INTRODUCTION

Ulcers are deep lesions penetrating through the entire thickness of the gastro intestinal tract (GIT) mucosa and muscularis mucosa (Kaur et al., 2012). Peptic ulcers are a broad term which includes ulcers of digestive tract in the stomach or the duodenum. Recent research has shown that this ulcer developed due to aggressive factors. Infection caused by bacteria Helicobacter pylori or reaction to certain medicines as Non Steroidal Anti-Inflammatory Drugs (NSAIDs) is the causative agent of the disease (Bandyopadhyay et al., 2001). Siddha Medicine is one such heritage of India particularly Tamil Nadu (South India) which is more suited to the culture, tradition and background of the country. In Siddha system of Medicine, Gunnam (Peptic Ulcer Disease) is classified into eight varieties according to Yugumini Vaithya Chinthamani - 800 are Vatha gunnam, Pitta gunnam, Kabha gunnam, Mukkutra gunnam, Vayu gunnam, Eri gunnam, Vanthi gunnam and Vali gunnam. Peptic Ulcer, a disease known for its remission and exacerbation due to many reasons is worldwide problem. Siddha system of Medicine too has recorded this clinical condition as Gunnam, 2000 years ago. The disease Gunnam not only affects the physique of a person but also has the characteristic excruciating pain in the abdomen drives one to the extent of committing suicide.

Aetiology of Gunmam (PUD): The causes of peptic ulcer disease include Helicobacter pylori infection, non-steroidal anti inflammatory agents (NSAIDs) and malignancy (Jagruti et al., 1997). The gastric mucosa protects itself from gastric acid with a layer of mucus, the secretion of which is stimulated by certain prostaglandins. NSAIDs block the function of cyclooxygenase 1 (cox-1), which is essential for the production of these prostaglandins. Stress as a possible cause, or at least complication, in the development of ulcers. Burns and head injury, however can lead to physiologic stress ulcers, which are reported in many patients who are on mechanical ventilation. Cigarette smoking can increase a person's chance of getting an ulcer. Smoking also slows the healing of existing ulcers and contributes to ulcer recurrence. Ulcers are more common in people who have cirrhosis of the liver, a disease often linked to heavy alcohol consumption (Saumendu Deb Roy et al., 2013). According to Agasthiyar, this disease occurs due to Seivinaippayan (Karmic law). In Agasthiyar Kanma Kandam – 300 attributes Gunnam to be the cumulative effects of sins committed by an individuals. But Yugumini in his Yugi Vaithya Chinthamani – 800 says there are two main reasons for the onset of Gunnam viz., personal habits like excessive intake of astringent and spicy food, unhealthy food habit and mental make-up like emotional imbalance.
Plants used in Peptic ulcer diseases (Gunnam): Modern allopathic drugs are used in the treatment of Peptic ulcer but most of these drugs exhibit serious side effects. The use of phyto constituents as drug therapy to treat major ailments has proved to be clinically effective and less relatively toxic than the existing drugs and also reduces the offensive factors serving as a tool in the prevention of peptic ulcer. The chemical constituents present in the herbal medicine or plant are a part of the physiological functions of living flora and hence they are believed to have better compatibility with human body. Plant extracts are the most attractive source since longtime and a large number of plants have been shown to produce promising anti ulcerogenic effects (Akhtar et al., 1992).

1. Cocculus hirsutus

Common name Kattukodi
Family name Menispermaceae

Traditional uses

Cocculus hirsutus DC. root decoction is given orally for stomachache (Parthibian et al., 2017).

Phytochemical evaluation: The plant of Cocculus hirsutus (L.) Diels, has been reported to contain essential oil, β-sitosterol, ginnol, glycosides, sterols and alkaloids (Das et al., 1964). Preliminary phytochemical analysis of the leaves showed the presence of alkaloids, phenolic compounds, flavonoids, glycosides, and carbohydrates (Merchant et al., 1962). Preliminary Phytochemical screening of leaf of Cocculus hirsutus showed the presence of phytoconstituents like flavonoids, phenolics, saponins and steroids (Kushpoo et al., 2016). The plant of Cocculus hirsutus has been reported to contain essential oil, β-sitosterol, ginnol, glycosides, sterols and alkaloids. The phytochemical studies showed the presence of bis-benzyl isoquinoline alkaloids; viz. shaheenine, cohirisnine, hirsutine, jamtine (jamitine- N –oxide, cohirisine, dehydrocohirsine, Cohiristine and haidenine which are isolated from stem and roots (Guha et al., 1979).

Anti ulcer activity: Ethanolic extract of Cocculus hirsutus significantly reduced (P < 0.01) the acid secretary parameters i.e. total and free acidity as well as the gastric volume and an ulcer index suggests that acid inhibition accelerates ulcer healing. The decrease in gastric volume and simultaneous decrease in acidity may be one of the reasons for the ulcer healing (Swathi et al., 2013). The Ethanolic leaves extract of Cocculus hirsutus showed the best anti-ulcer activity (Rao et al., 2011).

2. Cissus quadrangularis

Common name Pirandai
Family Vitaceae

Traditional uses: Cissus quadrangularis L. stem is used in GIA (stomach pain, constipation, vomiting and intestinal ulcer (Ganesh et al., 2016). Roasted stem eaten to cure stomach pain (Kanuppasamy, 2007)

Phytochemical evaluation: Phytochemical studies on methanol extract revealed the presence of triterpenoids including α- and β- amyrins, βsitosterol, ketosteroids, phenols, tannins, carotene and vitamin C. Seven alicyclic lipids constituents have also been reported from Cissus quadrangularis. Unsymmetric tetracyclic triterpenoids such as d-amyrin, onocer-7-ene-3a, 21b-diol, damytrone and 3,3′,4,4′-tetra hydroxy biphenyl, 3,3′,4,4′- tetrahydroxy biphenyl have been isolated from plant and were quantitatively determined by HPTLC and HPLC methods in samples collected from five different geographic zones of India. Several other constituents such as flavonoids quercetin and kaempferol, and stilbene derivatives, quadrangularins A,B,C and many others e.g. resveratrol, piceatanon, palloidol, perthenocissi and phystosterols have been isolated from plant. Stem extract contains a high percentage of calcium ions and phosphorus, both essential for bone growth (Déka et al., 1994).

Anti ulcer activity: The methanolic extracts of the plant are proved to possess pharmacological activities such as antioxidant, antiulcer, analgesic, anti-inflammatory (Unnati 2011). Pretreatment with Cissus quadrangularis significantly prevented the gastric mucosal lesion development and decreased the gastric toxicity produced by ulcerogen. In addition, ulcerated rats showed depletion of gastric wall mucus, glycoproteins and non-protein sulphydryl levels whereas treatment with Cissus quadrangularis reverted this decline in aspirin induced pyloric ligation rats (Malika Jainu et al., 2006). Methanol extract showed significant antulcer activity in experimentally induced ulcer in rat model by decreasing gastric secretions and by enhancing glycoprotein levels. Triterpenoids and β-sitosterol present in methanol extract possess anti-lipid peroxidating effect and thus prevent gastric damage (Gutierrez and Vargas, 2006). Anoop and Jegadesan, 2009 reported that the drug was found to increase the defensive factors by virtue of its ulcer score, carbohydrate protein ratio and decrease in aggressive factors like free acidity, pepsin apart from other biochemical parameters. Extract significantly reduced the formation of gastric and duodenal lesions by virtue of its cyto-protective and mucin productive activities.

Solanum nigrum

Common name Manathakkali
Family Solanaceae

Traditional uses

The fresh leaves are consumed for intestinal ulcer by Paliyar tribes in Dindugal district, Tamil Nadu, India (Mayilsamy and Rajendra, 2013).

Phytochemical evaluation: Solanum nigrum possesses numerous compounds that are responsible for pharmacological activities. Its active components are glycoalkaloids, glycopolypeptides, and polysaccharides, polyphenolic compounds such as gallic acid, catechin, protocatechusic acid (PCA), caffeic acid, epicatechin, rutin, and naringenin (Ravi et al., 2009). Eltayeb et al. (1997) demonstrated that the steroidal alkaloid solasodine was highest in the leaves.

The anti-ulcerogenic effects of the methanolic extract of *Solanum nigrum* berries on aspirin induced ulceration in rats with respect to antioxidant status in the gastric mucosa have been investigated. The results indicate that *Solanum nigrum* berries may exert its gastroprotective effect by a free radical scavenging action. *Solanum nigrum* berries may have considerable therapeutic potential in the treatment of gastric diseases (Jain and Devi, 2004).

### Cucumis trigonus

**Common name**: Mithukkam  
**Family**: Cucurbitaceae.  

**Traditional uses**: Hnatyszyn et al., (1999) reported that *Cucumis trigonus* was used widely as a antulcer and diuretic agent in South American folk Medicine. Germano et al. (1998) investigated that *Cucumis trigonus* was used in the traditional medicine of Mali for the treatment of gastric and duodenal ulcers.

**Phytochemical evaluation**: The preliminary phytochemical investigations on the ethanolic fruit extract of *Cucumis trigonus* revealed that the presence of alkaloid, gums, mucilage, protein, flavonoids. Tannin and phenol and steroids were absent. Moreover, flavonoid was found rich amount (Bharathajothi et al., 2006). 

**Anti ulcer activity**: Vela et al. (1997) suggested that *Cucumis trigonus* is used in the folk medicine to treat gastric and intestinal disturbances. The freeze - dried aqueous extract of the whole plant tested in rodents up to the dose of 2000 mg/ Kg animal not produced any toxicity. In order to assess the antulcer activity of this plant, the test animals were treated with a single oral administration of an aqueous extract of stem bark of *Cucumis trigonus*. After 8hrs. which showed a significant increase in the mucosal production (Hnatyszyn et al., 1999).

### Basella rubra

**Common name**: Kodi Pasalai  
**Family**: Chenopodiaceae.  

**Traditional uses**: Leaves are used in catarrhal affections and to hasten suppuration and decoction of roots relief bilious vomiting (Nadkarni, 1908)

**Phytochemical valuation**: *Basella rubra* contains amino acids, vitamins, organic acids, polysaccharides and biflavonoids. A glycoprotein with strong antiviral activity (against potato virus) has been isolated from leaves. The fatty acid composition of the seed oil has also been reported (Chaterjee and Chandra, 1991). Two novel antifungal peptides, designated α- and β-basbrins have been isolated from the seeds of *Basella rubra* (Wang and Bun, 2001). The plant was found to be rich in calcium constituents. The fatty oils from the seeds were found to contain palmitic, oleic and linolenic acid (ICMR, 2004). Carotenoids have been detected in leaves of *Basella rubra* and the major carotenoids detected in all the species were beta-carotene, small amounts of alpha carotene and traces of other carotenoids (Panteado et al., 2001).

**Anti ulcer activity**: Aqueous extract of the leaves of *Basella rubra* (10 and 20mg/kg p.o.) showed significant and dose-dependent antiulcer activity against ethanol and pylorus ligated induced ulcer in rats. Study was compared with ranitidine (50 mg/kg p.o.) as standard drug (Shrikalp Shrikant Deshpane et al., 2003) The aqueous extract of *Basella rubra* Linn. possesses significant and dose dependent anti-ulcer and cytoprotective effects. The aqueous extract of *Basella rubra* linn. has demonstrated antulcer activity and leaves masticated kept in mouth helped reliefapthae (Shu-Mei Lin et al., 2010).

### Hemidesmus indicus

**Common name**: Nannari  
**Family**: Asclepiadaceae  

**Traditional uses**: Jain and Singh, 1994 have reported that *Hemidesmus indicus* is employed in traditional medicine for gastric ailments.

**Phytochemical evaluation**: The preliminary phytochemical investigation showed the presence of alkaloids, carbohydrates, flavonoids, Glycosides and Tannins (Korrapati Vishali et al., 2011). Tannins 2.5 % present in leaves and roots are reported to contain sitosterol. (Kumara and Nishteswar, 2013) A new ester identified as lupeol octaocanoate in addition to the known compounds viz., lupeol, (α-amyrin), lupeol acetate, (α-amyryin acetate), and hexatriacontane. (Chatterjee Ipsihita et al., 2006) Coumarins, triterpenoid saponins, essential oil, starch, tannic acid, triterpenoid saponins present. (Joseph et al., 1918)

**Anti ulcer activity**: The ethanol extract of *Hemidesmus indicus* root possesses significant antulcer property which could be either due to cytoprotective action of the drug or by strengthening of gastric mucosa and thus enhancing mucosal defense (Korrapati Vishali et al., 2011). The combined ethanolic extracts of *Hemidesmus indicus* and *Ficus religiosa* at the doses of 100, 200, 400, 800 mg/kg body weight orally administrated in albino rats showed good anti ulcer activity in the pylorus ligation model but in aspirin induced ulcer model, the combined extract have shown less significant activity (Sony, 2013).

### Cassia fistula

**Common name**: Sarakkontrai  
**Family**: Caesalpinaceae  

**Traditional uses**: The leaves are known for their laxative, antiinflammatory, ulcer healing and anti-rheumatic properties. Leaves were also found effective against cough and ringworm infections (Chopra, 1956). The ulcer healing power of *Cassia fistula* was reported (Kirtikar and Basu, 1975).

**Phytochemical evaluation**: Agrawal et al., (1972) isolated fštulic acid from the pods, kæmёрol and a leucoesteragonin tetramer having free glycol unit, from the flowers. Besides phenolics and their derivatives, a certain amount of alkaloid has been reported in the flowers of the plant (Asseleih et al 1990). A bianthuquinone glycosides, fštulin, together with kæmёрol and shein has been isolated from the ethanolic extracts of the flowers o f the plant (Kumar et al., 1996). The young and old leaves of the plant contain highest amount of phenolic, flavonoid and proanthocyanin contents (Luximon-Rama et al., 2002).
Antiulcer activity: Antiulcer effect of methanolic extract of Cassia species seed extract was evaluated using pylorus ligation and indomethacin induced ulcers in wistar albino rats. Various biochemical parameters such as gastric volume, \( 	ext{pH} \) and total acidity were estimated. A significant reduction of ulcer index as well as gastric acid output in extract treated animals was observed with respect to control animals. The extract exhibited 75% protection in pylorus ligation model and 70.31% protection in indomethacin induced ulcers (Gill et al., 2011). The plant is very effective in treating the intestinal disorders like ulcer (Biswas et al., 1973).

**Aegle marmelos**

Common name Vilvam
Family Rutaceae

Traditional uses: The leaves are soaked overnight in water and this water is strained and taken in morning, this really works to treat the ulcer and give relive to patients (Pushpendra et al., 2012).

Phytochemical evaluation: Different organic extracts of the leaves of *A. marmelos* have been reported to possess alkaloids, cardiac glycosides, terpenoids, saponins, tannins, flavonoids and steroids (Venkatesan et al., 2009; Sivaraj et al., 2011). Aegle marmelos fruit pulp reported for the availability of steroids, terpenoids, flavonoids, phenolic compounds, lignin, fat and oil, inulin, proteins, carbohydrates, alkaloids, cardiac glycosides and flavonoids (Rajan et al., 2011). Bael is reported to have number of coumarins, alkaloids, steroids, and essential oils. Root and fruits contain coumarins such as scoparone, scopoletin, umbelliferone, marmesin and skimming. Fruits in addition contain xanthotoxol, impenthin and allomilferlin and alkaloids like aegeline and mamelline. It also contains polysaccharides like galactose, arabinose, uronic acid and Lrahaminose, which may obtain after hydrolysis. Different types of carotenoids have been reported in the *Aegle marmelos*, these are responsible for the imparting yellow colour to fruit. Marmelosin, skimminiane and umbelliferone are the therapeutically active principle of bael fruit. Minor constituents are like ascorbic acid, sotisterol, crude fibers, tannins, \( \alpha \)-amyrin, carotenoids, and crude proteins are also present (Pushpendra et al., 2012).

Anti ulcer activity: Aqueous extract of *Aegle marmelos* leaves was prepared and used for investigation. A daily dose of 1 gm/kg body weight of extract administration orally for 21 days. The volume of gastric secretion, ulcer lesion count, pepsin count, PH total activity, hexosamine content were estimated (Ilavarasan and Monideen, 2002; Shanthi et al., 2011).

Conclusion

This article reviews drugs derived from plants such as flavonoids, saponin, gums and mucilage and tannins for the treatment of peptic ulcer and it is evident that plant extracts have significant antiulcer activity in animal models. The review data suggested that medicinal plant those are evidently reported for its antiulcer activity.

REFERENCES


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