Review Article

A Basic Review on Medicinal Plants to Treat Ulcer

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ABSTRACT

The Aim of this review is to know more about the anti - ulcer Activity of the medicinal plants. An ulcer is erosion in the lining of the stomach and duodenum. There are different types of ulcers –gastric duodenal and mouth ulcers. Together gastric and duodenal ulcer, they are called peptic ulcer. There are many herbs and plant products that have been found to play a role in protecting or helping to heal stomach and peptic ulcers. In recent years, gastric ulcer has also been associated with infection of gastrointestinal mucosal tissue by *Helicobacter pylori*. Herbal plants are considered as safe for peptic ulcer treatment with minimum side effect.

Keywords: Peptic ulcer, Anti-ulcer activity, Medicinal plants, *Tephrosia* species.

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INTRODUCTION

Peptic ulcer is a GI disorder due to an imbalance between the aggressive factors like pepsin, Helicobacter pylori, acid and defensive factors like bicarbonate secretion, prostaglandins, gastric mucus, and innate resistance of the mucosal cell factors [1]. There are many types of ulcer such as mouth ulcer, stomach ulcer, duodenal ulcer, and genital ulcer. Of these peptic ulcer is seen among many people. The peptic ulcers are erosion of lining of stomach or the duodenum [2].Duodenal ulcers are found at the starting of small intestine and are characterized by severe pain with burning sensation in upper abdomen that awakens patients from sleep. Generally, pain occurs when the stomach is empty and relieves after eating. A duodenal ulcer is more common in younger person and predominantly affects males. In the duodenum, ulcers may appear on both the anterior and posterior walls [3]. In some cases, peptic ulcer can be life threatening with symptoms like bloody stool, severe abdominal pain, and cramps along with vomiting blood [4]. *H-pylori*, NSAIDS drugs, emotional stress, alcohol abuse, and smoking are the principal etiological factors associated with peptic ulcer [5]. Gram negative bacterium *Helicobacter pylori* remain present between the mucous layer and the gastric epithelium and are strategically designed to live within the aggressive environment of the stomach. Initially, Helicobacter pylori reside in the antrum but over time migrate toward the more proximal segments of the stomach [6].

Prevalence

Peptic ulcer is one of the world's major GI disease and affects 10% of the world population .[7] about 19 out of 20 peptic ulcers are duodenal. An estimated 15000 deaths occur each year as a consequence of peptic ulcer. Annual incidence estimates of peptic ulcer hemorrhage and perforation were 19.4–57 and 3.8–14 per 100,000 individuals, respectively. The average 7-day recurrence of hemorrhage was 13.9% and the average long-term recurrence of perforations was 12.2 %. [8] In the Indian pharmaceutical industry, antacids and antiulcer drugs share 6.2 billion rupees and occupy 4.3% of the market share[9]. There are several drug categories that have been used in the treatment of gastric ulcers, including proton pump inhibitors, M1-receptor blockers, and H2-receptor antagonists[10]. There are numerous side effects associated with the drugs used in the treatment of ulcers, including arrhythmia, impotence, gynecomastia, and hematopoietic changes. Moreover, there is a very high relapse rate (80% at 1st year and 100% in the 2nd year of treatment). Other issues include the long-term duration of the treatment period (therapy with H2- receptor antagonists for 1 year) and the incomplete eradication ofulcers[11].

Causes and Risk Factors

- Drinking too much alcohol
- Regular use of aspirin, ibuprofen, naproxen, or other NSAIDs.
- Smoking cigarettes or chewing
- tobacco Being very ill, such a

- being on a breathing machine
- Having radiation treatments Infection of the stomach by bacteria called Helicobacter pylori (*H.pylori*)[12].

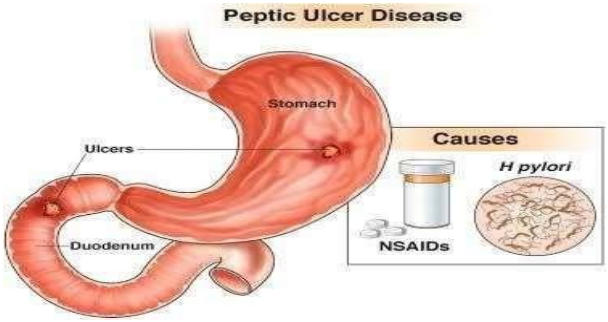

Figure 1: Peptic Ulcer Disease causes

Symptoms

Abdominal pain is a common symptom, but it doesn't always occur. Feeling of fullness -- unable to drink as much fluid Hunger and an empty feeling in the stomach, often 1 - 3 hours after a meal Mild nausea (vomiting may relieve this symptom) Pain or discomfort in the upper abdomen Upper abdominal pain that wakes you up at night.[12]

A many types of medicinal plants have been used for thousands of years in the traditional system of medicine (Ayurveda) to treat various disorders like peptic ulcer, cancer, diabetes, arthritis, hepatitis, acute and chronic inflammation, neurodegenerative diseases, and so forth [13]. Histological studies revealed that these medicinal plants did not show any acute toxicity. Preliminary photochemical screening of this medicinal plant identified the presence of important secondary metabolites like flavonoids and tannins which are the active principles of antiulcer activity [14]. This study has presented the review of commonly used anti-ulcer plants which are used for the treatment or prevention of peptic ulcers.

Plants such as

1. *Ocimum sanctum linn.*
2. *Morus Alba linn.*
3. *Mimosa pudica.*
4. *Aloe vera*
5. *Balsamodendronmukul*
6. *Carica papaya*
7. *Galegapurpurea*
8. *Alliumsativum*
9. *Abrus Pricatoriu*
10. *Tephrosia calophylla*

Medicinal Plants Review:

***Ocimum sanctum linn*.**

Family : Lamiaceae

Scientific name : *Ocimum tenuiflorum*

Higher classification : Basil

Order : Lamiales

Rank : Species

Kingdom : Plantae[15]

Ocimum sanctum belong to family Lamiaceae are very important for their therapeutic potential. Ocimum sanctum has two varieties i.e., black (Krishna Tulsi) and green (Rama Tulsi), Their chemical constituents are similar[16].Ocimum sanctum is widely distributed covering the entire Indian sub-continent. Tulsi is an important symbol of the Hindu religious tradition. Different parts of plant are used in Ayurveda.

Anti-ulcer activity of *Ocimum sanctum linn*:

The fixed oil significantly possessed antiulcer activity due to its lipoxygenase inhibitory, histamine antagonistic and antisecretory effects[17].

Reported other pharmacological activities of the plant are

- anti-bacterial,
- anti-inflammatory,
- antihypertensive,
- cardioprotective
- central nervous system depressant,
- antioxidant
- chemopreventive,
- immune modulatory,
- analgesic,
- antipyretic,
- anti-fertility,
- anti-arthritic,
- anti-stress
- anti-cataract,
- anticoagulant,
- hepatoprotective,
- radio protective [18].

Tephrosia callophylla

Species: *T. Purpurea, T. Maxima, T. Callophylla*.

Kingdom : Plantae

Family : Fabaceae

Genus : Tephrosia

Species :calophylla.

About 400 species [19] are there in the genus of *Tephrosia* in which 37 species of *Tephrosia* were found in India [20] and

specifically 13 species are found in Andhra Pradesh [21-27]. This plant is usually available in the form of shrubs.[28]

Figure 2: *T. callophylla*

Chemical constituents

The genus *Tephrosia* usually contains a wide variety of flavonoids and isoflavonoids. Investigation on *Tephrosia callophylla* revealed that the isolation of 23 different compounds of which 18 were known and 5 are new. *Tephrosia calophylla* contains flavonoids like (2S)-5-hydroxy-7, 4 -di-O- (γ,γ-dimethylallyl) flavonone and 6-hydroxy-E-3-(2,5-dimethoxy benzylidine)2',5'-dimethoxy flavonone [29]. Tephcalostan is a new coumestan derivative isolated from the whole plant of Tephrosia calophylla along with two known flavonoids, 7-Omethyl glabranin and kaempferol 3-O- β-Dglucopyranoside[30].

Calophione-A (a benzyl derivative), 1-(6'-Hydroxy-1',3'–benzodioxol-5'-yl)-2-(6-hydroxy- 2isopropenyl-2,3-dihydro-benzofuran-5-yl)-ethane-1,2 done and Tephcalostan -B, C, and D are three coumestan derivatives which were isolated from the roots of *Tephrosia calophylla* [31].

Antiulcer activity

The antiulcer activity of ethanolic extract of *Tephrosia callophylla* leaves were studied in pylorus ligation, ethanol induced and indomethacin induced ulcers models by using Wistar rats. The ethanolic extract was administered at a dose of 50 and 100 mg/kg orally and it shows significant reduction in gastric volume, free acidity, total acidity and ulcer index as compared to control. The extract of *Tephrosia callophylla* leaves showed significant antiulcer and cytoprotective activity at doses of 50mg/kg and100mg/kg.[32]

Methods

The aerial parts of Tephrosia callophylla were dried under shade, powdered and defatted with petroleum ether and then marc left over was subjected to methanol extraction using soxhlet apparatus. Antiulcer Property of methanol extract was determined against stress induced & aspirin induced ulcers in experimental animals model.

The total number of ulcers formed, ulcer index, percentage inhibition, ulcerated area, protected area, pH and Total acidity were parameters in the study.[33]

Tephrosia purpurea

Tephrosia purpurea is a species of flowering plant in the pea family, Fabaceae, that has a pantropical distribution. It is a common wasteland weed. In many parts it is under cultivation as green manure crop. It is found in poor soils throughout India and shri lanka.

Figure 3: *T. Purpurea*

Botanical name: *T. Purpurea.*

Family: Fabacea

Synonyms: *T. Vallichi, T. Indigofera*

Botanical classification

- TP Kingdom : Plantae
- Division : Magnoliophyta,
- Class : Magnoliopsida,
- Order : Fables',
- Family : Fabaceae,
- Genus : Tephrosia per's Species TP Linn.
- Indian synonyms of *Tephrosia purprea*

Indian Synonyms

- Hindi-Sarphank
- Sanskrit-Sharpunkha
- Malayalam -Kattamari,Kozhinjil
- Marathi –Untoali, Unhali
- Tamil- Kolingi, Kattu-Koalingi, Apavali, Mollukkay
- Gujarati-Unnali
- Punjabi-Sarpankho, Jhojro
- Urdu -Sarphoka, SatawalamKattamari, Kozhinjil

International synonyms of *Tephrosia purpurea*

Names Synonyms

- Arab-Sarboka
- Bulgarian- Echinaceapurpurea
- Chinese- Braseniapurpurea

- Dutch- *Actinidia purpurea*
- Danish -*Tephrosia diffusia*
- French -*Bauhinia purpurea*, *Tephrosia candida*
- Garman –*Wilder indigo*
- Hungarian-*Teohrosia candida*
- Indonesian –*Glomeruli Flora*
- Italian- *Glomeruli Flora*
- Japanese's –*Bauhinia purpurea*

Phyto-Constituents of *Tephrosia purpurea*

presence of glycosides such as rutin and quercetin, retenoids like deguelin, elliptone, rotenone and tephrosin, flavonoids like purpurin, purpurenone and purpuritenin and sterols such assitosterol [34,35]. An isoflavone, 7, 4-dihydroxy-3,5-dimethoxyisoflavone and chalcone, (+)-tephropurpurin, are also reported to be present in TP [36,37].

Traditional use

TP traditionally used to cure several types of external wounds 38and gastro-duodenal disorders 39. The plant has also been claimed to cure kidney, liver spleen, heart and blood related disorders [39,40].

The dried herbs are effective as tonic laxative, diuretics, deobstruent and used in the treatment of bronchitis, bilious febrile attack, boils, pimples and bleeding piles [41]. ethanolic extracts is possessed as potential antibacterial activity [42] Plant has been used to cure tumors, ulcers, leprosy, allergic and inflammatory condition such as rheumatism asthma and bronchitis [43-46]

Figure 5: seed

Figure 4: flowers

Description

Sub shrub to 1mm; branch lets pubescent – villous. Leaves to 7 cm; leaflets 4 -9 pairs, obovate, 0.8 – 2 × 0.3 – 0.7 cm, pubescent, base cuneate, margin entire, apex obtuse, mucronate; petiole to 1 cm; petiolule 1mm; stipules, lanceolate, 5mm 47. Pseudo racemes leaf- opposed, to 8 cm; bract to 2mm, pubescent; lobes lanceolate; upper lobes 2.5 mm, equal to lower one. Corolla bluish pink to purple; standard orbicular, 8.5 × 8mm, sericeous; wings 7.5 × 3 mm; keels 6.5 × 2.5 mm; staminal sheath 5 mm; filaments 2 mm. Ovary 5 mm, apprised pubescent; style 3 mm, glabrous. Pod 4 × 0.4 cm, downy – puberulous, continuous within, slightly falcate; seeds ca. 7, ovoid, 3.5 mm, strophiole in the middle of seed [48].

Anti-helicobacter Pylori & Antiulcer activity of *Tephrosia purpurea*:

Gastric and duodenal ulcers are a kind of inter wound .49 Helicobacter Pylori infection prevents healing of the wounded gastric and duodenum epithelium and its eradication drastically reduce the pathological symptoms.50 TP as anti-Helicobacter pylori agent in term of bacteriostatic and bactericidal activities efficacy at stomach acidic pH 51-53, likelihood of developing resistant mutants and synergistic capacity with common antibiotic. 54 Effect on ethanol induced gastric ulcer dose of aqueous extract of TP 1-20mg/kg, and 5-20mg/kg of TP gives dose dependent protection in indomethacin induced ulcers .55

CONCLUSION

Gastric ulcer, one of the most common gastrointestinal disorders, was thought to arise out of an imbalance between protective and aggressive factor. It is inferred from this analysis that plant extracts in have significant antiulcer activity. Varieties of botanical products have been reported to possess antiulcer activity. It has mucoprotective activity and gastric anti-secretary when compared with that of reference herbal drugs. The extract is non-toxic even at relatively high concentrations. Substances such as flavonoids and tannins that possess antiulcer activity are of particular therapeutic importance.

Plants *T. Purpurea* and *T. Callophylla* are rich in flavonoids like Quercetin and flavonone.

Quercetin has an anti-secretory mechanism of action. ... Besides the gastro protective activity, sofalcone (a chalcone), quercetin and naringenin (flavonone) accelerate the healing of gastric ulcers. In addition, the two first polyphenolic compounds have anti-H. Therefore, this flavonoids present in T. Purpurea could have an ideal more effective and less toxic therapeutic potential for the treatment of gastrointestinal diseases, particularly for peptic ulcers. This review provided an overall view of herbal plants used in the treatment of ulcers and given current updates about herbal treatment of ulcers.

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List of Abbreviation

PUD- Peptic ulcer disease

T.P. – *Tephrosia Purpurea*

NSAIDs- Non-Steroidal Anti-inflammatory Drugs

H Pylori - *Helicobacter pylori*

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