A REVIEW ON ANTI-ULCER MEDICINAL PLANTS

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ABSTRACT
Ulcer is a common gastro intestinal disorder which is seen among many people. It may be due to the regular usage of drugs, irregular food habits, stress etc. A number of synthetic drugs are available to treat ulcers such as proton pump inhibitors, H$_2$ receptor antagonists and other Non steroidal anti-inflammatory drugs. But these drugs are expensive and are likely to produce more side effects when compared to herbal medicines. Considering the morbidity caused by ulcer disease and dyspepsia over the world, cheap and easily available treatments will always be in demand especially for the people of non-industrialized countries. Medicinal plants containing active chemical constituents play an important role in the prevention of various diseases and have potential benefits to the society. Literatures revealed that many medicinal plants and poly-herbal formulations are used for the treatment of ulcer by various ayurvedic doctors and traditional medicinal practitioners. This article is the review of most commonly used antiulcer plants, their important phytoconstituents and the other reported activities of these plants.

Keywords: Anti-Ulcer, Herbal medicines, Medicinal plants, Poly-herbal formulations.

INTRODUCTION
Peptic ulcer is the most prevalent gastro intestinal disorder which occurs due to an imbalance between the aggressive factor like acid pepsin, helicobacter pylori and defensive factors like gastric mucus and bicarbonate secretion, prostaglandins and innate resistance of the mucosal cells factors [1]. It is considered as a lesion of gastric or duodenal mucosa. The exact cause for ulceration is unknown, but the formed lesion is maintained by hydrochloric acid and pepsin [2]. The discovery of remedies for peptic ulcer is of great interest as the disorder occupies a key position in concern of both clinical practitioner and researcher. Gastric ulcers mostly occur at old age and in individuals of lower socio-economic class [1,2]. The frequent injestion of non- steroidal anti – inflammatory drugs for rheumatoid diseases is associated with erosions, petechiae, type C gastritis, ulceration, interference with ulcer healing, ulcer complications and injury to the small and large intestine. Besides this the characteristic problem such as Zollinger-Ellisson syndrome where there is a high and uncontrollable production of acid leads to ulcer formation [3-4].

The anti-ulcer drugs such as H$_2$ receptors, proton pump inhibitors and cytoprotectants are available for the treatment of ulceration, as the modern medicine causes several side effects, herbal remedies are considered as the better alternatives for the treatment of peptic ulcer [5]. For example, H$_2$ receptor antagonists (Cimetidine) may cause gynecomastia in man and galactorrhea in women while proton pump inhibitors (omeprazole, lansoprazol) may cause nausea, abdominal pain, constipation and diarrhea. Due to the occurrence of these side effects, medicinal plants are always considered as the main source of new drugs as they posses potentially less or no side effects. As herbal treatments are found to be the safer alternatives, extensive studies are carried out mainly focusing on searching potent anti- ulcer agents of plant origin [6-7]. Many herbs with ethnomedical background have

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been screened for their anti-ulcer properties and they produced some encouraging results which proved their effective anti-ulcer activity. Several Indian medicinal plants have been reported with potent anti-ulcer activity (table 1).

Table 1. Medicinal plants with reported antiulcer activity

<table>
<thead>
<tr>
<th>S.No</th>
<th>Botanical name</th>
<th>Common name</th>
<th>Family</th>
<th>Plant part with anti-ulcer activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td><em>Abutilon indicum</em> L.</td>
<td>Atibala, Duvvena kayalu</td>
<td>Malvaceae</td>
<td>Leaves</td>
</tr>
<tr>
<td>2</td>
<td><em>Allophylus serratus</em></td>
<td>Tippani, mukkannaperuku, Tripura</td>
<td>Sapindaceae</td>
<td>Leaves</td>
</tr>
<tr>
<td>3</td>
<td><em>Aspilia Africana</em></td>
<td>Haemorrhage plannt</td>
<td>Asteraceae</td>
<td>Leaves</td>
</tr>
<tr>
<td>4</td>
<td><em>Azadirachta indica</em></td>
<td>Neem</td>
<td>Meliaceae</td>
<td>Leaves</td>
</tr>
<tr>
<td>5</td>
<td><em>Bauhinia racemosa</em></td>
<td>Asmantak</td>
<td>Caelpinaceae</td>
<td>Stem bark</td>
</tr>
<tr>
<td>6</td>
<td><em>Benincasa hispida</em> (thamb) cogn.*</td>
<td>White pumpkin, Ash gourd, Wax gourd, Petha, Kushmanda</td>
<td>Cucurbitaceae</td>
<td>Fruits</td>
</tr>
<tr>
<td>7</td>
<td><em>Boswellia serreta</em></td>
<td>Indian olibanur</td>
<td>Burseraceae</td>
<td>Bark</td>
</tr>
<tr>
<td>8</td>
<td><em>Centella asiatica</em></td>
<td>Gotu kola</td>
<td>Apicae</td>
<td>Leaves</td>
</tr>
<tr>
<td>9</td>
<td><em>Croton zambesicus</em> Mull. Arg</td>
<td>Tiger bush</td>
<td>Euphorbiaceae</td>
<td>Roots</td>
</tr>
<tr>
<td>10</td>
<td><em>Emblica officinalis</em></td>
<td>Amla</td>
<td>Euphorbiaceae</td>
<td>Fruit pulp</td>
</tr>
<tr>
<td>11</td>
<td><em>Excoecaria agallocha</em> L.</td>
<td>Mangrove tree</td>
<td>Euphorbiaceae</td>
<td>Bark</td>
</tr>
<tr>
<td>12</td>
<td><em>Ficus religiosa</em></td>
<td>Peepal tree</td>
<td>Moraceae</td>
<td>Stem bark</td>
</tr>
<tr>
<td>13</td>
<td><em>Garcinia cambogia</em></td>
<td>Brindleberry</td>
<td>Clusiaceae</td>
<td>Fruits</td>
</tr>
<tr>
<td>14</td>
<td><em>Hibiscus rosasinensis</em> Linn.</td>
<td>China rose, Shoe flower</td>
<td>Malvaceae</td>
<td>Roots</td>
</tr>
<tr>
<td>15</td>
<td><em>Lawsonia inermis</em></td>
<td>Henna</td>
<td>Lyrthraceae</td>
<td>Leaves</td>
</tr>
<tr>
<td>16</td>
<td><em>Leucas lavandulifolia</em></td>
<td>Leucas</td>
<td>Labiatae</td>
<td>Whole plant</td>
</tr>
<tr>
<td>17</td>
<td><em>Mimosa pudica</em></td>
<td>Sensitive plant, Touch me not, Chue mue</td>
<td>Fabaceae</td>
<td>Leaves</td>
</tr>
<tr>
<td>18</td>
<td><em>Morinda citrifolia</em> Linn.</td>
<td>Indian mulberry, Nunnakai</td>
<td>Rubiaceae</td>
<td>Fruits</td>
</tr>
<tr>
<td>19</td>
<td><em>Ocimum sanctum</em> L.</td>
<td>Tulsi, tulasi, Sacred plant</td>
<td>Labiatae</td>
<td>Fixed oil, Whole plant</td>
</tr>
<tr>
<td>20</td>
<td><em>Polyalthia longifolia</em></td>
<td>Lofty evergreen tree, Thwaites</td>
<td>Annonaceae</td>
<td>Leaves</td>
</tr>
<tr>
<td>21</td>
<td><em>Sapindus trifoliatus</em></td>
<td>Soap nut tree</td>
<td>Sapindaceae</td>
<td>Leaves</td>
</tr>
<tr>
<td>22</td>
<td><em>Terminelia chebula</em></td>
<td>Triphala</td>
<td>Combretaceae</td>
<td>Fruits</td>
</tr>
<tr>
<td>23</td>
<td><em>Zapoteca portoricensis</em></td>
<td>Elugelu</td>
<td>Fabiaceae</td>
<td>Roots</td>
</tr>
<tr>
<td>24</td>
<td><em>Zingiber officinale</em></td>
<td>Ginger</td>
<td>Zingiberaceae</td>
<td>Rhizome</td>
</tr>
</tbody>
</table>

*Abutilon indicum*

*Abutilon indicum* L., is commonly known as “Atibala” is considered as a diuretic and heart tonic [8]. It has been reported as a remedy for jaundice, piles, ulcer, leprosy, and as blood purifier [9]. Phytochemical screening proved the presence of flavonoids (quercitin), alkaloids, saponins, terpenoids, monoterpenoids (linalool), glycoproteins, amino acids, polysaccharides, tannins, essential fatty acids, phenolic compounds and vitamins [10]. The methanol extract of leaves of *A. indicum* are found to possess a significant anti ulcer activity in a dose dependent manner [1]. The effect of this plant in treatment of bronchial asthma is due to its mast cell stabilizing and anti inflammatory activity [11]. The ethanolic and aqueous extracts of leaves of *Abutilon indicum* are found to exert immuno stimulant effect and the activity is attributed to its flavonoid content [12]. Investigations proved that the crude methanol extract of leaves of *Abutilon indicum* are cytotoxic and anti microbial [13]. The alcohol and water extracts of the leaves have also shown hypoglycemic effects [14]. Methanol extract of the leaves were investigated for the free radical scavenging activity and superoxide radical scavenging activity and are found to possess maximum anti oxidant activity at 250 μg/ml concentration [15]. The flower extract of *Abutilon indicum* has been reported with significant hepatoprotective activity [16]. The crude leaf extract of the plant are proved as larvicidal [17].

*Allophylus serratus* Kurz

*Allophylus serratus* is a medicinal plant with a strong ethnopharmacological background of anti-ulcer activity belonging to the family Sapindaceae which is found all over India. The plant has been described in Indian medicinal plants as an anti-inflammatory and carminative drug and is also used in elephantiasis,
oedema, fracture of bones, several gastro intestinal disorders along with dyspepsia and anorexia and diarrhoea. Various phytochemical studies reported the presence of beta-sitosterol and phenacetamide in leaves which are responsible for anti ulcer activity with very minimum side effects. [7] The compounds isolated from the ethanolic extract of leaves of Allophylus are reported to exert significant osteoporotic activity by causing osteoblast differentiation and mineralization [18]. The plant is also reported to possess hepato protective activity. The reduction in acid output and peptic activity are the major mechanisms involved in production of anti ulcer activity by allophylus leaf extract [7].

**Aspilia Africana**

Aspilia africana belonging to the family asteraceae is commonly known as hemorrhage plant because of its ability to stop blood flow from wounds. The phytoconstituents isolated from the plant are terpenoids, Germacrene D, alpha-pinene, limonene and beta-sitosterol. The extract effectively suppresses both early and later phases of inflammation [19]. Aqueous extracts of the leaves of Aspilia Africana are proved to exhibit dose dependent anti ulcer activity especially in cases of drug induced ulcers. The plant is also reported to exert anti microbial, haemostatic and anti fertility effects [20]. Ethanolic leaf extract of Aspilia africana belonging to the family asteraceae has been reported as anti diabetic and hypolipidemic in alloxan induced diabetic rats [21].

**Azadirachta indica**

_Azadirachta indica_ (meliaceae) which is commonly known as neem is well known for its medicinal properties. The active constituents of the plant are nimbin, nimbidin and nimbidiol. Phytochemical screaming of the extract proved the presence of saponins, tannins, triterpenoids, flavonoids, alkaloids and phenolic compounds [22]. The aqueous extract of the leaves of Azadirachta indica are reported to produce anti fertility effects and those effects are due to androgen deficiency caused by anti androgen activity of neem [23]. The alcolholic extracts of leaf inhibited different fungal species and are proved to possess anti fungal property [24]. The methanolic extracts of Azadirachta indica exhibited anti microbial property against many species of microbes [25]. The constituents like azadiricin and nimbin isolated from the methanolic extracts of seed, leaf and bark of neem are found to exhibit anti oxidant nature [26]. Aqueous extracts of neem leaves possess chemo protective effects against benzo(a)pyrene induced forestomach tumors [27].

**Bauhinia racemosa**

_Bauhinia racemosa_ (caesalpiniaceae) is popularly known as apta in marathi and kanchnal in hindi. Stem bark of the plant is traditionally used in the treatment of head ache, fever, skin diseases, tumors, dysentery, diarrhoea. Aqueous and alcoholic extract of the dried stem bark are proved to exert significant analgesic activity [28]. _Bauhinia racemosa_ is a traditional valued plant of anti ulcer property. The constituents like flavonoids (quercetin, nagingin, silymarin, anthocyanosides, and sophoridian derivaties), saponins and tannins produce anti-ulcer effects [29]. Methanolic extract of stem bark of Bauhenia racemosa has been reported to possess anti tumor and anti oxidant activity against Ehrlich ascites carcinoma tumor [30]. Methanolic extract of stem bark of the plant was proved to be an effective anxiolytic agent [31]. Phytochemical investigations reported the presence of protein, oil, fats, phenolic compounds, flavonoids, saponins, tannins and carbohydrates. Methanolic and aqueous extracts of the plant are reported to exhibit a broad spectrum of anti microbial activity [32].

**Benincasa hispida**

Benincasa hispida belonging to the family cucurbitaceae is commonly called as ash gourd in english, kushmanda in sanskrit is cultivated as a vegetable throughout India. Fruit juice of kushmanda has been proved to be anti convulsant against shock induced convulsions [33]. Evaluation of methanolic extract of fruit of Benincasa hispida has revealed the anti diarrheal activity which also showed significant reduction in gastro intestinal motility [34]. Methanolic extract of the seeds of the plant have been investigated for free radical scavenging, anti inflammatory and analgesic potential and are reported to be beneficial as natural anti oxidant in the treatment of inflammation and pain [35]. Methanolic extract is beneficial as anti ulcer, anti histaminic, anti inflammatory and anti depressant. Phytochemical studies reported the presence of triterpenes: alnusenol, multiflorenol, iso multiflorenol, Flavone: iso vitexin and Sterols: lupeol, lupeol acetate and beta sitosterol. Petroleum ether and methanolic extracts of Benincasa hispida has been proved to exhibit gastroprotective effects along with anti oxidant property [36]. Aqueous pulp extract of the plant has been proved to exert significant hepatoprotective effect against diclofenac sodium induced hepato toxicity [37].

**Boswellia serreta**

The plant Boswellia serreta (Burseraceae) which is commonly known as Indian olibanur in english is considered as a native plant to india. The plant is mostly available in Khandesh, Nagpur-Wardha of Maharastra and in Andhra Prades. Petroleum ether and aqueous extracts of the bark of boswellia serreta are reported to exhibit significant anti-ulcer activity in aspirin induced ulcer model [38]. Hexane extract of oleo gum resin of boswellia serreta has been proved to effectively reduce the elevated levels of serum marker enzymes and prevented to increase in liver weight at lower doses but the extract exhibited a mild hepato-protective activity in high doses [39]. Extracts
of oleo gum resin of Boswellia serrata are proved to possess anti arthritic activity which showed its activity in synergism with rhizome extract of Glycyrrhiza glabra. The oleo gum resin of the plant has been reported to be useful as Immuno modulatory, anti tumor and anti inflammatory [40]. The extract of the plant is proved to be efficient in treating osteo arthritis of knee due to the presence of its chemical constituent boswellic acid [41].

**Centella asiatica**

*Centella asiatica* (Umbelliferae) is one of the important medicinal plant with ethno pharmacological background. It is known as Bramhi which is described as anti aging plant by charaka. The plant is mainly used in the treatment of mental and neurological disorders. The plant is beneficial as brain tonic and in treating tuberculosis, syphilis, amoebic dysentery, leprosy, wounds and ulcer. Ethanolic extract of the aerial parts of centella asiatica has been proved to possess high anti microbial activity [42]. The mechanism of anti-ulcer activity is acid inhibition for the treatment of gastric disorders. The anti-ulcer activity of *Centella asiatica* is attributed to the presence of phenolic compound in the extract. In indigenous medicinal system the plant is used as a tonic in skin diseases and leprosy [43]. Petroleum ether, ethanol and chloroform extracts of Centella asiatica have been proved to be effective anti bacterial and anti fungal agents [44]. It also possess the properties of wound healing, memory improvement, treatment of mental fatigue, bronchitis, asthma, dysentery, kidney trouble, urethritis, leucorrhea and toxic fever [43].

**Croton zambesicus**

*Croton zambesicus* belonging to the family Euphorbiaceae is grown as an ornamental tree in villages and towns of Nigeria. The root bark extracts were reported to contain alkaloids, saponins, terpenes, tannins, phlobatamins, anthraquinones and cardiac glycosides. The stem and root barks are reported to be rich in oxygen containing compounds. Ethanolic root extract of Croton zambesicus has been investigated and proved as a potential anti ulcer and anti convulsant agent [45]. Aqueous leaf extract has been reported to been beneficial in treating seizures [46].

**Excoecaria agallocha**

*Excoecaria agallocha* belonging to the family Euphorbiaceae is commonly known as a mangrove plant which is traditionally used in epilepsy, tooth ache and ulcer treatment. The plant is suggested to be beneficial as anti microbial, anti tumor, wound healing and anti oxidant agent. Oil obtained from the bark has been reported to be efficient in treating rheumatism, leprosy and paralysis. Bark extract of the plant is proved to possess gastro protective effect in a model of NSAID induced ulcer. The plant extract act by decreasing acidity and increasing the mucosal defense mechanism [47]. Organic solvent extracts of leaves of the plant has been revealed with potent anti oxidant and anti filarial activity which exert anti oxidant activity by decreasing oxidative stress and anti filarial activity by blocking embryogenesis of filarial parasites [48].

**Ficus religiosa**

*Ficus religiosa* commonly known as peepal tree, belongs to the family moraceae is considered as a traditional medicine to treat various diseases including gastric ulcer. It is one of the deciduous tree which is often considered as a sacred tree and is planted in and around temples. It is traditionally used for gonorrhea, dysentery, diarrhoea, haemorrhoids, ulcers, gastrohelcosis leucarrhea, menorrhagia, vaginal and urogenital disorders. The methanolic plant extract contains carbohydrates, saponins, amino acids. Flavonoids, tannins and steroids have shown anti-helminthetic activity. The aqueous bark extract contains carbohydrates, tannins, flavonoids and poly phenolic compounds which exerted anti-diabetic activity. The ethanolic bark extract is reported to possess anti-bacterial, analgesic, wound healing, anti-ulcer and anti-lipid peroxidation activities [3].

**Garcinia cambogia**

*Garcinia cambogia* (Guttifererae). Garcina has also been considered to make foods more filling and satisfying. Chemical constituent of *Garcinia cambogia* (new xanthone) garbogiol was isolated from root. It was reported that Garcinia extract inhibits the cytoplasmic lipid accumulation as well as adipogenic differentiation of preadipocytes. *Garcinia cambogia* herbal preparation has been suggested useful in the treatment of gastrointestinal disorders, anti-obesity activity, anti-cancer activity, anti-inflammatory activity, and lipid lowering property. Petroleum ether, chloroform and ethanolic extracts were studied for their anti helminthetic activity and ethanolic extract has been found to be more effective [49].

**Hibiscus rosasinensis**

*Hibiscus rosa-sinensis* L.(Malvaceae.) It is known as Chinese rose, Shoe flower (English), Arkapriya, Japapushpa (Sanskrit), Jasund (Hindi), Angharee-hind (Persian), and Wadamal (Sinhalese) The young leaves sometimes serve as a substitute for spinach. The plant is traditionally valued as emolient, emmenagogue, antinfiammatory, refrigerant, aphrodisiac, anodyne, and laxative. Many researchers reported the use of the flower to treat heart disorders. The plant is reported to be antidiarrheal, antiphlogistic, antispermaticogenic, androgenic, antitumor, antiestrogenic, antiimplantation , wound Healing, anticonvulsant. Its main constituents are flavonoids, anthocyanins, quercetin, cyanidin, kaempferol, hydrocitrinic acid. Hibiscus rosasinensis which is one of the widely used traditional medicine is investigated and
proven to possess cardio protective effects. The activity is produced by significantly decreasing the size of infraction in a dose dependent manner [50]. Ethanolic extract of leaves and flowers are reported to possess anti bacterial effects against clinical isolates of bacteria [51]. Hibiscus has been proved to be an effective and safe anti dandruff agent [52].

**Lawsonia inermis**  
*Lawsonia inermis* (Lythraceae) commonly known as henna is native to North Africa and south west asia is cultivated as an ornamental plant in India. Henna is mainly used as a coloring agent because of its chemical constituent lawson. The plant also helps to relieve from stress condition due to prolonged anxiety [53]. It is also reported to contain carbohydrates, proteins, flavonoids, tannins and phenolic compounds, alkaloids, terpenoids, quinones, coumarins, xanthones and fatty acids. It also exerts many other medicinal benefits like analgesic, hypoglycemic, hepatoprotective, immunomodulants, anti-inflammatory, antibacterial, antimicrobial, antifungal, antiviral, antiparasitic, antitrypanosomal, antidermatophytic, antioxidant, antiurolithiatic, antifertility, tuberculostatic and anticancer properties [54]. Ethanolic extract of leaves of henna are proved to be an effective anti bacterial agent against gram negative rod micro organism Pseudomonas aeruginosa which belongs to the family Pseudomonadaceae [55]. Studies demonstrated that the petroleum ether extracts of the leaves of henna or mehendi are anti helminthetlic in Indian adult earth worms [56]. The phytoconstituent, Lawsoon is considered as the anti microbial agent in Lawsonia inermis. The constituent has also been used to be anti mycotic, anti bacterial, virucidal and anti parasitic [57]. Investigations proved that water and chloroform extracts of leaves were able to inhibit the growth pattern of *A. niger* and *F. oxysporum*. *Streptococcus* sp. like *S. aureus*. Which suggest that the plant extract is valuable in management of burnt wound infections [58]. The stem bark of the plant is traditionally used in treatment of jaundice, enlargement of liver and spleen. The main constituents of the plant that are responsible in exerting hepatoprotective activity are flavonoids. Warm aqueous extract of the leaves produced significant hepato protective effect in carbon tetrachloride induced hepatotoxicity model [59].

**Leucas lavandulifolia**  
Folkloric herb *Leucas lavandulifolia* belonging to the family Labiatae is commonly used to alleviate the abdominal discomfits mainly stomach ulceration. The genus *Leucas* contains about 100 Asiatic and African species, but the most common species found in India is *Leucas lavandulifolia* Sm. It is commonly called as Gumma or Drupuspi in India. It is used to counteract abdominal and liver diseases. rural area of West Champaran, Bihar (India). The methanolic extract of the herb is reported to exert significant anti ulcer activity against indomethacin and pylorus ligation induced ulcer models. It also exhibited ulcer protection activity in a dose dependent manner. The mechanism of anti ulcer activity of plant extract is observed by the significant reduction in ulcer index as well as gastric acid output [60].

**Mimosa pudica**  
*Mimosa pudica* which is known as chue mue (chinese), touch me not (english) belongs to the family Fabaceae is reported to contain an alkaloid mimosine. Reported constituents in plant are polyphenolic constituents like flavonoids, quercitin, naringin, saponins, glycosides, tannins, gums and mucilages. Medicinal importance of plant is due to its use as anti hyperglycemic, anti diarrhoeal and anti convulsant. Alcoholic extract of the leaves has been proved to possess anti ulcer activity as it effectively reduces the parameters like gastric acid secretion, PH, total acidity, free acidity and ulcer index [61]. Ethanolic extract of the leaves of mimosa pudica have been reported to possess anti ulcer activity in a dose dependent manner and these leaf extracts may be useful as a natural anti oxidant in treatment of ulcer [62]. Aqueous extract of the plant has been found to have significant anti inflammatory activity as the extract effectively inhibited carrageenan induced paw edema [63].

**Ocimum sanctum**  
*Ocimum sanctum* is a well documented medicinal plant because of its potential therapeutic activities. From ancient time, the plant is widely used by traditional medical practitioners. It is commonly known as tulsi and the essential oils extracted from it majorly constitute eugenol which is a phenolic compound responsible for therapeutic potentials of tulsi. Traditional medical practitioners used tulsi as expectorant, anti-asthmatic, anti-cancer, analgesic, anti-emetic, anti-diabetic, anti-fertility, hepatoprotective, hypotensive, hypolipidemic and for anti-stress activity. Aqueous decoction of tulsi is also recommended for glaucoma, cataract and conjunctivitis. The aqueous extract of ocimum is reported to possess anti ulcer activity, the mechanism of action is by inhibiting the gastric acid secretion or by stimulating the mucosal defense mechanism [64].

**Polyalthia longifolia**  
*Polyalthia longifolia* is a popular shrub known as thwaites belongs to the family annonaceae. It is well distributed in tropical and sub-tropical regions. The plant is mostly employed in treatment of skin diseases, fever, diabetes and hypertension. The non volatile part is the source of biologically active compounds. The biochemical investigations of the plant prove the presence of alkaloids, diterpenes like clerodane and enhalimane, flavonoids like quercitin, steroids like beta-sitosterol and stigmasterol. The mechanism of scavenging the free radicals and
reducing inflammation causing acute and chronic ulceration is the major role of the plant in treatment of ulcer. The plant is reported to possess anti microbial, hypoglycemic, anti-hyperglycemic and hypotensive effects [6].

**Sapindus trifoliatus**

*Sapindus trifoliatus* which is commonly known as a soap nut tree, Indian filbert belonging to the family sapindaceae is the plant chiefly found in south-India. The seed oil is extensively used in manufacture of soap because of presence of a chemical constituent beta sitosterol in seed. The aqueous extracts of leaves are reported with potent anti-ulcer activity due to presence of flavonoids, triterpenoids, carbohydrates and sterols in the extract. *Sapindus trifoliatus* shown potent action due to its antagonism on histaminergic activity produced by H₂ receptor blockade. *Sapindus trifoliatus* has been reported with activities like astringent, anti-helmintic, expectorant, in treatment of asthma, cholera, epilepsy, gout, rheumatism and paralysis [65]. Methanolic extract of seeds of the plant are reported to exert anti helminthentic activity in earthworms [66].

**Terminalia chebula**

Terminalia chebula commonly known as triphala is considered as king of medicine because of its traditional value. Chemical constituents in terminalia chebula are tannins, chebulic acid, glycosides, sugar, triterpenoids, steroids and small quantity of phosphoric acid. The methanolic extract of the fruits of terminalia chebula has been reported with potential anti ulcer activity. It act by boosting up the mucosal defence mechanism and by inhibiting the gastric acid secretion. Reported pharmacological activities of the plant are anti-fungal, antibacterial, anti-viral, anti-carcinogenic, anti-oxidant, adapogenetic, anti-anaphylactic, hypolipidemic, anti-diabetic, hepatoprotective, cardioprotective, wound healing, immunomodulatory and chemo protective. The plant have its extensive use in ayurveda and siddha for constipation, diarrhea, ulcers, gastro enteritis, cough, dyspepsia, hemorrhoids, candidiasis, parasites, malabsorption syndrome, hepatomegaly, vesicular and renal calculi, urinary discharges, tumors, skin diseases, leprosy, intermittent fever, rheumatism, arthritis, gout, neuropathy, paralysis, memory loss, epilepsy, diabetis, depression, cardio vascular diseases, anorexia and wounds [67].

**Zapoteca portoricensis**

The leaves of *Zapoteca portoricensis* popularly known as “ELUGELU” in eastern Nigeria are used to treat tonsillitis, spasmodic and other gastrointestinal disorders. Its roots have been reported to possess anti-infl ammatory activity, antifungal and antibacterial activity. The methanolic extract of the roots have been reported to possess potent anti ulcer activity [68]. The different extracts prepared from the leaves of the plant have been proved to be useful as a anti bacterial or anti fungal agent due to its anti microbial properties [69]. The aqueous and alcoholic extracts of *Zapoteca portoricensis* belonging to the family fabaceae are traditionally used as anti diarrhoeal, anti canvulsant, antispasmodic and in the treatment of tonsillitis. Terpenoids and steroids obtained from the column fractions of the root extracts are proved to be responsible for the production of significant anti inflammatory activity [70].

**Zingiber officinale**

Ginger (*Zingiber officinale* Roscoe,) is mainly cultivated for its rhizome which is considered as a popular spice important medicine in India. Volatile oils in ginger are the medicinally active chemical constituents which constitute of about 1-4%. The phenolic compounds found in ginger are gingerol and zingerone. The constituents in ginger are reported to exert anti-oxidant, anti-ulcer, anti-inflammatory, anti-tumor, carminative, diaphoretic, digestive, expectorant and gastro protective activities. The phenolic content in aqueous extract of ginger is reported to have potential ulcer preventing ability, aqueous extract of ginger will also reduce free radicals damage during ulceration. Hence, ginger is used as ulcer preventive agent [4]. Antimicrobial efficacy of the extract of Zingiber officinale has been proved against serotypes of *escherichia coli*, *salmonella*, *listeria monocyotogenes* and *aeromonas hydrophila* [71]. The anti oxidant effect of the total phenols in alcoholic extract of zinzier officinale were studied and have been proved to exhibit higher anti oxidant effect than quercitin [72]. n-Hexane, Ethyl acetate and Ethanolic extracts except the aqueous extract of ginger have been proved to inhibit bacterial growth in a dose dependent manner and hence reported to be useful in treatment of bacterial infections [73]. Ginger anticancer properties are attributed to the presence of certain pungent vallinoids, like [6]-gingerol and [6]-paradol, and some other constituents like shogaols, zingerone etc. A number of mechanisms may be involved in the chemopreventive effects of ginger [74].

**CONCLUSION**

Gastric ulcer one of the most widely spread gastro intestinal disorder believed to be due to an imbalance between aggressive and protective factor. From this study it is evident that plant extracts have significant anti ulcer activity in animal models. The extract is non-toxic even at relatively high concentrations. A variety of botanical products have been reported to possess antilucer activity but finally, it should be noted that substances such as flavonoids and tannins in herbal extracts possess antiulcer activity The article presents a review on medicinal plants with potential anti ulcer activity. *Garcinia combogia*, *Terminalia Chebule*, *Abutilon*
indicum, Boswellia serrata, Centella asiatica, Polyalthia longifoli, Allophylus serratus kurz, etc., which are today popular all over the world due to their proven effective qualities for treating anti ulcer.

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