Dasamula</i>  |
| iii) Stem:      | <i>Tinospora cordifolia</i> , <i>Acorus calamus</i>                      |
| iv) Bark:       | <i>Saraca asoca</i>  |
| v) Leaf:        | <i>Indigofera tinctoria</i> , <i>Lawsonia inermis</i> , <i>Aloe vera</i> |
| vi) Flower:     | <i>Biophytum sensityvum</i> , <i>Mimusops elenji</i>                     |
| vii) Fruit:     | <i>Solanum species</i>   |
| viii) Seed:     | <i>Datura stramonium</i>   |

**2. Based on habit:**

- |              |                            |
|--------------|----------------------------|
| i) Grasses:  | <i>Cynodon dactylon</i>    |
| ii) Sedges:  | <i>Cyperus rotundus</i>    |
| iii) Herbs:  | <i>Vernonia cineria</i>    |
| iv) Shrubs:  | <i>Solanum species</i>     |
| v) Climbers: | <i>Asparagus racemosus</i> |
| vi) Trees:   | <i>Azadirachta indica</i>  |

**3. Based on habitat:**

- |                   |                                |
|-------------------|--------------------------------|
| i) Tropical:      | <i>Andrographis paniculata</i> |
| ii) Sub-tropical: | <i>Mentha arvensis</i>         |
| iii) Temperate:   | <i>Atropa belladonna</i>       |

**4. Based on therapeutic value:**

- |                        |  |
|------------------------|--|
| i) Antimalarial:       | <i>Cinchona officinalis</i> , <i>Artemisia annua</i>     |
| ii) Anticancer :       | <i>Catharanthus roseus</i> , <i>Taxus baccata</i>        |
| iii) Antiulcer :       | <i>Azadirachta indica</i> ,<br><i>Glycyrrhiza glabra</i> |
| iv) Antidiabetic :     | <i>Catharanthus roseus</i> , <i>Momordica charantia</i>  |
| v) Anticholesterol :   | <i>Allium sativum</i>                                    |
| vi) Antiinflammatory : | <i>Curcuma domestica</i> , <i>Desmodium gangeticum</i>   |
| vii) Antiviral :       | <i>Acacia catechu</i>                                    |
| viii) Antibacterial :  | <i>Plumbago indica</i>                                   |
| viii) Antifungal :     | <i>Allium sativum</i>                                    |
| ix) Antiprotozoal :    | <i>Ailanthus sp.</i> ,<br><i>Cephaelis ipecacuanha</i>   |

- |                         |  |
|-------------------------|--|
| x) Antidiarrhoeal :     | <i>Psidium guajava</i> ,<br><i>Curcuma domestica</i>         |
| xi) Hypotensive :       | <i>Coleus forskohlii</i> ,<br><i>Allium sativum</i>          |
| xii) Tranquilizing :    | <i>Rauwolfia serpentina</i>                                  |
| xiii) Anaesthetic :     | <i>Erythroxylum coca</i>                                     |
| xiv) Spasmolytic :      | <i>Atropa belladonna</i> ,<br><i>Hyoscyamus niger</i>        |
| xiv) Diuretic :         | <i>Phyllanthus niruri</i> ,<br><i>Centella asiatica</i>      |
| xv) Astringent :        | <i>Piper betle</i> , <i>Abrus precatorius</i>                |
| xvi) Anthelmentic :     | <i>Quisqualis indica</i> ,<br><i>Punica granatum</i>         |
| xvii) Cardiotoxic :     | <i>Digitalis sp.</i>   |
| xviii) Antiallergic :   | <i>Nandina domestica</i> ,<br><i>Scutellaria baicalensis</i> |
| xix) Hepatoprotective : | <i>Silybum marianum</i> ,<br><i>Andrographis paniculata</i>  |

**5. Based on Ayurvedic formulations in which used:****a) The ten roots of the Dasamoola (Dasamoolam):**

- |  |
|--|
| i) <i>Desmodium gangeticum</i> (Orila)       |
| ii) <i>Uraria lagopoides</i> (Cheria orila)  |
| iii) <i>Solanum jacquinii</i> (Kantakari)    |
| iv) <i>Solanum indicum</i> (Cheruchunda)     |
| v) <i>Tribulus terrestris</i> (Njerinjil)    |
| vi) <i>Aegle marmelos</i> (Koovalam)         |
| vii) <i>Oroxylum indicum</i> (Palakapayyani) |
| viii) <i>Gmelina arborea</i> (Kumizhu)       |

- |   |
|---|
| ix) <i>Steriospermum suaveolens</i> (Pathiri) |
| x) <i>Premna spinosus</i> (Munja)             |

**b) The ten flowers of the Dasapushpa (Dasapushpam):**

- |  |
|--|
| i) <i>Biophytum sensitivum</i> (Mukkutti)      |
| ii) <i>Ipomea maxima</i> (Thiruthali)          |
| iii) <i>Eclipta prostrata</i> (Kayyuniyam)     |
| iv) <i>Vernonia cineria</i> (Poovamkurunnil)   |
| v) <i>Evolvulus alsinoides</i> (Vishnukranthi) |
| vi) <i>Cynodon dactylon</i> (Karuka)           |
| vii) <i>Emelia sonchifolia</i> (Muyalcheviyan) |
| viii) <i>Curculigo orchioides</i> (Nilappana)  |
| ix) <i>Cardiospermum halicacabum</i> (Uzhinja) |
| x) <i>Aerva lanata</i> (Cherula)               |

**c) The four trees of the Nalpamara (Nalpamaram):**

- |                                      |
|--------------------------------------|
| i) <i>Ficus racemosa</i> (Athi)      |
| ii) <i>Ficus microcarpa</i> (Ithi)   |
| iii) <i>Ficus relegiosa</i> (Arayal) |

iv) *Ficus benghalensis* (Peral)

**d) The three fruits of the Triphala (*Thriphalam*):**

i) *Phyllanthus emblica* (Nellikka)

ii) *Terminalia bellerica* (Thannikka)

iii) *Terminalia chebula* (Kadukka)

Rubiaceae	35	118
Euphorbiaceae	30	104
Asclepiadaceae	29	101

**Plant species with therapeutic value under different plant groups: [3]**

Plant species group	no. of plant having therapeutic value
Thalophytes	230
Bryophytes	39
Pteridophytes	382
Gymnospermae	55
Angiospermae:	
Monocotyledones	676
Dicotyledones	3495
Total	4877

**Plant families containing over 100 species with therapeutic value: [3]**

Family	Genera	Species
<b>I. Monocots</b>		
Liliaceae	45	165
Orchidaceae	45	135
<b>II. Dicots</b>		
Compositae	89	331
Leguminosae	91	313
Ranunculaceae	31	208
Laminaceae	46	189
Rosaceae	28	146
Umbelliferae	34	123

**Major plant drugs for which no synthetic one is currently available : [4,5]**

Drug	Plant	use
Vinblastine	Catharanthus roseus	Anticancer
Ajmalacine	Catharanthus roseus	Anticancer, hypotensive
Rescinnamine	Rauvolfia serpentina	Tranquilizer
Reserpine	Rauvolfia serpentina	Tranquilizer
Quinine	Cinchona sp.	Antimalarial, amoebic dysentery
Pilocarpine	Pilocarpus jaborandi	Antiglucoma
Cocaine	Erythroxylum coca	Topical anaesthetic
Morphine	Papaver somniferum	Painkiller
Codeine	Papaver somniferum	Anticough
Atropine	Atropa belladonna	Spasmolytic, cold
Atropine	Hyoscyamus niger	Spasmolytic, cold
Cardiac glycosides	Digitalis sp.	For congestive heart failure
Artemisinin	Artemisia annua	Antimalarial,
Taxol	Taxus baccata	Breast and ovary cancer
	T. brevifolia	antitumour
Berberine	Berberis	leishmaniasis
Pristimerin	Celastrus paniculata	Antimalaria
Quassinoids	Ailanthus	Antiprotozoal
Plumbagin	Plumbago indica	Antibacterial, antifungal
Diospyrin	Diospyrin	
Gossypol	Gossypium sp.	Antispermatogetic

Allicin	Allium sativum	Antifungal, amoebiasis
Ricin	Ricinus communis	
Emetine	Cephaelis ipecacuanha	Amoebiasis
Glycyrrhizin	Glycyrrhizia glabra	Antiulcer
Nimbidin	Azadirachta indica	Antiulcer
Catechin	Acacia catechu	Antiulcer
Sophoradin	Sophora subprostrata	Antiulcer
Magnolol	Magnolia bark	Peptic ulcer
Forskolin	Coleus forskohlii	Hypotensive, cardiotonic
Digitoxin, Digoxin	Digitalis, Thevetia	Cardio tonic
Nerrifolin	Thevetia	Cardio tonic
Podophyllin	Podophyllum emodi	Anticancer
Indicine	N-oxide Heliotropium indicum	Anticancer
Elipticine	Ochrosia	Anticancer
Homoharringtonine	Cephalotaxus	Anticancer
Camptothecine	Camptotheca acuminata	Anticancer

**Peptic ulcer:** Peptic ulcer also known as PUD or peptic ulcer disease, this is the most common ulcer of an area of the gastrointestinal tract that is usually acidic and thus extremely painful. It is defined as mucosal erosions equal to or greater than 0.5 cm. As many as 70–90% of such ulcers are associated with *Helicobacter pylori*, a spiral-shaped bacterium that lives in the acidic environment of the stomach. Ulcers can also be caused or worsened by drugs such as aspirin, Plavix (clopidogrel), ibuprofen, and other NSAIDs. Four times as many peptic ulcers arise in the duodenum—the first part of the small intestine, just after the stomach—as in the stomach itself. About 4% of stomach ulcers are caused by a malignant tumor, so multiple biopsies are needed to exclude cancer. Duodenal ulcers are generally benign. [6, 7, 10]

**Classification of peptic ulcer:** [6,7,8]

#### A) Ulcer by Region/Location

- Duodenum (called duodenal ulcer)
- Oesophagus (called esophageal ulcer)
- Stomach (called gastric ulcer)

- Meckel's diverticulum (called Meckel's diverticulum ulcer; is very tender with palpation)

#### B) Modified Johnson Classification of peptic ulcers:

- Type I: Ulcer along the body of the stomach, most often along the lesser curve at incisura angularis along the locus minoris resistentiae.
- Type II: Ulcer in the body in combination with duodenal ulcers. Associated with acid oversecretion.
- Type III: In the pyloric channel within 3 cm of pylorus. Associated with acid oversecretion.
- Type IV: Proximal gastroesophageal ulcer
- Type V: Can occur throughout the stomach. Associated with chronic NSAID use (such as aspirin).

A major causative factor (60% of gastric and up to 90% of duodenal ulcers) is chronic inflammation due to *Helicobacter pylori* that colonizes the internal mucosa. The immune system is unable to clear the infection, despite the appearance of antibodies. Thus, the bacterium can cause a chronic active gastritis (type B gastritis), resulting in a defect in the regulation of gastrin production by that part of the stomach, and gastrin secretion can either be increased, or as in most cases, decreased, resulting in hypo- or achlorhydria. Gastrin stimulates the production of gastric acid by parietal cells and, in *H. pylori* colonization responses that increase gastrin, the increase in acid can contribute to the erosion of the mucosa and therefore ulcer formation. [6,7,8,10]

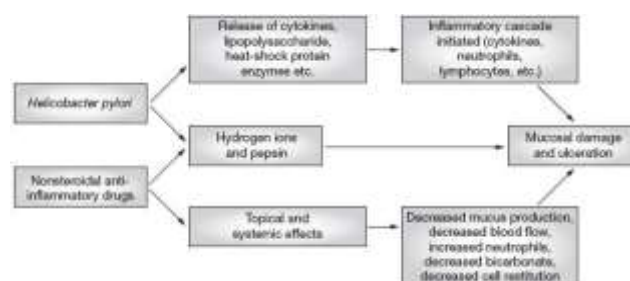


Figure 01: *Helicobacter pylori* and non-steroidal anti-inflammatory drugs have synergistic effects on gastric mucosal damage. Both *H. pylori* infection and NSAID use have been found to independently and significantly increase the risk of gastric and

duodenal mucosal damage and ulceration. H. pylori and NSAIDs act synergistically through pathways of inflammation in the development of ulcers and in ulcer bleeding.<sup>[9]</sup>

**Anti ulcer drugs:** Antiulcer drugs are a class of drugs, exclusive of the antibacterial agents, used to treat ulcers in the stomach and the upper part of the small intestine. Recurrent gastric and duodenal ulcers are caused by Helicobacter pylori infections, and are treated with combination treatments that incorporate antibiotic therapy with gastric acid suppression. The anti ulcer activities may be

attained by the synthetic drug as well as medicinal plant source which contains there active chemical constituents (eg. Flavonoids, Terpenoids, Tannins etc)

**Herbal drugs with anti-ulcer activity:** In current research scenario the natural medicines derived from the traditional knowledge of plant pharmacological properties. Large number of medicinal plants and dietary nutrients has been shown to posses gastro-protective activity.<sup>[11]</sup>

**Plants with anti-ulcer activity:**<sup>[11]</sup>

Sl no.	Botanical Name	Family	synonyms	Part used	Active constituents	Medicinal Use
01	Aloe Vera	Liliaceae	Gritkumari	Leaves	Barbaloin, isobarbolin, saponins.	Laxative, Wound healing, Skin burns & care, Ulcer.
02	Terminalia Chebula	Combretaceae	Harida	Seed	Tannins, gallic acid, chebulinic acid, sorbitol.	wound ulcer, leprosy, inflammation
03	Terminalia Bellerica	comretaceae	Bahada	Seed, Bark	Tannins, galic acid, ellagic acid	Cough, Insomnia, Dropsy, Vomiting, Ulcer
04	Vetiveria Ziziinoides	Toaceae / Graminae	Benachar	Root	Phenolic compounds, pods contain saponin protein, flavonoids.	Hyperdisia, Burning, ulcer, Skin, Vomiting
05	Napoleona vogelli hook	Lecythidaceae	Bori-bori	leaf	Carbohydrates, tannins, terpenes, Resins, Steriods, alkaloids, Flavonoids	Cough, asthma, antiulcer, gactro-protective

06	<i>Ficus arnottiana</i> Miq.	Moraceae	paras papal	leaf	$\beta$ sitosterol, gluanol acetate and glucose, Sterols, alkaloids, carbohydrates, tannins, phenols	useful in inflammation, diarrhoea, diabetes, burning sensation, leprosy, scabies, wounds and skin diseases, ulcer
07	<i>Nigella sativa</i> Linn	Ranunculaceae	Black cumin	Seed	alkaloids nigellicin, nigellidin, quanzoline, tannin, steroid $\alpha$ -spinasterol, campesterol	diuretic, hypoglycemic, anti-tumor. antiulcer
08	<i>Jatropha curcas</i> Linn	<u>Euphorbiaceae</u>	Ratanjot	Leaves	phenolic compounds, saponin, flavonoids.	rubefacient, suppurative, insecticidal and in foul ulcers, tumors and scabies, given internally in jaundice
09	<i>Manilkara hexandra</i> Roxb	Sapotaceae	Khirmi	bark	phenolic compounds, saponin, protein, flavonoids	cures leprosy, ulcers, leucoderma,
10	Ginseng	<u>Araliaceae</u>	Ninjin	Root, leaf-stem.	Polysaccharides, tri-terpenoids, flavonoids, volatile oils, peptides, amino acids, fatty acids.	anti-fatigue, anti-hyperglycemic, anti-obesity, anti-cancer, anti-oxidant and anti-aging, anti-ulcer

11	<i>Falcaria vulgaris</i>	<i>Umbelliferae</i>	Ghazzyaghi	seeds	tannin and saponin	skin ulcer, stomach disorders including peptic ulcer, liver diseases and stones of kidney and bladder
12	<i>Basella rubra</i>	Basellaceae	Mohini	leaf	saponin, protein, flavonoids	Antiulcer
13	<i>Nerium indicum</i> Mill	Apocynaceae	Kaner	Leaves roots	phenolic compounds, flavonoids	Chancre, ulcers and Leprosy
14	<i>Acacia nilotica</i> Delile	Fabaceae	Kikar	Bark tender leaves, pods	phenolic compounds, tannins, flavonoids	Anti-ulcers Sore throat and toothache diarrhea and dysentery urogenital diseases
15	<i>Albizia lebbek</i>	Fabaceae	Indian saris, sirisha, sirsa	Leaves, bark flowers	phenolic compounds, saponin protein, flavonoids	Boils, eruptions and swellings Leprous ulcers
16	<i>Anethum chyrseum</i>	Apiaceae	-----	leaves	triterpenoids, flavonoids	Antiulcer, ant toxicity
17	<i>Ageratum conyzoides</i>	Aeteraceae	Billy goat weed	leaves	Flavonoids	Antiulcer, wound healings, leprosy, anti-inflammatory



18	Glycyrrhiza glabra)	Leguminosae	Liquorice	root and rhizome	glycyrrhizinic acid, a triterpenoid saponin	anti-ulcer activity
19	Capsicum	Solanaceae	chilli or paprika	fruit	Tri-terpenoid saponin	flatulent dyspepsia, chronic laryngitis, anti-ulcer
20	Alpinia galangal	Zingiberaceae	Galanga Root	Rhizome	Tri-terpenoid saponin	
21	Spathodea falcata	Bignoniaceae Juss	-----	Leaves	terpenoids and steroids	antiulcer, antipyretic and anti-inflammatory agent
22	Kochia scoparia	<u>Amaranthaceae</u>	-----	Fruit	phenolic compounds, saponin protein, flavonoids	antiulcer, antipyretic and anti-inflammatory agent
23	Panax japonicus	<u>Araliaceae</u>	Japanese ginseng	Rhizome	phenolic compounds, saponin, flavonoids	Antiulcer, leprosy, anti-inflammatory
24	Panax binnatidus	----- --	-----	Rhizome	phenolic compounds, protein, flavonoids	antiulcer, antipyretic and anti-inflammatory agent
25	Calendula officinalis	Asteraceae	Common Marigold	Rhizome	phenolic compounds, saponin protein, flavonoids	antiulcer, antipyretic and anti-inflammatory agent
26	Calliandra portoticensis	Leguminosae- Mimosodideae	Mimosa portoricensis Jacq	Leaves	phenolic compounds, saponin protein, flavonoids	Antiulcer, leprosy, anti-inflammatory
27	Bauhinia racemosa	Caesalpinia ceae	-----	Flower buds	phenolic compounds, flavonoids	Antiulcer, anti-inflammatory



28	Cassia nigrans	Fabaceae- Caesalpinioi deae	Chamaecrist a nigricans (Vahl) Greene	Leave s	Flavonoids	Antiulcer, leprosy, anti- inflammat ory
29	Swertia chirata	Gentianacea e	Chiraito	Whol e plant	tannin, flavonoids	Antiulcer, anti- inflammat ory
30	Curcuma longa	Zingiberace ae	Haldi	Rhizo me	phenolic compounds, tannins, flavonoids	Antiulcer, wound healings, anti- inflammat ory
31	Zingiber offcinalis	Zingiberace ae	Ginger	Root	phenolic compounds, flavonoids	Antiulcer
32	Azadirachta indica	Meliaceae	Neem	Leave s	phenolic compounds, saponin protein, flavonoids	Antiulcer, wound healings, leprosy, anti- inflammat ory

## CONCLUSION:

From this review on “Medicinal/Herbal plant which may effective in the treatment of ulcer or which show anti ulcer activities” we can say that the medicinal plant have a vital role against many diseases as shown in the table (the medicinal plant that have not available in any synthetic form). There are various medicinal plant and there extracts (contain active chemical constituents eg: tannins flavonoids etc.) have significant antiulcer activity in in- vivo experiment on animal models. It has mucoprotective activity and gastric anti-secretary when compared with that of reference drugs. The extracts are non-toxic even at relatively high concentrations. The antiulcer activity is probably due to the presence of flavonoids in all this plants. The above-mentioned medicinal plants could prevent ulcer in rats in a dose-dependent manner. A variety of botanical products have been reported to possess antiulcer activity; finally, it should be noted that

substances such as flavonoids and tannins that possess antiulcer activity are of particular therapeutic importance. The antiulcer activity of the drug can be attributed to free-radical scavenging property, inhibition of acid secretory parameters and strengthening of gastric mucosal barrier. The results of this study indicate that extracts of leaves and plants extracts of some medicinal plant have good potentials for use in peptic ulcer disease. It is concluded from this study that the drug may possesses antiulcer activity in different gastric ulcer models if used in the animal model.

## REFERENCES:

01. <http://www.umm.edu/altmed/articles/herbal-medicine-000351.htm>
02. Joy P.P., Thomas J., Mathew S., Saaria P.Baby, “medicinal plant”, Kerala agricultural

- university aromatic and medicinal plants research station, 1998, 10-11
03. Jiaxiang, S. 1997. Introduction to the Chinese Materia Medica. In UNDP, 1997
  04. Kumar, N., M. Abdul Khader, J. B. M., Rangaswami, P. and Irulappan, I., “Introduction to Spices, Plantation Crops, Medicinal and Aromatic Plants”, Oxford and IBH Publishing Co. Pvt. Ltd., New Delhi. 1997.
  05. Kumar, S., Shukla, Y. N., Lavania, U. C., Sharma, A. and Singh, A. K. 1997. Medicinal and Aromatic Plants: Prospects for India. *J. Med. Arom. Pl. Sc.* 19 (2):361-365.
  06. [http://en.wikipedia.org/wiki/Peptic\\_ulcer#cite\\_ref-10](http://en.wikipedia.org/wiki/Peptic_ulcer#cite_ref-10)
  07. Perez-Aisa MA et al. (2005) Clinical trends in ulcer diagnosis in a population with high prevalence of *Helicobacter pylori* infection. *Aliment Pharmacol Ther* 21: 65–72
  08. Ikuko Kato, Abraham M. Y. Nomura, Grant N. Stemmermann and Po-Huang Chyou, “A Prospective Study of Gastric and Duodenal Ulcer and Its Relation to Smoking, Alcohol, and Diet”, *American Journal of Epidemiology*, Volume135, Issue5, 1991,521-530
  09. Yuhong Yuan, Ireneusz T Padol and Richard H Hunt, “Peptic ulcer disease today”, *natural clinical practice gastroenterology & hepatology*, nature publishing group, 2006, volume 3, 81-82.
  10. Ikuko Kato, Abraham M. Y. Nomura, Grant N. Stemmermann and Po-Huang Chyou, “A Prospective Study of Gastric and Duodenal Ulcer and Its Relation to Smoking, Alcohol, and Diet”, *American Journal of Epidemiology* Volume135, Issue5, 521-530.
  11. Gadekar R, Singour PK, Chaurasiya PK, Pawar RS, Patil UK. A potential of some medicinal plants as an antiulcer agents. *Phcognocy Review* 2010;4:136-46