International Journal of Herbal Medicine
Available online at www.florajournal.com

E-ISSN: 2321-2187
P-ISSN: 2394-0514
www.florajournal.com
IJHM 2025; 13(4): 124-130
Received: 06-06-2025
Accepted: 04-07-2025

Snehal P Kohale
Shri Swami Samarth Institute of Pharmacy, Parsodi, Dhamangaon Rly, Amravati, Maharashtra, India

Jitendra A Kubde
Shri Swami Samarth Institute of Pharmacy, Parsodi, Dhamangaon Rly, Amravati, Maharashtra, India

Pooja R Hatwar
Shri Swami Samarth Institute of Pharmacy, Parsodi, Dhamangaon Rly, Amravati, Maharashtra, India

Ravindra L Bakal
Shri Swami Samarth Institute of Pharmacy, Parsodi, Dhamangaon Rly, Amravati, Maharashtra, India

Rutik N Sapkal
Shri Swami Samarth Institute of Pharmacy, Parsodi, Dhamangaon Rly, Amravati, Maharashtra, India

Corresponding Author:
Snehal P Kohale
Shri Swami Samarth Institute of Pharmacy, Parsodi, Dhamangaon Rly, Amravati, Maharashtra, India

Medicinal plants with anti-ulcer properties: A review

Snehal P Kohale, Jitendra A Kubde, Pooja R Hatwar, Ravindra L Bakal and Rutik N Sapkal

DOI: https://www.doi.org/10.22271/flora.2025.v13.i4b.1006

Abstract
Health comprises of balanced state of Dosha, Dhatu, Mala and Agni. For digestion process balanced Jatharagni is immensely important. Root cause of all diseases is diminished Jatharagni, so it is important to correct the Jatharagni if it gets disturbed. For this purpose Deepan and Pachan Dravyas are recommended. Both these Dravyas modify and balances state of Jatharagni, improves digestive secretions, facilitates peristaltic movements etc. Though the action of Deepan and Pachan Dravyas appears to be similar, it is very necessary to differentiate Deepan and Pachan Karma on physiological basis.

Keywords: Peptic ulcer, medicinal plants, Anti-ulcer properties, gastric ulcers

Introduction
An ulcer is an inflammatory rupture in the mucous membrane or skin that lines the digestive track. When the natural balance is upset by increased aggression or decreased mucosal resistance, ulceration results [1]. Ulcer is an imbalance between defensive forces like prostaglandins, bicarbonate secretion, and gastric mucus, intrinsic resistance of the mucosal cell components and aggressive factors like acid, pepsin, and Helicobacter pylori causes peptic ulcers, a gastro-intestinal disease. Peptic ulcers typically occur when aggressive elements outweigh defensive ones [2]. Any area of the gastrointestinal system that has been subjected to the forceful action of acid-peptic fluids might form peptic ulcers, which are persistent and typically isolated lesions. The most frequent locations for peptic ulcers are the first segment of the duodenum and the lesser curvature of the stomach, which are referred to as duodenal and gastric ulcers, respectively [3]. Infection of gastrointestinal mucosal tissue by Helicobacter pylori has also been linked in recent years to gastric ulcers. Eliminating Helicobacter pylori appears to be a cure for peptic ulcer disease, which affects about 70% of people with the infection [4].

A frequent gastrointestinal condition that causes mental anguish and disrupts everyday routines, ulcers bring a great deal of distress to patients. It is typically more prevalent in people who are constantly rushing, anxious, and curry-eating [5]. Traditional medicine has utilized a variety of Jordanian and Iraqi medicinal herbs for their hypoglycemic and anti-ulcer properties [6]. One of the earliest documented medical practices is herbal therapy. Thirteen medications connected to natural products were approved between 2005 and 2007, and approximately half of the medications approved between 1998 and 2007 were based on natural products. Many natural products show strong action against this condition without severe negative effects when compared to synthetic anti-ulcer drugs. Traditionally, a number of medicinal herbs have been widely utilized to cure stomach ulcers [7]. Many medicinal plants used to treat the signs and symptoms of stomach diseases were found in this region's ethno pharmacological inventory [8].

Strengthening defensive mechanisms are the goals of peptic ulcer treatment. Relieving pain, healing the ulcer, and preventing recurrence are the ideal goals of peptic ulcer disease treatment. Peptic ulcers can be treated with a variety of medications, such as proton pump inhibitors and H2 receptor antagonists; however, clinical examination of these medications has revealed relapse rates, adverse effects, and drug interactions [10]. While there are many chemical agents available to treat peptic ulcers, they come with serious side effects. For example, H2 antagonists can cause impotence, headaches, skin rashes, and arrhythmias, while proton pump inhibitors can cause hyper gastrinemia and atrophic gastritis without warning.

Other medications, such as antic1holinergics, cause constipation, dry mouth, urine retention, impaired vision, xerostomia, and the onset of glaucoma. Antacid usage causes stomach distention, belching, and constipation, and there is a risk of ulcer perforation [11].

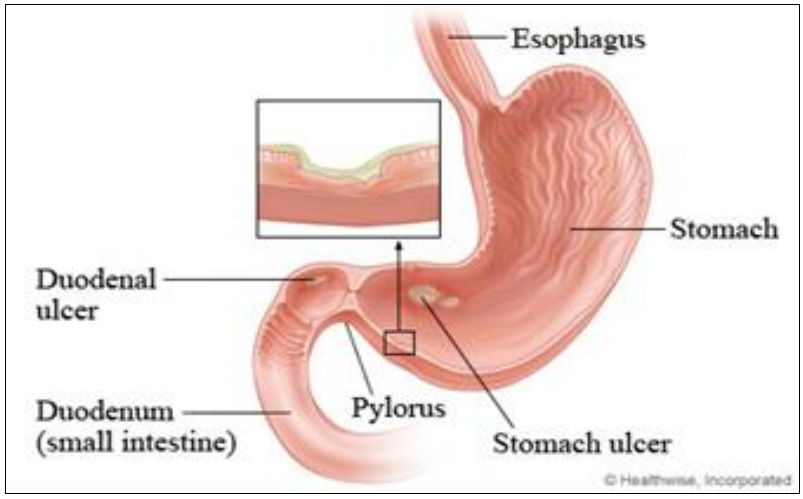

Fig 1: Peptic ulcer [9]

Common forms of peptic ulcer: [12]

1. Duodenal ulcers (DU)
2. Gastric ulcers (GU)
3. Stress ulcers (SU)
4. NSAID induced ulcers
5. Recurrent oral ulceration.

A chronic disease that affects people's quality of life and is linked to rising rates of morbidity and mortality is Peptic Ulcer Disease (PUD). According to reports, 50% of people suffer with dyspepsia, and 10% of adults will experience it at some point in their lives [13]. Despite lowering morbidity and mortality, many medications used to treat peptic ulcers can cause a number of negative side effects, including arrhythmias, impotence, gynecomastia, and alterations in hematopoietic function. As a result, the treatment of peptic ulcers remains inadequate [14].

Because herbal medicine is more culturally acceptable, more compatible with the human body, and has less negative effects, 75-80% of people worldwide still utilize it for primary healthcare in this day and age, primarily in underdeveloped nations [15]. Ayurveda, the traditional Indian medical system, values all of the selected plants for their numerous health advantages.

The name Ayurveda, which combines the Sanskrit words "Ayu" (life) and "Veda" (knowledge), refers to a comprehensive medical system that was created in India more than 5,000 years ago and uses a constitutional model to help individuals become healthier [16]. Many ancient societies and tribal groups employ *Centella asiatica* (Linn.) as an ethno medical herb in many places [17].

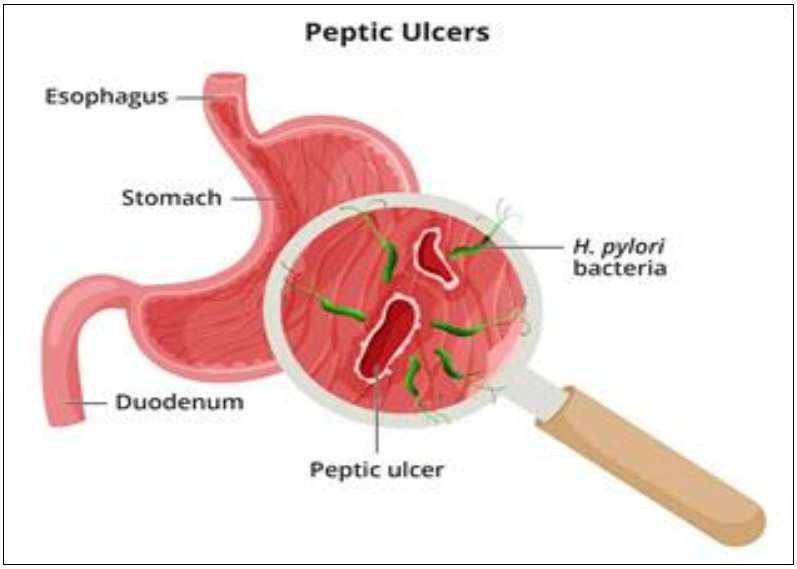

Fig 2: Peptic ulcer due to H. pylori [18]

Worldwide, the use of phyto therapeutic medications for main or secondary medical care is growing [19]. Thousands of individuals suffer from gastric and duodenal ulcers, which are now regarded as a worldwide health issue [20]. Natural products either as pure chemicals or as standardized plant extracts provide infinite chances for finding novel medications [21].

Gastric ulcer (GC) arise from continuous erosions and destruction of the stomach wall that might become perforated and progressed into peritonitis and large hemorrhage as a

result of inhibition in the manufacture of mucus, bicarbonate and prostaglandins [22]. Various therapeutic treatments, such as plant extracts, are utilized to increase the mucosal defensive mechanism or restrict stomach acid secretion in order to restore equilibrium [23]. According to western medicine, ulcers are gastrointestinal mucosal defects that pierce the muscularis mucosa [24]. A number of natural medications have been shown to have anti-ulcerogenic properties due to their strong influence on mucosal defense mechanisms [25]. A number of medication types are being used to treat ulcers in an effort to rebalance the protective and aggressive elements that contribute to ulcer development [26]. Reducing stomach acidity and fortifying the stomach mucosal barrier are the usual treatments for gastric ulcers [27]. One of the most dangerous gastrointestinal conditions in the world, peptic ulcer disease significantly affects morbidity. Approximately 8% of all prescriptions are for medications used to treat GIT issues. The cost of treating ulcer disease is also significantly impacted by drug resistance [28].

In this way, medicinal plants also have a huge market for themselves in our ultimate goal of providing healing contact to the sick person [29]. A wealth of novel, safer, and more potent antiulcer medicines may be found in natural goods [30]. Histamine H2-antagonists, proton pump inhibitors, and antimuscarinics are the mainstays of the modern medical treatment for peptic ulcers. Additionally, acid-independent therapy is offered by sucralfate and bismuth cholinergics [31]. Gastric ulcers are caused due to imbalance between attacking and protective factors of gastric mucosa [32].

For thousands of years, the ancient medical system (Ayurveda) has utilized a variety of medicinal plants to treat a wide range of illnesses, including peptic ulcers, cancer, diabetes, arthritis, hepatitis, acute and chronic inflammations, neurological diseases, and more [33]. A wide variety of plants used in traditional medicine are recognized to have antiulcer characteristics. These plants may be exploited to create new and improved antiulcer medications by potential chemical manipulation [34]. The goal of drug treatment for peptic ulcers is to either stimulate the mucosal defenses or inhibit the aggressive element [35]. Because of their natural origin and significant therapeutic implications, the usage of medicinal plants has increased globally [36]. Industries are very interested in using plant tissue culture technologies to produce secondary metabolites on a large scale because of their great economic and medicinal significance [37].

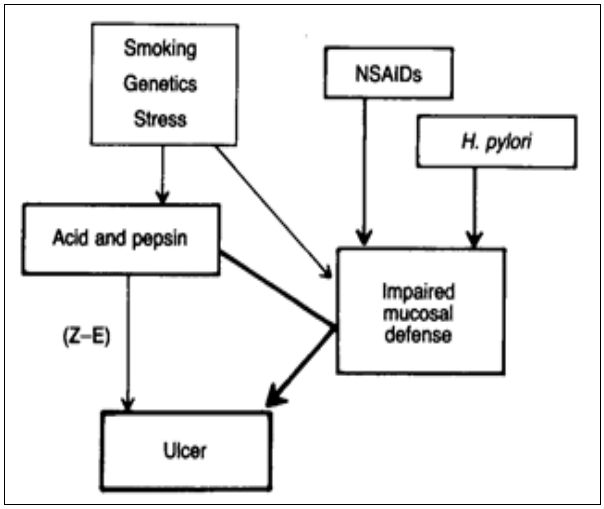

Fig 3: Pathogenesis of peptic ulcer [38]

One of the most prevalent gastrointestinal conditions, peptic ulcer disease has a high risk of morbidity, especially among people in less developed nations [39]. Medicinal plants have been used to treat diseases for as long as people have existed [40]. There is an abundance of therapeutic plants on Mother Earth. They are significant producers of novel compounds with advantageous medicinal properties [41]. To find novel natural anti-ulcer treatments, a broad search has been initiated. Herbs, vegetables, spices, medicinal plants, and unrefined pharmaceutical ingredients are thought to be potential sources of treatment for a number of illnesses, including stomach ulcers [42]. Carbohydrates, flavonoids, amino acids, steroids, saponins, and tannins are all found in plant bark [43]. For thousands of years, people have utilized plants as medicine [44]. Because of its traditional and medical uses for treating severe ulcers, gastritis, and stomachaches, the plant has been regarded as ethonobotanically significant [45]. The *catharanthus roseus* plant's alkaloids, vincamine and vindoline, demonstrated anti-ulcer properties [46].

The pathophysiology of gastric ulcers, the most prevalent GIT condition, includes multiple functional reasons [47]. Several plants and herbs have been used in traditional Indian medicine to heal stomach ulcers and other gastrointestinal ailments [48]. The most common condition affecting the GI tract is peptic ulcer [49]. An excoriated portion of the duodenum or stomach mucosa brought on by the action of the gastric juice is known as a peptic ulcer [50]. The jejunum, distal duodenum, and lower oesophagus could be impacted [51]. One of our ongoing programs, which tests extracts, fractions, and isolated chemicals from indigenous medicinal plants for anti-ulcer activity, is interested in the plant's efficacy in treating gastrointestinal ulcers [52].

The anti-ulcer properties most likely work by increasing intragastric mucous secretion and decreasing gastric acid secretion [53]. Antiulcer medications can also be found in plants. In the 1960s, a medication known as carbenoxolone was used to treat peptic ulcers in a modern manner [54]. One of the most significant aspects of people's culture and traditions is the use of plant-based medications. The majority of people on the planet now rely on plant-based medications for their basic medical needs [55]. It is well recognized that non-steroidal anti-inflammatory medicines (NSAIDs), including indomethacin, can result in stomach ulcers, particularly when misused [56]. As one of the most common gastrointestinal

conditions, peptic ulcers continue to be a major issue for researchers and healthcare professionals. Many medications are being sought after as a result, providing improved and more recent alternatives for the treatment of peptic ulcers [57].

2. Medicinal plants that having antiulcer property

2.1 *Aloevera* (L.) Burm F

Fig 4: *Aloevera* [58]

- **Family name**: Liliaceae
- **Common name**: Aloevera
- **Parts used**: Leaf
- **Active constituent**: Saponin, barbaloin, isobarbaloin

Roles in Human body

Detoxification, laxative, wound healing, skin burns care, antiulcer, cytoprotective, anti-fungal, hepatoprotective, immunostimulator, mucus secreting and anti-diabetic [13].

Antiulcer property: The plant's anti-ulcer properties have been documented in an ulcer model caused by Indomethacin. The plant's antioxidant, anti-inflammatory, mucus-secreting, cytoprotective, or healing properties are the mechanism that produces its antiulcer efficacy. The plant's pharmacological properties include wound healing, immunomodulation, antifungal, hepatoprotective, hypoglycemia, and hypolipidemic effects [2].

2.2 Glycyrrhiza glabra

Fig 5: *Glycyrrhiza glabra* [59].

- **Family name:** Fabaceae
- **Common name**: Liquorice, mulathi
- **Parts used:** Roots, rhizomes and stolon's

Active constituents: Flavonoids (Glabrol, Liquritin), Isoflavones (Glabridin, Glabrene), Coumarines (Liquocoumarin) and chalcones (isoliquiritin).

Roles in Human body: Diuretic, antioxidant activities, laxative, sedative, anxiolytic, antimicrobial, antiviral, anti-inflammatory, analgesic, antineoplastic, anticonvulsant action and antipyretic [13].

Antiulcer property: Glycyrrhizinic acid, a triterpenoid saponin, is the main ingredient in liquorice. It is well recognized that this class of chemicals provides ulcer prevention [4].

2.3. *Curcuma longa*

Fig 6: *Curcuma longa* [60]

Family name: Zingiberaceae

Common name: Turmeric, Haldi

Parts used: Rhizome (brownish yellow in colour) Active constituent: Flavonoids, curcumin, phenolic compounds, tannins, zingiberene, borneol, cineol and sabinene.

Roles in Human body: Anti-inflammatory, wound healing, anti-oxidant, anti-fungal, anti-bacterial, anti-venom, anti-protozoan, hypolipemic, hypoglycaemic, anti-coagulant, anti-carcinogenic and prevention of gastric ulcer [13].

Antiulcer property: Studies have been conducted to assess the antiulcer properties of turmeric in the duodenum and stomach [2]. In rats administered Indomethacin, Reserpine, pyloric ligation, and hypothermic restraint stress, ethanol extract demonstrated strong anti-ulcerogenic action [24].

2.4. *Ficus religiosa*

Fig 7: *Ficus religiosa* [61]

- **Family name**: Moraceae
- **Common name**: Peepal, Asvatthah
- **Parts used:** Bark, leaves, Fruit, Seeds
- **Active constituent:** Saponins, tannins and flavonoids

Roles in Human body: Anti diabetic, antiulcer, anti-amnesic, anti-microbial, anti-inflammatory, anti-convulsant, anti-asthmatic, anti-anxiety, anti-cancer and also used for menorrhagia, dysentery, diarrhoea, haemorrhoids, anti-lipid peroxidation and gastrohelcosis [13].

Antiulcer property: Additionally, there was possible antiulcer action evident in the ethanolic extract of F. Religiosa stem bark. F. Religiosa's antiulcer properties were assessed *in vivo* using the pylorus ligation assay, indomethacin-induced stomach ulcers, and cold-restrained stress [11].

2.5. Catharanthus roseus (L.)

Fig 8: *Catharanthus roseus* [62]

Family name: Apocynacea

Common name: periwinkle, pink flowered “Rosea”, and white flowers “Alba”.

Parts used: Flower, leaves, fruit.

Active constituents: *Vinblastin, Vincrestine, Vindesine, Vindeline, Tabersonine*, flavonoids, carbohydrates, vinceine, *vineamine, raubasin*, reserpine, *catharanthine saponin*.

Roles in the human body: Anti-cancer, anti-diabetic, anti-microbial, anti-oxidant, anti-helminthic, anti-ulcer, hypotensive, anti-diarrheal, wound healing, hypolipidemic, memory enhancement.

Antiulcer property: The plant's alkaloids, vincamine and vindoline, have anti-ulcer properties. The plant leaves contain an alkaloid called vincamine, which has neuroprotective and cerebrovasodilatory properties [46].

3. Conclusion

Medicinal plants with anti-ulcer properties offer a promising alternative therapy for the treatment of peptic ulcers. The use of natural remedies, such as *Aloevera, Glycyrrhiza glabra, Curcuma longa, Ficus religiosa,* and *Catharanthus roseus*, has shown potential in reducing gastric acid secretion, promoting wound healing, and increasing mucosal defense. These plants have been traditionally used to treat various health issues, including gastrointestinal problems, and their active constituents contribute to their anti-ulcer properties. Given the limitations and side effects associated with conventional treatments, the use of medicinal plants as an alternative therapy for peptic ulcers is worth exploring further. Further research is needed to fully understand the mechanisms of action and to develop effective and safe treatments for peptic ulcers. The potential of medicinal plants in treating peptic ulcers highlights the importance of preserving traditional knowledge and promoting further research in this area.

4. References

1. Gadekar R, Singour PK, Chaurasiya PK, Pawar RS, Patil UK. A potential of some medicinal plants as an antiulcer agents. Pharmacognosy Reviews. 2010;4(8):136-146.
2. Srinivas TL, Lakshmi SM, Shama SN, Reddy GK, Prasanna KR. Medicinal plants as anti-ulcer agents. Journal of Pharmacognosy and Phytochemistry. 2013;2(4):91-97.
3. Bhoumik D, Masresha B, Mallik A. Antiulcer properties of herbal drugs: A review. International Journal of Biomedical Research. 2017;8(3):116-124.
4. Borrelli F, Izzo AA. The plant kingdom as a source of anti-ulcer remedies. Phytotherapy Research. 2000;14(8):581-591.
5. Maury PK, Jain SK, Lal N, Alok S. A review on antiulcer activity. International Journal of Pharmaceutical Sciences and Research. 2012;3(8):2487-2493.
6. Twaij HA, Al-Dujaili EA. Evaluation of the anti-diabetic and anti-ulcer properties of some Jordanian and Iraqi medicinal plants: A screening study. Journal of Medical Research. 2014;2014:1-10.
7. Alsabri SG, Rmeli NB, Zetrini AA, Mohamed SB, Meshri MI, Aburas KM, *et al*. Phytochemical, anti-oxidant, anti-microbial, anti-inflammatory and anti-ulcer properties of *Helianthemum lippii*. Journal of Pharmacognosy and Phytochemistry. 2013;2(2):86-96.
8. Hiruma-Lima CA, Santos LCD, Kushima H, Pellizzon CH, Silveira GG, Vasconcelos PCP, Brito AS. Qualea grandiflora, a Brazilian "Cerrado" medicinal plant presents an important antiulcer activity. Journal of Ethnopharmacology. 2006;104(1-2):207-214.
9. https://images.app.goo.gl/QADMPCYcVb6kMEPg8
10. Devaraj VC, Krishna BG. Antiulcer activity of a polyherbal formulation (PHF) from Indian medicinal plants. Chinese Journal of Natural Medicines. 2013;11(2):145-148.
11. Kaur D, Rana AC, Sharma N, Kumar S. Herbal drugs with anti-ulcer activity. Journal of Applied Pharmaceutical Science. 2012;2(3):160-165.
12. Vyawahare N, Deshmukh V, Gadkari M, Kagathara V. Plants with antiulcer activity. Pharmacognosy Reviews. 2009;3(5):118-125.
13. Mubashir A, Ghani A, Mubashar A. Common medicinal plants effective in peptic ulcer treatment: A nutritional review. International Journal of Agriculture and Biosciences. 2022;11(2):70-74.
14. Akhtar AH, Ahmad KU. Anti-ulcerogenic evaluation of the methanolic extracts of some indigenous medicinal plants of Pakistan in aspirin-ulcerated rats. Journal of Ethnopharmacology. 1995;46(1):1-6.
15. Sen S, Chakraborty R, De B, Mazumder J. Plants and phytochemicals for peptic ulcer: An overview. Pharmacognosy Reviews. 2009;3(6):270-279.
16. Bhattacharya S, Chaudhuri SR, Chattopadhyay S, Bandyopadhyay SK. Healing properties of some Indian medicinal plants against indomethacin-induced gastric ulceration of rats. Journal of Clinical Biochemistry and Nutrition. 2007;41(2):106-114.
17. Abdulla MA, Al-Bayaty FH, Younis LT, Abu Hassan MI. Anti-ulcer activity of *Centella asiatica* leaf extract against ethanol-induced gastric mucosal injury in rats. Journal of Medicinal Plants Research. 2010;4(13):1253-1259.
18. https://images.app.goo.gl/vtFadidHgHtM9Rpg9
19. Cipriani TR, Mellinger CG, Souza DLM, Baggio CH, Freitas CS, Marques MC, *et al*. Acidic heteroxylans from medicinal plants and their anti-ulcer activity. Carbohydrate Polymers. 2008;74(2):274-278.
20. Santin JR, Lemos M, Júnior LCK, Niero R, de Andrade SF. Antiulcer effects of *Achyrocline satureoides* (Lam.) DC (Asteraceae) (Marcela), a folk medicine plant, in different experimental models. Journal of Ethnopharmacology. 2010;130(2):334-339.
21. Sridhar TM, Josthna P, Naidu CV. *In vitro* antibacterial activity and phytochemical analysis of *Solanum nigrum* (Linn.): An important antiulcer medicinal plant. Journal of Experimental Sciences. 2011;2(8):24-29.
22. Khan MSA, Hussain SA, Jais AMM, Zakaria ZA, Khan M. Anti-ulcer activity of *Ficus religiosa* stem bark ethanolic extract in rats. Journal of Medicinal Plants Research. 2011;5(3):354-359.
23. Ganachari MS, Kumar S. Anti-ulcer properties of *Ziziphus jujuba* Lam leaves extract in rats. Journal of Natural Remedies. 2004;4(2):103-108.
24. Jamal A, Siddiqui A, Jafri MA. A review on gastric ulcer remedies used in Unani System of Medicine. Pharmacognosy Reviews. 2006;5(2):153-159.
25. Shirode D, Patel T, Roy S, Jyothi T, Rajendra S, Prabhu K, Setty S. Anti-ulcer properties of 70% ethanolic extract of leaves of *Albizzia lebbeck*. Pharmacognosy Magazine. 2008;4(15):228-231.
26. Roy SP, Niranjan CM, Jyothi TM, Shankrayya MM, Vishawanath KM, Prabhu K, *et al*. Antiulcer and anti-inflammatory activity of aerial parts of Enicostemma littorale Blume. Journal of Young Pharmacists. 2010;2(4):369-373.
27. Wasman QS, Suan CL, Fournier J, Ozdemir M. Potential effect of medicinal plants on the prevention of gastric ulcer: mechanism of actions. Journal of Pharmacy and Nutrition Sciences. 2022;12:94-108.
28. Sisay Zewdu W, Jemere Aragaw T. Evaluation of the anti-ulcer activity of hydromethanolic crude extract and solvent fractions of the root of *Rumex nepalensis* in rats. Journal of Experimental Pharmacology. 2020;12:325-337.
29. Alam F. Anti-ulcer plants from North-East India: A review. Der Pharmacia Lettre. 2019;11(6):73-96.
30. Jesus NZT, Falcão HS, Lima GRM, Caldas Filho MRD, Sales IRP, Gomes IF, Batista LM. *Hyptis suaveolens* (L.) Poit (Lamiaceae), a medicinal plant protects the stomach against several gastric ulcer models. Journal of Ethnopharmacology. 2013;150(3):982-988.
31. De Barros MP, Lemos M, Maistro EL, Leite MF, Sousa JPB, Bastos JK, de Andrade SF. Evaluation of antiulcer activity of the main phenolic acids found in Brazilian Green Propolis. Journal of Ethnopharmacology. 2008;120(3):372-377.
32. Bhoomannavar VS, Patil VP, Hugar S, Nanjappaiah HM, Kalyane N. Anti-ulcer activity of *Neptunia oleracea* Lour. Pharmacologyonline. 2011;3:1015-1020.
33. Ignatiu V, Narayanan M, Subramanian V, Periyasamy BM. Antiulcer activity of indigenous plant *Operculina turpethum* Linn. Evidence-Based Complementary and Alternative Medicine. 2013;2013:1-7.
34. Zakaria ZA, Hisam EA, Rofiee MS, Norhafizah M, Somchit MN, Teh LK, *et al*. *In vivo* antiulcer activity of the aqueous extract of *Bauhinia purpurea* Leaf. Journal of Ethnopharmacology. 2011;137(2):1047-1054.
35. Gupta J, Kumar D, Gupta A. Evaluation of gastric anti-ulcer activity of methanolic extract of *Cayratia trifolia* in

experimental animals. Asian Pacific Journal of Tropical Disease. 2012;2(2):99-102.
36. Jena R, Kar DM, Rath D, Roy KS, Ghosh G. Antiulcer property of *Mussaenda philippica*. Pharmacognosy Journal. 2019;11(3):603-607.
37. Sridhar TM, Preethi D, Naidu CV. An efficient callus induction and plant regeneration of *Solanum nigrum* (L.): An important antiulcer medicinal plant. Journal of Phytology. 2011;3(5):23-28.
38. https://images.app.goo.gl/k89SGpYAH8zzeftA9
39. Sachin SS, Archana J. Antiulcer activity of methanol extract of *Erythrina indica* Lam. leaves in experimental animals. Pharmacognosy Research. 2009;1(6):396-401.
40. Akuodor GC, Usman IMS, Mbah CC, Megwas UA, Akpan JL, Ugwu TC, *et al*. Studies on anti-ulcer, analgesic and antipyretic properties of the ethanolic leaf extract of *Gongronema latifolium* in rodents. African Journal of Biotechnology. 2010;9(15):2316-2321.
41. Nagori BP, Solanki R. *Cynodon dactylon* (L.) Pers.: A valuable medicinal plant. Research Journal of Medicinal Plants. 2011;5(5):508-514.
42. Mahmood AA, Mariod AA, Al-Bayaty F, Wahab ASI. Anti-ulcerogenic activity of *Gynura procumbens* leaf extract against experimentally-induced gastric lesions in rats. Journal of Medicinal Plants Research. 2010;4(8):685-691.
43. Gregory M, Divya B, Mary RA, Viji MH, Kalaichelvan VK, Palanivel V. Anti-ulcer activity of *Ficus religiosa* leaf ethanolic extract. Asian Pacific Journal of Tropical Biomedicine. 2013;3(7):554-556.
44. Srikanth J, Muralidharan P. Antiulcer activity of *Morinda citrifolia* Linn Fruit extract. Journal of Scientific Research. 2009;1(2):345-352.
45. Sridhar TM, Preethi D, Naidu CV. Effect of silver thiosulphate on *in vitro* plant regeneration of *Solanum nigrum* (Linn.): An important antiulcer medicinal plant. Current Botany. 2011;2(7):14-16.
46. Aruna MS, Prabha MS, Priya NS, Nadendla R. *Catharanthus roseus*: Ornamental plant is now medicinal boutique. Journal of Drug Delivery and Therapeutics. 2015;5(3):1-4.
47. Roy SP, Prajapati K, Gupta R, Bhadra D, Patel N, Batiwala A, *et al*. Evaluation of anti-ulcer effects of ethanolic extract of *Delonix regia* flower. Indian Journal of Research in Pharmacy and Biotechnology. 2013;1(3):440-445.
48. Singh S. Evaluation of gastric anti-ulcer activity of fixed oil of *Ocimum basilicum* Linn and its possible mechanism of action. 1999;36:253-257.
49. Tiwari P, Malik JK. A comprehensive review on botanical as anti-ulcer therapeutics: Prospective avenues of biocompatible drug discovery. Scholars International Journal of Traditional and Complementary Medicine. 2020;3(2):27-32.
50. Kore KJ, Shete RV, Patel AJ, Kulkarni JB. Antiulcer activity of aqueous extract of *Spinacia oleracea* in rats. International Journal of Research in Pharmacy and Chemistry. 2011;1(3):654-661.
51. Kumar R. Investigation of in-vitro method of antiulcer activity. Journal for Research in Applied Sciences and Biotechnology. 2023;2(1):264-267.
52. Tan PV, Nyasse B, Orock EGE, Wafo P, Forcha EA. Prophylactic and healing properties of a new anti-ulcer compound from *Enantia chlorantha* in rat. Phytomedicine. 2000;7(4):291-296.
53. Raji Y, Ogunwande IA, Adesola JM, Bolarinwa AF. Anti-diarrhegenic and anti-ulcer properties of *Irvingia gabonensis* in rats. Pharmaceutical Biology. 2001;39(5):340-345.
54. Mahidol C, Prawat H, Prachyawarakorn V, Ruchirawat S. Investigation of some bioactive Thai medicinal plants. Phytochemistry Reviews. 2002;1:287-297.
55. Bhardwaj A, Kumar R, Dabasa V, Alam N. Evaluation of anti-ulcer activity of *Citrullus lanatus* seed extract in Wistar albino rats. International Journal of Pharmacy and Pharmaceutical Sciences. 2012;4(5):135-139.
56. Kouitcheu LB, Nanfack NB, Eyoum BB, Tchuenteu TR, Nguepi E. Anti-*Helicobacter pylori* and antiulcerogenic activity of *Aframomum pruinosum* seeds on indomethacin induced gastric ulcer in rats. Pharmaceutical Biology. 2017;55(1):929-936.
57. Singh R, Madan J, Rao H. Antiulcer activity of black pepper against absolute ethanol-induced gastric mucosal damage in mice. Pharmacognosy Magazine. 2008;4(15):232.
58. https://images.app.goo.gl/1juTTYqk1btiYdF9A
59. https://images.app.goo.gl/Quku2JHJeZFZhQR27
60. https://images.app.goo.gl/DaVAcB93UyJLp4Ap8
61. https://images.app.goo.gl/8YaREnCRUXjcfqAu6
62. https://images.app.goo.gl/HaDcffboCZrCmHYe7