1 LITERATURE REVIEW

1.1 LITERATURE REVIEW:

• Parmar et al., (1994) was worked on an evaluation of anti ulcer agent using various modal like gastric and duodenal ulcer. Along this they also suggested other experimental methods which are helpful in elucidating the various mechanisms like Cytoprotection, Hist-blockers, anti-seccratory, effect on GI mucosal blood flow, gastric potential difference with involvement of biochemical alterations including gastric mucus, mucosubstance, postacyclin, sulphydryl etc. which were involved in the ulcerogenic and/or gastroprotective effect of new drug.

• Hinrichsen et al., (1992) stated that when cimetidine or ranitidine given then sinus bradycardia, arrest in sinus and increase the atrioventricular conducting time.

• Akram et al., (2010) said that in Pakistan, sullying rate was around 83% in adult patients encountering upper gastrointestinal endoscopy for diverse reasons. Malady with H. pylori is joined with a three to six fold increase in threat of developing non heart (body and antrum) stomach development.

• Gilard et al., (2006) communicated that Clopidogrel limits platelet incitation when it given in blend.

• Ogawa and Echizen (2010) given understanding about medicine relationship with proton pump inhibitors.

• Hajare et al., (2001) whispered that possible relieving development of 90% ethanolic concentrate of Dalbergia sissoo leaves was thought about in unmistakable models. It was contemplated that D. sissoo leaf concentrate had essential relieving development in serious, sub-extreme and unremitting models of bothering. With no side effect on gastric mucosa.

• Singh et al., (2010) analyzed was performed to portray hypoglycemic effect of ethanolic concentrate of Dalbergia sissoo L. leaves in alloxanized diabetic rats. The result was
that ethanolic concentrate of plant Dalbergia sissoo leaves is 12 % more effective in decreasing blood glucose level stand out from standard solution (Glibenclamide).

- Bhaskar et al., (2009) attested that torment assuaging activity was thought about in mice using hot plate and acidic destructive impelled writhing systems, while carrageenan incited paw edema was used to become acquainted with development. They find that ethanol and watery concentrates of P. daemia and C. carandas were found to lessening in a broad sense advancement of edema incited by means of carrageenan after 2 hrs. Both plants demonstrated through and through capable on yeast incited hyperpyrexia in rats after 2 hrs.

- Kuranakar et al., (2009) investigated on anticonvulsant effect of ethanolic concentrate of builds of Carissa carandas with respect to electrically and falsely actuate seizures. They exhibited that ethanolic root concentrate of C.carandas anticonvulsant effect.

- Bas et al., (2008) find that in status and late accommodating treatment causes higher passing rate.

- Dhuley, (1999) contemplated that polyherbal enumerating is more advantageous than built medicines.

- Eom (2010) deciphered that usage of proton pump or histamine -2 receptor adversary may joined with an extend threat of gathering and picked up pneumonia.

- Halabi (1991) shut effect of nizatidine in decreasing heart rate in elderly patients with heart disillusionment or those taking beta blockers.

- Hutchinson (2007) fined that association of a proton pump inhibitor to patients with acquired haemochromatosis can control ingestion of non-haem iron from a test supper and successive eating schedule.

- Laheij (2004) said current use of gastric destructive suppressive treatment had been allied with raised peril of community acquired pneumonia.
• Narayan (2010) concluded that in treatment of gastric ulcer polyherbal formulation having more beneficial results.

• Shanmugasundaram (1990) reported *Gymnema sylverstre* having anti-diabetic activity.

• Hajare (2000) reported that *Dalbergia sissoo* having analgesic and antipyretic activity.

• Halare (2001) reported dried leave of *Dalbergia sissoo* having antibacterial, anti-protozoal, anti-inflammatory activity.

• Taha (1999) given idea about plant constituents of *Dalbergia sissoo*.

• Kirtikar (2003) reported *Carissa carandas* having anthelmintics, astringents, appetizer, antipyretic activity.

• Khare (2007) proved that *Carissa carandas* having activity against acidity.

• Rajasekaran (1999) reported extract of *Carissa carandas* having cardiotonic, antipyretic and anti-viral activity.

• Hasnain (1990) reported for antioxidant, hepatoprotective and analgesic activity of *Carissa carandas*.

### 1.2 LITERATURE REVIEW RELATED TO DRUGS:

#### 1.2.1 Dalbergia sissoo:

*Dalbergia* genus having 300 species all over world and about 25 species available in India. Due to enriching and regularly fragrant wood, rich in aromatics introduce in timber trees Dalbergia are foreign made. (Wealth of Indian Raw Materials, 1972; Chopra R et

1.2.1.1 **Taxonomical classification:**

<table>
<thead>
<tr>
<th>Kingdom</th>
<th>Plantae</th>
</tr>
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<tbody>
<tr>
<td>Division:</td>
<td>Magnoliophyta</td>
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<td>Class</td>
<td>Magnoliopsida</td>
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<td>D. sissoo</td>
</tr>
<tr>
<td>Scientific name</td>
<td>Dalbergia sissoo</td>
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</tbody>
</table>
1.2.1.2 Botanical Description:

Dalbergia sissoo is an expansive tree having tallness of 25 meter and breadth of 2-3 meter. It has 15cm long weathered clears out. leaves are engraved having flyers are 3-5, substitute, 2.5cm-3.6 cm in measurement. They are wide applaud sharpen, glabrescent, petiolules 3-5mm long. blossoms are whitis pink in shading, 5-8mm long, pale white to dull yellow shading. racemes 2.7-3.7cm long in short axillaries panicles. Its crown is fit as a fiddle, organic products is cocoa and unit like shape which is 5-7.5cm × 8-13mm and having 1-4 seeds. seeds are kidney fit as a fiddle having breadth of 6-8 × 4-5mm. (Orwa et al 2009)

1.2.1.3 Geographical Distribution:

The exotic ranges of D sissoo are Bangladesh, India, Bhutan, Malaysia and Pakistan where as native ranges Cyprus, Ghana, Kenya, Iraq, Nigeria, USA, Zimbabwe. (Orwa et al 2009)

1.2.1.4 Traditional Uses:

The Dalbergia sissoo having high values as a medicinal plant also can be used as a timber and fuel wood, in land protection and reclamation. It can found in various region of India, Pakistan and Nepal.

D. sissoo having vast medicinal properties. It has many activities like abortifacient, aphrodisiac, anthelmintic, antipyretic. It can also b used in condition of vomiting, ulcers, dysentery, stomach problem, skin disease. (Kirtikar and Basu , 1993) Different part of D. sissoo like roots, bark, wood, leaves are used in many ayurvedic formulation for many disease like skin disease, blood disease, syphilis, stomach problem, nausea, eye and
nose disorder. D. sissoo having antidiarrhoeal activity because they having anti bacterial activity but they having lack of antimicrobial activity. (Brijesh Et al 2006)

In rural areas of village D. sissoo also be used as folk medicine in various condition like excoriations, gonorrhea and in skin disease. Anti pyretic and analgesic activity also has be seen by leaf of D. sissoo. (Hajare et al 2000). In ayurveda leaves juice also use in eye preparations. Significant anti inflammatory effects without any side effect can possess by alcoholic leave extracts of D. sissoo.(Hajare et al 2001) In animal non specific diarrhea can also be treated by using leaves of D.sissoo. In human beings for sour throats, heart problems, dysentery, syphilis and gonorrhea leaf extract has been used. The leaf extract of D. sissoo also showed anti-oxidant activity batter than regularly used anti oxidants like Selenium and vitamin E. colorectal cancer also can be treated with other conventional treatment shows more powerful effect it may be because of it contain higher amount of flavonoids present in leaf extract. In treatment and prevention of chronic bacterial infection *D. sissoo and Dhatura stramonium* is used with cow urine.

In treatment of eye and nose disease, worm disease, blood disease leaf juice can use. It is also can be used in skin disease, stomach problems, urinary problems, burning sensation. (Ishtiaq et al 2006, Ahmad 2005)

For removing of dandruff from hair boiled leaf filtrate is used. (Sultana et al 2006). Strong repellent action also be showed by D. sissoo oil. (Ansari et al 2005)

**Bark:**

D. sissoo bark get utilized as a part of distinctive ways it get utilized as anthelmintic, aperitif, Spanish fly with expectorant and refrigerant activity. Bark can be use as anti inflammatory and as anti oxidant. (Kumari and Kakkar 2008) As par ayurveda bark or wood of D. sissoo is used in various diseases like blood disorder, dysentery, dyspepsia, leucoma. In unani line of treatment bark is used for treatment of scabies, scalding urine, blood disease, stomach problem, syphilis. bark having properties of bitter, hot, abortifacient, expectorant, anthelmintic and antipyretic, vomiting, skin disease, anti ulcer. (Ahmad 2007)
**Synonyms:**

English: Bombay blackwood, Sissoo, Indian rosewood, sissoo  
Hindi: Agaru, biridi, tali, gette, kara, shisham, sisam, sissai, sissu, sissoo  
Sanskrit: Aguru, shinshapa  
Bangali: Shisu, shishu, sisu  
Tamil: Sisutti, sisso, nukku, kattai, yette, gette  
Arabic: Dabergia, sissoo  
Nepali: Sissau, sisham  
Indonesian: Pradu-khaek, du-khaek  
Javanese: Sonowaseso  
Spanish: Sisu  
Thai: Du-khaek, pradu-khaek  

**Chemical constituent:**

The different plant part having different chemical constituent, which is explain downward.

**Leaves** of plant having trisaccharides, oligosaccharides.

**Tree trunk** contain flavnoides.

**Flower** contain tectorigeninbiochanin.

**Leaf** containing phenols.

**Stem bark** and **Heartwood** contain neoflavenes, pods contain tannin, bark contain flavonoids, hearwood contain dalbergin, 4-phenyl chromene, dalbergichromene and amino acids like glycine, alanine, threonine, linoleic acid, oleic acid.
Root bark contains chalcone, flavones, 7-hydroxy-6-methoxflavone, rotenoid, dehydroamorphigenin.

Root contains cardiac glycosides, anthraquinones and saponins.

1.2.1.5 Pharmacological action:

1.2.1.5.1 Antidiabetic Activity:

Study demonstrates that when ethanolic concentrate of leaves was administrated orally at measurement of 250 and 500 mg/kg to solid rats. Out of both measurement 500 mg/kg discovered to be more successful than 250mg/kg. Dosage of 500mg/kg lessen more blood glucose level in ordinary rates its around 38.2% diminishment in blood glucose level in one day dosing. When it given to Alloxan induce diabetic rats for 21 days that large decrease in RBS level in both doses of 250mg/kg and 500mg/kg. so it can concluded that ethanolic leave extract having hypoglycemic and anti-hyperglycemic activity.

1.2.1.5.2 Anthelmintic Activity:

Anthelmintic activity was investigated against earthworms using ethanolic extract of bark of Dalbergia sissoo. Using standard drug as piperazine citrate (15mg/ml) and albendazole (20mg/ml) and saline as a control with different concentration of ethanolic extract of Dalbergia sissoo were compare effect on parasite. The study showed that Dilbergia sissoo having potential usefulness to paralyzed and kill worms.

1.2.1.5.3 Anti-inflammatory Activity:

Anti-inflammatory activity was investigated with different models using methanolic extract of Dalbergia sissoo. In carrageenan induced paw edema Dalbergia sissoo showed good effect when Dalbergia sissoo used in 70% methanolic extract. Dalbergia sissoo root extract given in 1000 mg/kg dose it showed most potent anti-inflammatory action without any side effects.
There may risks of conceivable mitigating action of 90% ethanolic concentrate of Dalbergia sissoo on rear paw edema provocative modal. The arrangement was made up with one percent carrageenan in 0.5% sodium carboxymethyl cellulose and managed in right rear paw of the creature. perception said that out of three separate dosages of Dalbergia sissoo 300 mg/kg, 500 mg/kg, 1000mg/kg hinder irritation however dosage of 1000mg/kg indicated more powerful hostile to provocative activity. This may due to bark having sugar, protein, amino corrosive, tannins and flavonoids.

1.2.1.5.4 Antimicrobial property:
Antimicrobial property was study utilizing two medications as a part of blend, Dalbergia sissoo and Datura stramonium with bovine pee. The movement was assessed utilizing gram-positive microscopic organisms like Sraphylococcus aures and Streptococcus pneumonia and gram-negative microbes like Rscherichia coli, Pseudomonas aeruginosa. Assessment was done by utilizing chloramphenicol (30mcg), Ampicillin (10mcg), Nalidixic corrosive (10mcg) and Rafampicin (30mcg) as standard medications. By giving restraint of DNA and RNA combination bovine pee is given most intense hostile to microbial impact on both classes of gram-positive and gram-negative microbes.

1.2.1.5.5 Analgesic and Antipyretic:
Nociceptive receptors are receptors which build power of agony motivations. Tail flick model was utilized to research movement of torment refluxes on rats utilizing ethanolic concentrate of bark of Dalbergia sissoo. Ethanolic concentrate were made in diverse measurements of 300mg/kg, 500mg/kg, 1000mg/kg and get assessed by contrasting and that of standard medication 300mg/kg. outcome discovered to be critical in dosage subordinate maner where P 0.01. These impacts may be a direct result of ethanolic concentrate having phytochemicals like starches, proteins, amino acids, phenolic mixes and flavonoid.
1.2.1.5.6 Antidiarroheal Activity:

Utilizing distinctive routines like agar weakening technique, tube weakening strategy and nonpartisan red uptake measure antibacterial movement, antiprotazoal and antiviral action of D. sissoo were assessed separately. Utilizing ganglioside corrosive reseptor ELISA cholera poison and Escherichia coli labile poison were tested. E. coli stable poison was inspected by sucking mouse measure. They find that D. sissoo were lessened creation and tying of cholera poison and bacterial adherence and attack. They inferred that D. sissoo is shows antidiarrohoal impact on account of bacterial harmfulness.(Brijesh S et al 2006; Mujumdar M,2005)

1.2.1.5.7 Antioxidant Activity:

DPPH free radical searching movement, decreasing force, ferric diminishing cancer prevention agent force measure, ferrous particle rummaging action and nitrous oxide radical rummaging movement was carried on distinctive stem concentrate of D. sissoo like petroleum ether, chloroform, and methanol. Out of all different stem concentrate chloroform concentrate having astonishing result in all models in different measurements where as petroleum ether and methanol concentrate having moderate activity. (Kaur A, 2011) free forager action was controlled by nitric oxide and hydrogen peroxide utilizing methanolic root extricate. At measurements of 250 µg/ml greatest searching movement was found in ntric oxide (26.66%) and hydrogen peroxide (50.68%). outcome obviously demonstrated that D. sissoo having intense cancer prevention agent movement. (Arya V. 2011)

1.2.1.5.8 Larvicidal and mosquito repellant activity:

D. sissoo indicated larvicidal action against mosquitoes in oil concentrate of wood. Anopheles stephensi, Aedes aegypti and Culex quinquefasciatus mosquitoes were utilized to assess larvicidal and repellant action of oil. Larvicidal movement demonstrated by oil in measurements depended way. On account of Culex quinquefasciatus mosquitoe oil demonstrated 100% mortality in 24hr at 4ml/m2. In sublethal measurements 2ml/m2 Aedes aegypti mosquitoes neither lay eggs and in Culex quinquefasciatus nor hatch. In measurements of 1ml/m2 of oil indicated
extraordinary anti-agents action when it applies on uncovered piece of human. The term of activity is 8-11hr. (Ansari, 2005)

1.2.2 Carissa Carandas:
Throughout India Karamarda is found, having family Apocynaceae. Frequently it is use in pickles and spices.

Scabies, intestinal worms, pruritus, biliousness in various diseases traditionally Karamarda use to treat disease. The various kind of pharmacological activities also it having like anti-inflammatory, analgesic, anti-pyretic, cardiotonic. Along with these activities it has also evidence to show hepato-protective, free-radical scavenging, antireheumatic, antibacterial, antiviral and anticonvulsant activity.

1.2.2.1 Taxonomical Classification:

Kingdom: Plantae

Division: Magnoliophyta

Class: Magnoliopsida

Order: Gentianales

Family: Apocynaceae

Genus: Carissa

Species: Carissa Carandas
1.2.2.2 Synonyms

Krishanapaakaphalam, Sushenaa, Karamardikaa, Vaneshudraa, Sheeraphenaa, Saamlapushpaa.

1.2.2.3 Vernacular name:

Sanskrit: Karmard, Sushena

Hindi: Karamarda

English: Carnberry Bengal current, Christ’s thron, Corinda tree, Karanda

Tamil: Kalakai, Kalakkay

Telugu: Vakkay, Peddakalavi

Kannada: Karjige, Karekayi

Gujarati: Karamdaa
1.2.2.4 Botanical Description:

Habit: A large thorny evergreen shrub

Height: 2-3m

Extensions: unbending and spreading with 2cm straightforward or forked thistles, up to 5cm long on axils and hubs.

Bark: light green.

Leaves: inverse, basic; exstipulate; petioles short; laminae elliptic or extensively elliptic

Inflorescences: In axillary corymbose cymes; bracts liner.

Blooms: Fragrant blossom with white or pale rose hues, swinger, actinomorphic, pentamerous, hypogynous.

Corolla: 5 projections, salverform, flaps oval lanceolate, pubescent, white.

Androcium: polyandrous, apically appendaged, basifixed, introrse, dehiscence longitudinal.

Gynoecium: one ovary ellipsoid 2-carpeled, syncarpous, 2 in every locules, style filiform disgrace minutely bifid.

Organic product: Small in size around 1.5 to 2.5 cm long, littlebit gruff pointed blackish or ruddy purple when ready, mash is rosy purple and sharp.

Seed: Oblongoid, curved endosperm plump
1.2.2.5 Chemical constituents:

Root: It contain 2-acetyl phenol, salicylic acid and alkaloid. It also contains casrissone, carinol, lignin, odoeriside H, digitoxigenin, glucose, D-digitalose, acetylphenol and terpenoid from root materials. Stem bark contain alkaloids. Leaves contain triterpenes, tennins, ursolic acid and carissic acid. Fresh flower contains myrcene, limonene, camphene, careen, dipentene, farnesol, nerolidol, dihydrojasmine, α-terpenol, citronellal, β-ionoe, nerylactate, linalol and geranyl acetate. Fruit contains 2-phenyl ethanol, linalool, β-caryophyllene, iso amyl alcohol, benzyl acetate, lupeol, malonic acid, glycolic acid, glycine, alanine, phenyl alanine, oxalic acid, cerine, glucose, tartaric acid, galactose, malic acid, and a novel triterpenic alcohol. Seeds contains fatty acids, likes palmitic, stearic, oleic, arachidic linoleic acid.

1.2.2.6 Pharmacolognosy:

Carissa carandas having small and thin, flat stem bark. Stem bark is slightly rough due to longitudinal striations, brownish external surface, and gray internal surface. Mature bark when seen in microscope wide zone of stratified cork having lenticels at a few place can observed. In secondary cortex thin walled, tubular, parenchymatous cells are present which having group of stone cells. Cortical fibers are in single or in groups which having prismatic crystals of calcium oxalate.

1.2.2.7 Ayurvedic properties:

Rasa- Taste- Amla (Sour), Tikta (Bitter)

Guna-Quality- Guru (Heavy)

Veerya-Potency- Ushna (Hot)

Vipaka-Post digestive effect- Amla (Sour)

Doshaghnata- Disease pacifyingeffect-Vatashamaka

Rogaghnata- Trishana (Thirst), Aruchi (Tastelessness), Agnimandya (Indigestion),
Prashtada (Dental diseases), Vatavikara, Yakridvikara (Diseases of liver), Visphota (boils),
Vishavikara (Diseases due to poisoning).

1.2.2.8 Uses

**Root:** The roots are useful in various stomach disorders like acidity, flatulence it also be use in anthelmintic, stomachic, antiscorbutic, intestinal worms, scabies, diabetic ulcer, pruritus, gonorrhea, pyrexia, indigestion, chronic ulcer, biliousness, urinary disorders and act insect repellent.

**Stem bark:** In skin disease stem bark of Carissa carandas is used.

**Leaves:** Leaf of it can be utilized as a part of fever, the runs, ear infection, soreness of mouth and throat.

**Fruits:** The unripe fruits can utilize in various symptoms like pyretics, mucosal congestion, and gastric problems. It also can be used in diarrhea, anorexia, disease of brain and in haematemesis. The ripe fruit sweet in taste having cooling, appetizing, antiscorobic and is useful in bilious complaints, expectorant anorexia, burning sensation, scabies, pruritus and other skin diseases. It can also be useful in anemia and poisoning and libido function improvement in woman. The fruit having antimicrobial and anti fungal activity it can also be used to clean old wound infection.

Different plant part reported for different activities like dropsy, anasarca, madness, rheumatism, hemiplegia, epilepsy, convulsion, postnatal complains.

**Tradition Medicinal Uses:**

Traditionally *Karamarda* used in treatment of cancer with different part of plants. They utilized diverse plant parts like roots, blossoms, spines, leaves and natural products are blended in equivalent amount and smash to structure watery glue. Also, this glue gets utilized as a part of cleaning of wound. Alongside this, glue can bubbled in water and
when half amount of water remains, bubbling get halted and water get utilized as a part of treatment of tumor. Impact get more when it can consolidated with piece of neem.

Other uses:

In India Karamarda use in different ways like making in jam, jelly, squash, syrup, etc. Fruits having astringent effect, also it can be use in tanning and dying. The fruit extract use as a refreshing drink in hot weather. The unripe fruit can utilize in making of pickle. In Rajasthan Karamarda used in making of testy dish with chili.

1.2.2.9 Pharmacological Activities:

1.2.2.9.1 Anticancer

Anticancer activity of Carissa carandas has been done using different extract. On human ovarian carcinoma cell line, chloroform extract of leaves shows cytotoxicity with the dose of EC\textsubscript{50} 7.702 µg/ml. In case of n-hexane extract of unripe fruits shows cytotoxicity against cancerous cell of lung in dose of 2.942 µg/ml. The similar action also can be observed with chloroform extract of unripe fruits with same dose taken in case of n-hexan.

1.2.2.9.2 Anti-inflammatory /Analgesic/Antipyretic activities:

Carissa carandas eth. or aq. root extract was taken for evaluation of analgesic, antipyretic and anti-inflammatory study using various model like hot plate method, acetic acid induced abdominal writhing model, carrageenan induced rat paw edema. In case of hot plate method and acetic acid induced abdominal writhing model both ethanol and aqueous extract of Carissa carandas shows more significant action. But in Carageenan induced rat paw edema model more effective is ethanolic extract as compared to aq. extract of Carissa carandas. Both ethanol and aq. extract of Carissa carandas shows significant antipyretic action.

1.2.2.9.3 Hepatoprotective action:

There is a traditional belief that Carissa carandas having hepatoprotective activity. Researcher took ethanolic extract of root of Carissa carandas in various oral doses to
evaluate hepatoprotective activity against CCl$_4$ and paracetamole. What's more, they find that root concentrate of Carissa carandas diminish altogether serum marker catalyst, bilirubin and lipid paroxidation. It increments in level of uric corrosive, glutathione, super oxide dismutase, catalase and protein in a measurements subordinate way. Thus, they reasoned that ethanolic concentrate of Carissa carandas have hepatoprotective action.

1.2.2.9.4 Anti convulsant activity:

It was used in different dose (100, 200, 400mg/kg) against above model. They find that in maximal electroshock prompted seizure show all measurements of root concentrate demonstrated critical diminishment in term of seizure. In dosages of 200 and 400mg/kg ethanolic root concentrate gave assurance against seizure. Furthermore, same measurements give more noteworthy activity against pentylenetetrazole affected tonic seizure and in N-methyl-dl- aspartic corrosive model it postponed onset of seizure.

The gathered information proposed that ethanolic root concentrate of Carissa carandas indicated against convulsant impact by ensuring and deferring seizure.

1.2.2.9.5 Antibacterial activity:

P. aeruginosa, S. aureus, E. coli like pathogen get utilized to evaluate antibacterial activity of Carissa carandas. For this they used methanolic, ethyl acetate and ethanolic extract of Carissa carandas leaves. Out of this ethyl acetate and ethanolic leaves extract having average inhibition against pathogen but methanolic extract showed more significant inhibition against pathogen when it compared with tetracycline.

1.2.2.9.6 Cardiotonic activity:

Methanolic extract of Carissa carandas was evaluated for cardiotonic and cardioprotective action. For that different parameter get used like bloodpressure, various urine test along with these histopathological investigation also done with anatomical changes including thickness of wall of ventricles and diameter of ventricular wall chamber. Methanolic extract of Carissa carandas showed potent remodeling
activity by regulating blood flow. In histopathological study also showed that intermyocardial distance also improved. Cardiac hypertrophy caused by physiological stress also overcome by use of it. They also observed that preload and afterload was reduced which get increase because of physiological and pathological changes. After seen such a kind of result they concluded that methanolic extract of *Carissa carandas* Linn having potent cardiac remodeling and cardioprotective activity.

1.2.2.9.7 Neurological and diuretic activity:

Neurological and diuretic activities were studied using methanolic extract of *Carissa carandas* Linn. Neurological study was evaluated by different model like pentobarbital induce hypnosis, exploratory behavior in which open field test, hole cross test and hole board test. Diuretic activity evaluated by calculating electrolyte ratio. They find that methanolic extract of *Carissa carandas* leaves potentiate action of hypnosis induced by pentobarbital in mice. Methanolic extract showed reduced score in open field test, in hole cross test it reduce number of hole cross from one chamber and in hole broad test it decreased head dip responses. When methanolic extract evaluated for diuretic activity compared with furosemide it decreasing electrolyte ratio and showed diuretic activity.

1.2.3 Gymnema sylverstre:

Asclepiadaceae is a family of *Gymnema sylverstre* R.Br. which is distributed widely in all over in India. In various region it known by various name.

<table>
<thead>
<tr>
<th>Language</th>
<th>Name</th>
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<tbody>
<tr>
<td>English</td>
<td>Periploca of wood</td>
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<tr>
<td>Hindi</td>
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<tr>
<td>Sanskrit</td>
<td>Meshashringi, madhunashini</td>
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<td>Marathi</td>
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<td>Adigam, cherukurinja</td>
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<td>Telgu</td>
<td>Podapatri</td>
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</table>
Kannada: Sannagerasehambu (Kanetkar P, 2007; Paliwal R, 2009; Potawale E, 2008)

The name *Gymnema* is given by hindu word *Gurmar* which means “destroyer of sugar”. Furthermore, it having a capacity to obliterate inordinate sugar introduce in body in Diabetes mellitus.

1.2.3.1 The taxonomical classification given below:

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<th>Plantae</th>
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</table>
1.2.3.2 Plant description:

*Gymnema sylvestre* distributed all over India, it having height of 600 m. It is slow grooving, perennial, woody climber. The plant is become various in size when it come in puberty. Leaves arrangement are opposite. Little, yellow, in axillary and parallel bloom plan. Terete and lanceolate upto 3 inches long of follicles. Calyx flap plans are long, applaud, and harsh. In corolla it is having 5 plump scales with yellow shading and valvate aestivation. Anther and carpel is display in pair. (Potawale E, 2008)

*Gymnema sylvestre* having variety of therapeutic uses in ayurved and homeopathic medicine system. Majorly its use in treatment of diabetes and gastric problems i.e. constipation, hemorrhoids and hepatosplenomegally. plant also be used in treatment of urinary problem, breathing trouble and in asthma. Along with this it having antimicrobial, anti-hypercholesterolemic and anti inflammatory action. The researcher survey reveal that *Gymnema sylvestre* having many effective ingredient which are responsible for these action.

1.2.3.3 Pharmacognostic Studies:

In India leaves of *Gymnema sylvestre* used in treatment of diabetes and as diuretics. selling rate of leaves and aerial parts of these drugs in herbal market is higher. Therefore, microscopic and macroscopic characters of this drug must have to know.
1.2.3.4 Macroscopic characteristics

*Gymnema sylverstre* having green leaves with hairy and light brown stem. The leaves having properties like straightforward in structure, vicinity of petiolate, adjusted to cordate base, edge whole, inverse with intense zenith. The leaves having reticulate venation, pubescent on both surface. Gymnema sylverstre's leaves having trademark arrange and biting taste. It having a capacity to get desensitizes sweet taste for few hours. (Madhurima H, 2009)

1.2.3.4.1 Microscopic Characteristics

- **Petiole:**

  Steed shoe shape petiole can be seen in transverse segment. Barrel formed single layer epidermis is available with thick walled of uniseriate, multicellular, non-glandular trichomes.

- **Lamina:**

  In lamina epidermal cells are square with external arched divider and flimsy fingernail skin. In transverse segment of lamina, epidermal cell surface are seen hindered with tricomes, which are multicellular. Underneath adaxial epidermis single layer nearly masterminded palisade cells are available. (Madhurima H, 2009)

- **Stem:**

  Stem seen round in transverse area. The external layer epidermis is barrel molded and having thick walled. Trichomes are multicellular and uniseated. The stopper is made by 3 to 5 layers and corticells are recently extended and collenchymatous. The xylem is consistent and barrel fit as a fiddle having vicinity of medullary rays.Stem having obvious and expansive pericycle. (Madhurima H, 2009)

- **Powder:**

  The powder is yellowish green in shading having astringent in taste with fragrant smell. (Madhurima H, 2009)
2.2.3.4.2 Identification test:

With 1 N watery Naoh and half KOH respond with powder material it shows green fluorescence under UV 254nm. When it treated with half HNO3 in sunlight it demonstrated orange shading. General distinguishing proof test of Gymnema sylverstre with hydro alcoholic concentrates: i) it can desensitize sweet taste buds ii) it deliver froth when it shake with water iii) concentrate is blended with weaken corrosive it create voluminous hasty.

1.2.3.4.2 Purity test: (Rajpal V, 2006)

The immaculateness can be found by accompanying test:

I. Maximum dampness content not more than 6%.

II. Total powder content not more than 12%.

III. Heavy metal substance in leaves extricate not more than 40ppm.

1.2.3.4.3 Phytochemistry:

The leaves of Gymnema sylverstre contain oleanane and dammarene classes of triterpene saponin. Gymnemic corrosive and gymnemasaponin comes in oleanane saponins while gymnemasides comes in dammarene saponin. (Khramov 2008) The leaves additionally contains different sort of phytochemicals like resins, chlorophyll, egg whites, sugars, formic corrosive, tartaric corrosive, butyric corrosive, anthraquinone subsidiaries, inositole alkaloids, natural corrosive, parabin, calcium oxalate, lignin, cellulose.

1.2.3.4.4 Mechanism of action of Gymnema sylverstre:

_Gymnema sylverstre_ have been reported as hypoglycemic action on preclinical and clinical study. It can use in treatment of diabetes mellitus. The researcher accepted that leaves concentrate may fortify arrival of insulin from pancreas furthermore may build uptake of cholesterol by cells. There are many machenism by which leave extract of _Gymnema sylverstre_ showed hypoglycemic action:

✓ It initiates activation of islet cells,
✓ It increase release of insulin,
✓ It is not allow to absorb insulin in intestine,
✓ It increase utilization of glucose in body by activation of enzyme responsible for regulation of insulin dependent pathway,
✓ It increases phosphorylasse activities and decreases process of glucose formation by desensitizing enzyme.

1.2.3.4.5 Uses:

1.2.3.4.5.1 Traditional Uses:
In susruta Gymnema sylverstre use as madhumeha furthermore it is use in treatment of urinary issue. It additionally groups numerous sort of exercises like thermogenic, mitigating, intense, astringent, acrib, digestive, liver tonic, emetic, diuretic, stimulant, stomachic, anthelmenthis, purgative, expectorant, antipyretic and uterin tonic. It can likewise be use in treatment of dyspepsia, stoppage, hemorrhoids, jaundice, renal and vesicle calculi, cardiopathy, asthma, bronchitis, amenorrhoea, leucoderma and conjunctivitis.

Traditionally it can also be used in various ayurvedic preparation like Ayaskri, Varunadi kasaya, Varunadighrtam, Mahakalyanakaghrtam.

1.2.3.4.5.2 Ethnobotanic Uses:
In India close around 400 tribal and other ethnic gatherings are available. Every tribal gathering having their own particular values in custom people dialect, convictions and information about utilization of regular assets and drugs. Ethnobotanists review and behavior report of plants. Numerous territories of Gujarat utilized green leaves of Gymnema sylverstre for biting in morning as a component of treatment of diabetes furthermore be utilized as a part of cleaning of pee by decreasing glycosuria. In Bombay, Gujarat and Madras, vaids are utilized green leaves of Gymnema sylverstre in treatment of furunculosis and madhumeha. Root part additionally be utilized as a part of treatment of diarrhea and plant glue is utilized as a part of mouth ulcer when it apply with mother milk. (Ekka N.and Dixit V,2007)
1.2.3.4.5.3 Pharmacological Uses:

*Gymnema sylvestre* showed many pharmacological actions by different mechanism. Majorly this drug is used in neuropathic treatment for diabetes. It likewise has activity against Hyperlipidemia, stoutness, joint inflammation, Parkinson, hypercholesterolemia (Rachh P, 2010). Plant having bioactive substances that is reason they additionally follow up on aggravation and growth like illness. The plant leaves act against obesity (Parimala V, 2010), dental problems (Parimala V, 2010), go about as anti-infection agents, stomach issue, blood purifier, and in rheumatic arthritis. Distinctive pharmacological properties of plant have been examined in point of interest. Distinctive plant parts like leaves, root reported diverse restorative properties which is utilized as a part of distinctive illness in ayurvedic arrangement of treatment.

1.2.3.4.5.4 Antidiabetic Property:

The plant *Gymnema sylvestre* having sweet taste destroying ability. *Gymnema sylvestre* contains presence of triterpenesaponins known as gymnemic acids, gymnemasaponins, and gurmarin. In beryllium nitrate and streptozocin treated rats evaluated for hypoglycemic effect and experimental trial conformed hypoglycemic effect. Researcher found increase in body weight of rats but there is significantly decrease in fasting blood glucose level which was quite similar action of insulin and glibenclamide treated animal.

Kang et al 2012, found anti oxidant activity of leaves ethanolic extract of *Gymnema* which having role in Diabetes. Many assay was perform to evaluated anti-oxidant activity like thiobarbituric acid assay, Superoxide dismutase assay, azinobis assay. For evolution of hyperlipidemic activity of gymnemic acid and gymnemagenin done by LC/MS analysis. They find reduction of lipid peroxidation in serum 31.70 %, in liver 09.90 %, in kidney 09.10 % in diabetic rats. The ethanolic leaf extract can also activate enzyme glutamate pyruvate transaminases involved in gulconeogenesis and ketogenesis and in liver it activate glutathione peroxidase. (Patil M, 2012)
antihyperglycemic effect is reported for five triterpene glycoside which a fraction of saponin isolated from methanolic leaf extract of G. sylverstre. Within 6 hours of administration it reduce blood glucose level significantly. Gymnemic acid IV was reported for increase in plasma concentration of insulin.

In a same manner antidiabetic and antihyperlipidemic activity was evaluated using dried powdered leaves of G. sylverstre. Leave extract was administered in non diabetic and alloxan induce diabetic rats. They found that there was no effect on alleviated glycemia by normal food and administration of glucose but it may cause increase serum lipid level in superoxide dismutase. But in alloxan induce diabetes showed no effect on body weight and lipid level in blood. So they concluded that methanolic extract of Gymnema sylverstre having anti diabetic and antihyperlipidemic activity.

1.2.3.4.5.5 Antiarthritic activity:

Antiarthritis activity was evaluated using leaf extract of G. sylverstre. There was significant result found as antiarthritic when it evaluated using water soluble and petroleum ether extract. The prediction was that effect was due to presence of natural triterpenoid, steroids and saponin glycosides. Different extract was made using 1% Tween 80 and Diclofenac use as standard. Drug was administered once daily upto 21days and many observation was made like swelling in multiple joins on induction with an adjuvant and exhibited inflammation in cells, fracture in bone and reshaping in bone. result was significant reduction in paw swelling model treated by petroleum ether extract. anti inflammatory effect may be because of inhibiting of cytokines, interferons and prostaglandin responsible for pain impulse. The another mechanism may also act like protection of joint cartilage. The conclusion was leaf ether extract having potent antiarthritic activity.

1.2.3.4.5.6 Treatment of Dental caries:
S. aureus, S.mitis and S. mutants like gram positive bacteria and Candida albicans like fungi may causes infection in tooth and causes dental caries. These kind of pathogen may stick to tooth and metabolize sugar into lactic acid which is cause demineralization of tooth enamel. various concentration of 25, 50, and 100 mg/mL of chloroform, petroleum ether and methanolic leaf of G. sylverstre evaluated for microbial dental inflation. Out of all extract methanolic extract was found more potent in low dose. The marketed product “Gurmar Herbal tooth paste” and “Gurmar Herbal tooth powder” having good potential against tooth infection. (Parimala V. (2010)

1.2.3.4.5.7 Antibiotics and Antimicrobial activity:

The different kind of microbes like S. aureus, E.coli and B.subtilis was used to evaluate antibiotic and antimicrobial activity with different extract of G. sylverstre. The antibacterial activity of G. sylverstre was evaluated of E. coli and B. cereus and found leaf extract having significant anti microbial activity.

Bhuvneswari et al, (2011) evaluated methanolic extract of aerial and root part of G. sylverstre. They find that extract showed activity against broad spectrum of microbes. The same study was performed using ethanolic extract against Bacillus pumilus, B. subtilis, P. aeruginosa and S.aureus. The study confirmed that ethanolic and methanolic extract of G. sylverstre possess significant antimicrobial and antibiotic activity.

1.2.3.4.5.8 Anti inflammatory Activity:

The G. sylverstre is believe as unpleasant, bitter, digestive, liver tonic and anti inflammatory. For anti inflammatory activity bioactive substance tannin and saponins are responsible in G. sylverstre. For evaluation of anti inflammatory activity various model get used like rat paw oedema and cotton pellet induces granuloma model. The aqueous leaf extract of G. sylverstre was used in dose of 200, 300 and 500 mg/kg with standard drug phenylbutazone. They find that dose of 300 mg/kg showed 48.5% reduction in oedema in rat paw model where as standard drug reduce inflammation up to 57.6%. At dose of 200 mg/kg and 300 mg/kg showed significant reduction in granuloma as compared to control.
1.2.3.4.5.9 Anticancer and Cytotoxic Activity:

It is reported that which plant derived saponin namely ginsenoside, soyasaponin and saikosaponin they possess anticancer activity. On HeLa cancer cell line in in-vitro condition gymnemagenol showed potential anticancer activity. Using MTT cell proliferation assay cytotoxic activity of saponin was tested. different concentrations of gymnemagenol were taken and plates were kept for observation. After 96 hours IC\textsubscript{50} value was calculated and it was 37\(\mu\)g/ml. Out of all dose 50 \(\mu\)g/ml showed significant cytotoxic activity on HeLa cells. The gymnemagenol was found to highly active against proliferative cells of HeLa. Along with this Gymnema showed no harmful effect on normal cells in in-vitro condition. So they conclude that gymnemagenol possess anti ulcer activity which is more beneficial for nowadays.

1.2.3.4.5.10 Antihyperlipidemic Activity:

Recently mortality rate gate higher because of coronary artery disease than other disease.(Hardman G. and Gilman G. 2001) Hyperlipidemia is major factor for causing atherosclerosis and other heart related disease. (Kaushik M. 2011) If reduction of cholesterol level in blood may avoid heart problems. Because of major side effect and adverse reaction there is limited use of allopathic treatment. The gymnemic acid formulation found to be effective in reduction of obesity. Triterprnr saponin deriver many acylated derivatives of deacylgymnemic acid. In Gymnema sylverstre gymnemic acid derived many substances like gymnemic acid I-VII, gymnemoside A-F, gymnemasaponins. The different diet were fed to rats in different group of high cholesterol diet, atorvastatin as standard, high cholesterol diet with hydroalcoholic extract of gymnemic acid up to seven days. The animal in group of high cholesterol diet showed rise in serum cholesterol level, serum triglycerides, low-density lipoprotine cholesterol as compare to normal animals. The group of high cholesterol diet with hydroalcoholic extract of gymnemic acid showed significant reduction in all cholesterol level at dose of 200 mg/kg as compare to group of high cholesterol diet. The hexan extract of Gymnema sylverstre reported for antiobesity activity. The reduction in body weight and higher temperature due to obesity was observed when hexan extract of Gymnema administered for 45 days. It also observed that extract able to control
cholesterol, triglyceride, LDL levels. The study proved that hexan extract of Gymnema sylverstre possess anti obesity activity when it compared with standard drug atorvastatin.

**1.2.3.4.5.11 Immunostimulatory Activity:**

Immunostimulant having an ability to enhance immunity. These agents enhance or suppresses its action against body response to a particular condition and maintain ideal condition of body. leaf extract of *G. sylverstre* reported for immunostimulatory effect. For these study aqueous extract of leaf get examine for different immunostimulatory action. It can be determined by movement of neutrophils, chemotaxis tests, phagocytosis of killed *C. albicans*, and nitroblue tetrazolium assay. In-vitro study of immunostimulant activity of leaf aqueous extract of *G. sylverstre* showed remarkable immunostimulant activity in different doses.

**1.2.3.4.5.12 Hepatoprotective activity:**

Researcher was evaluated hepatoprotective effect of hydro-alcoholic extract of *G. sylverstre*. With rat hepatocytes hepatoprotective activity was evaluated using different hydro alcoholic extracts. In D-galactosamine induced hepatotoxic model dose of 200, 400, and 600 µg/mL showed significant antihepatotoxicity whereas 800 µg/mL dose showed cytotoxic action. After treatment with different extracts they able to restored altered biochemical parameters to normal when it compared to D-galactosamine treated animals.

**1.2.3.4.5.13 Wound healing activity:**

It was also evaluated alcoholic activity of alcoholic leaf extract and they find leaf extract showed significant wound healing activity.

Researcher was found that hydro alcoholic extract of *G. sylverstre* possess good wound healing activity as compare to control. Many parameters were used for evaluate activity like TLC analysis, wound contraction, and qualitative tests. Because of free scavenging activity and presence of phytochemical agent (flavonoids) in leaf extract may possess
wound healing activity. The presence of flavonoids were detected by TLC and phytochemical analysis.

1.2.3.4.5.14 **Ethanobotanical Uses.**

The leaves of *G. sylverstre* were used traditionally in treatment of diabetes where as other parts like flower and bark used in treatment of respiratory disorder.

The *Sushruta*, is ancient literature of Indian medicine, describe about gurmar as a destroyer of madhumeha. extract of *G. sylverstre* also be used in treatment of inflammations, help in digestion, liver tonic, diuretic, stimulant, thermogenic, stomachic, cardiotonic, anthelminitics, antipyretic, laxative, uterine tonic. plant has been also reported in treatment of liver disorder like jaundice, stomach problem like constipation, in cardiopathy, respiratory disorder like asthma and bronchitis, in eye problem like conjunctivitis, in renal problem like vesical calculi, in skin problems like leucoderma and in CNS problems like parkinsonism.

Ancient literature given idea about extract used in multiple disorders like anodyne, hepatosplenomegaly, stimulant, antipyretic, alexipharmic, cardiotonic, stomachic, uterine tonic, laxative, intermittent fever and in skin disorder.

The root bark of plant used in pain as analgesic, emetics and in snake bite juice of root can helpful.

Rather than this plant extract also be useful in condition like piles, intestinal pain, eye, cardiac and respiratory problems.

1.2.3.4.6 **Bio availability and Toxicity:**

For any herbal drug bioavailability is main and important factor for effectiveness. Gymnemic acid is a active phytochemicals present in *G. sylverstre* which has poor lipid solubility and because of that it cannot easily absorb and riches in to systemic circulation.

Pathan and his colleague established technique for herbal formulation to increase bioavailability of gymnemic acid. They used combination of gymnemic acid and
phospholipid complex to increase bioavailability. Bioavailability gets increase because of increase capacity to cross lipid biomembrane.

The complex showed cardio-protective activity because complex showed antiapoptotic potential. In toxicity study it showed safe in recommended dose.

1.2.4 Antiulcer Drugs of Herbal Origin:

Indigenous source of herbal origin have not investigate effectively for presence of safe and antiulcer drugs. The some plants have been reported for significant antiulcer activity in last few years. But in case of herbal drug research is not reached up to that level as compared research was carried on H₂ receptor antagonist and PPI drugs more frequently used to treat gastric ulcer.

Therefore initiation was taken place to find out effective and potential herbal drug from natural sources. Some phytochemicals are given as bellows who having potent antiulcer activity.

1.2.4.1 Anthocynosides:

It having potent anti ulcer activity which can extract out from *Vacinium myrtillus*. It can initiates biosynthesis of mucopolysaccharides which can facilitate mucus layer forming in gastric regions.

1.2.4.2 *Apium graveolens*:

It can commonly known as celery, having family Apiaceae. Al-Howiriny and his co-workers reported that ethanolic extract of celery shows potent antiulcer activity in dose of 250 and 500 mg/kg against indomethacin induce ulcer model. *Apium graveolens* shows anti-oxidant activity and because of that it possess potent anti ulcer activity. It can decrease gastric secretion and potent mucus secretion ability.
1.2.4.3 Bupleurum falcatum:

*Bupleurum falcatum* comes in flowering plants having family *Apiaceae*. Root of *B. falcatum* used clinically in China and Japan as a herbal medicine. Shilbata et al. reported that crude saponin fraction of it having antiulcerogenic activity in shay rat model. Polysaccharide crude extract having ability to possess potent anti ulcer activity in ethanol induces ulcer model which is reported by Yamada.

1.2.4.4 Curcuma longa:

*Curcuma longa* having family Zingiberaceae, find in all over India. It can more frequently use as herbal medicine. *Curcuma longa* having curcuma phytochemical which having anti inflammatory activity. Plant extract having more potent anti oxidant activity and because of it can show anti ulcer activity. *Curcuma longa* known as turmeric having yellow pigment curcuma use commonly in India as anti inflammatory agent. Curcuma having ability to suppress prostaglandin. In double blinded study turmeric root decrease pain in biliary dyskinesia. Recently research has been carried on COX-2 inhibition activity.

1.2.4.5 Camellia sinensis:

In world it can be used as nonalcoholic beverage. It can used in medication of various disorder as a green tea. Seed of it having triterpene saponin which having prophylactic action against ulcer induced by ethanol and black tea extract having ability to inhibit ulcerogenic activity. Black tea contain theaflavin active phytochemical. Theaflavin having antioxidant activity, increase PGE$_2$ activity and increase mucus secretion and because of that it showed ulcer healing activity in ulcer produce by indomethacin. Theaflavin having anti-inflammatory activity which can suppress ulcer formation.

1.2.4.6 Glycyrrhiza galbra:

Liquorice is a sweet in flavor which can extricated from *Glycyrrhiza galbra*. It is a leguminous plant found in India. It has family Fabaceae. Mulaithi is a synonym of
liquorice having anti ulcer activity because of capacity to increase mucus secretion, increase level of prostaglandin, increase activity of surface activity and life span of gastric mucosa. Along with that it acquired anti pepsin activity so it can able to heal ulcer. With anti pepsin activity it also having anti oxidant activity which can moderate healing process. In 1960 carbenoxolone was derived from glycrrhethinic acid and used as anti ulcer drug.

1.2.4.7 Kochia Scoparia:

*Kochia scoparia*’s fruit reported for gastroprotective activity because fruit extract has saponin. Gastroprotective action because of it having protective mechanism not because of decrease gastric secretion.

1.2.4.8 Lagenaria vulgaris:

Cucurbitaceae is a family of *Lagenaria vulgaris*. This plant modulate glutathione level and possess anti ulcer activity.

1.2.4.9 Myristica malabarica:

Rampatri is a common name of *Myristica malabraica* having family Myristicaceae. This plants having variety of pharmacological activity like anticarcinogenic, hepatoprotective, anti-thrombatic. Phytochemicals present in it having used in various Ayurvedic preparation. Recently it is reported that plant in methanolic extract having superoxide scavenging and prolyl endopeptidase inhibiting action. Plant also possess anti oxidant activity and base on it shows anti ulcer activity on NSAID induce ulcer model. Plant having two main phytochemicals malabaricone-B and malabaricone-C. both components having ulcer healing activity. This healing activity possess due to mucus secretion activity and by enhancing level of healing factor like endostatin.

1.2.4.10 Panax ginseng:
Sun et al., reported that *Panax ginseng* is used for gastrointestinal disturbance and as an erythropoietic. They used water soluble extract and alkali extract of plant and compare antiulcer activity of plant. (Kang M. 2012)

1.2.4.11 Phyllanthus emblica:

*Phyllanthus emblica* also be known as Indian gooseberry having family Euphorbiaceae. Fruit of plant is well known and known as amla. Plant has more importance in Ayurveda. Plant having more value in Indian medicine because it possess anti cancer activity (Patil M, 2012), anti inflammatory and anti oxidant activity.

The clinical investigation reported that plant can used in gastric disturbance. Ethanolic extract of fruit reported for ulcer protective activity due to high anti oxidant activity and increase level of interlukine 10. More finding on ethanolic extract of fruit also give idea about anti ulcer action and researcher added that this action also been seen by modulation of COX and NOS pathway.

1.2.4.12 Picrorhiza kurroa:

Scrophulariaceae is a family of *Picrorhiza kurroa*. More frequently seen in Himalaya and some tropical area of India. Component gets from plant is used in many disorders like bilious fever, chronic dysentery, dyspepsia. Plant having many important phytochemicals like Kutkoside, iridoid glycosides and picroside I, II, III. Out of this major constituent kutkoside reported for gastro protective action because of anti oxidant activity along with this it also having hepatoprotective action.

1.2.4.13 Piper betle:

The plant having family Piperaceae and it is medium size shrub. Topical humid environment is favorable for plant. Plant leaves are use as mouth freshener because it having plungent and aromatic flavor. Plant having higher importance in Ayurvedic medicine as an indigenous substance. Plant leaf oil having medical importance to cure
respiratory disorders, antiseptic, ulcerprotective in cataract like eye problems. Such a kind of action due to presence of terpinene, carvacrol, cadinene, monoterpenoids, eucalyptol, eugenol, methyl eugenol, chevibetol, hydroxychavicol. Out of these substances anti ulcer activity possess by allypyrocatechol mainly it is due to arginase metabolism and shift of cytokine balance.

1.2.4.14  **Pistacia lentisus:**

Plant having Anacardiacea family and having major component mastic which is resinous exudate of tree. Plant used in mainly gastric trouble, dyspepsia, gastralgia and peptic ulcer. Plant extract significantly reduce ulceration in gastric mucosal disturbance due to pylorus ligation, drugs comes in NSAID and stress induce ulcers models.

1.2.4.15  **Pteleopsis suberosa:**

The plant extract has saponin which is reported for ulcer protective action. plant possess anti ulcer activity in indomithacine induce ulcer model and in ethanol induce ulcer model by increase stimulation of prostaglandins.

1.2.4.16  **Shilajit:**

Asphatlum is a biological name of shilajit. It is one of most important drugs in Ayurveda. It is used in respiratory disorder, genital disease, diabetes and ulcer healing. Substance 4-methoxy-6-carboxy biphenyl evaluated for anti ulcer activity and parameter was mucus secretion, gastric juice carbohydrate and carbohydrate protein ratio, amount of DNA and proteins in gastric tissue. 4-methoxy-6-carboxy biphenyl showed more significant result as ulcer protective in all aspects.

1.2.4.17  **Silybum marianum:**
The plant having silymarin which is flavonolignan complex present in milk thistle. This substance having anti ulcer activity due to inhibition of lipoxygenase pathway and leukotriene synthesis.

1.2.4.18 **Sophora subprostrata:**

In China this plant having use in digestive disease. Root of plant having sophoradin which can synthesize flavonoids which can possess anti ulcer activity.

1.2.4.19 **Spinacia oleracea:**

The plant has Amaranthaceae family. Spinach is nitrate rich green vegetable, fruit of it edible. Peterson and his co-worker reported that spinach make thick layer on gastric mucosa and give protective action against HCL produced by stomach.

1.2.4.20 **Tectona grandis:**

Tree extract increase protein content of gastric juice and help in ulcer healing activity in aspirin induce ulcer model.

1.2.4.21 **The unripe plantain banana:**

Scientists reported banana possess anti ulcer activity in phenyl butazone prednisolone produce ulcer model and stress induce ulcer model.

Researcher reported unripe banana shows anti ulcer activity in aspirin induce ulcer model. They said that only unripe banana having both prophylactic and ulcer healing activity in aspirin induce ulcer model. More study suggested that banana increase protective nature by increasing mucus secretion and decrease shedding of mucosal cells. Banana increase thymidin uptake by gastric mucosa and increase eicosanoid stimulation and gives healing action.

1.2.4.22 **Zingiber officinale:**
Worldwide *Zingiber officinale* is used as therapeutic agent. It is used as antiemetic, stomachic and carminative in Saudi Arabia. In China it is used as a stimulant in colic and atonic dyspepsia. Also it having uses in motion sickness and gastric disturbances. It is also reported as anti ulcer.

### 1.3 THERATURE REVIEW RELATED TO PLANTS HAVING ULCEROGENIC ACTIVITY:

Many plants reported for anti ulcer activities which are as follows:

**Table 1 Plants reported for anti ulcer activities**

<table>
<thead>
<tr>
<th>Sr.No.</th>
<th>Name of Plants</th>
<th>Family</th>
<th>Chemical constituents</th>
<th>References</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td><em>Tectona Grandis</em> (Trunk bark and wood chips)</td>
<td>Verbenaceae</td>
<td>Phenolic acid, β-sitosterol and triterpenoids</td>
<td>Goel and Sairam 2002</td>
</tr>
<tr>
<td>2</td>
<td><em>Wedelia calendulacea</em> (leaves)</td>
<td>Compositae</td>
<td>Saponin, phytosterol and isoflavonoids</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td><em>Glycyrrhiza glabra</em> (root)</td>
<td>Papilionaceae</td>
<td>Glycrrhizin, triterpene, saponin and isoflavonoids</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td><em>Ficus religiosa</em> (Bark)</td>
<td>Moraceae</td>
<td>β-sitosteryl-d-glucoside, vitamine –K and lanosterol</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td><em>Bacopa monniera</em> (Whole plant)</td>
<td>Scrophulariaceae</td>
<td>Saponins, monnierin, hersaponin, bacosides A and B, brahmine and herpestine</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td><em>Convolvulus pluricaulis</em></td>
<td>Papilionaceae</td>
<td>N-methylconiene, flavones glycoside,</td>
<td></td>
</tr>
<tr>
<td>No.</td>
<td>Plant Name</td>
<td>Family</td>
<td>Constituents</td>
<td>Reference</td>
</tr>
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</tr>
<tr>
<td>7</td>
<td>Emblica officinalis (leaves)</td>
<td>Euphorbiaceae</td>
<td>Vitamin C, minerals and amino acids</td>
<td>Sairam et al, 2002</td>
</tr>
<tr>
<td>9</td>
<td>Centella asiatica (whole plant)</td>
<td>Umbelliferae</td>
<td>Saponins, monnierin, hersaponin, bacoside A and B.</td>
<td>Sairam et al, 2001</td>
</tr>
<tr>
<td>10</td>
<td>Ocimum sanctum (leaves)</td>
<td>Labiatae</td>
<td>Camphor, pinene, limonene, terpinolene, myrcene, linalool and borneol.</td>
<td>Dharmani et al. 2006</td>
</tr>
<tr>
<td>11</td>
<td>Allophylus serratus</td>
<td>Sapindaceae</td>
<td>Saponin and isoflavonoid</td>
<td>Dharmani et al. 2005</td>
</tr>
<tr>
<td>12</td>
<td>Desmodium gangeticum (leaves)</td>
<td>Leguminosae</td>
<td>Pterocarpanoids gangetin, gangetinin, desmodin and alkaloids.</td>
<td>Dharmani et al. 2005</td>
</tr>
<tr>
<td>13</td>
<td>Terminalin pallida (leaves)</td>
<td>Combretaceae</td>
<td>Glycosides, flavones, tannins, oligomeric and proanthocyanidins</td>
<td>Gupta et al, 2005</td>
</tr>
<tr>
<td>14</td>
<td>Musa sapient (leaves)</td>
<td>Scitaminaceae</td>
<td>Acylstergyloside and sitoindoside IV</td>
<td>Sanyal et al, 1998</td>
</tr>
<tr>
<td>15</td>
<td>Bidens pilosa</td>
<td>Compostiae</td>
<td>Phenylheptatriyne</td>
<td>Alvarez et al, 1999</td>
</tr>
<tr>
<td>16</td>
<td>Hemidesmus indicus (Hole plant)</td>
<td>Asclepiadaceae</td>
<td>Coumarino-lignoids, hemidesmine, hemidesmin-1,2 and</td>
<td>Anoop and Jegadees, 2003</td>
</tr>
</tbody>
</table>
### 1.4 LITERATURE REVIEW RELATED TO HERBAL PLANT EXTRACT HAVING ULCEROGENIC ACTIVITY:

#### 1.4.1 Herbal plant extracts with antiulcerogenic property:

Ethanolic extract of *Terminalia pallid* Brandis having family Combretaceae decrease acid secretion and showed potent antioxidant activity in indomithacin induce ulcer model, histamine ulcer model and alcohol induce ulcer model. (Gupta M, 2005)

Ethanolic extract of *Allophylus serratus* Kurz having family sapindaceae decrease acid secretion and peptic acidity and increases mucin secretion in cold stress ulcer model, alcohol induce ulcer model, aspirin induce ulcer and pylorus ligation induce ulcer model.

Ethanolic extract of *Desmodium gangeticum* having family Leguminosae increase mucin secretion in cold stress induce ulcer, alcohol induce ulcer, aspirin induce ulcer and in pylorus ligation induce ulcer model.

Ethanolic extract of *Ocimum santum* Linn having family labiatae decrease acid secretion and increase mucin secretion in mucin secretion in cold stress induce ulcer, alcohol induce ulcer, aspirin induce ulcer, peptic induce ulcer model and histamine ulcer model. (Dharmani P, 2006)

Ethanolic extract of *Hemidesmus indicus* having family asclepiadaceae increase mucin secretion in aspirin induce ulcer model and pylorus induce ulcer model. (Anoop A. 2003)

<table>
<thead>
<tr>
<th></th>
<th><strong>Plant</strong></th>
<th><strong>Family</strong></th>
<th><strong>Active Constituents</strong></th>
<th><strong>References</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>17</td>
<td><em>Maytenus ilicifolia</em> (Leaves)</td>
<td>Celastraceae</td>
<td>Alkaloids, tannins and flavones</td>
<td>Martins et al, 2003</td>
</tr>
<tr>
<td>18</td>
<td><em>Phyllanthus niruri</em> (Aerial part)</td>
<td>Euphorbiaceae</td>
<td>Niuride</td>
<td>Okoli et al, 2009</td>
</tr>
</tbody>
</table>
Fresh juices of *Asparagus racemosus* wild having family liliaceae have no effect on acid and pepsin secretion but it increase mucin secretion. (Sairam K, 2003)

Methanolic extract of *Emblica officinalis* Gaertn having family euphobiaceae decrease acid and pepsin secretion and increases mucus secretion in alcohol induce ulcer model, aspirin induce model, cold stress induce ulcer model, pylorus ligation and acetic acid induce ulcer model.

Aqueous extract of *Azardica indica* A Juss having maliaceae inhibit acid secretion in cold stress induce ulcer model, pylorus ligation, indomithacin induce ulcer model and mercaptomethylimidazole model also it has antioxidant activity. (Bandyopadhyay U. 2002)

Fresh juice of *Centella asiatica* Linn having family apiaceae has no action on acid secretion but it increase mucin secretion in cold stress ulcer model, alcohol induce ulcer model and in pylorus ligation.

Fresh juice of *Bacopa monniera* wetts having family scrophulariaceae having no effect on acid secretion but increase mucus secretion in cold stress ulcer model, aspirin induce ulcer, alcohol induce ulcer model and in pylorus ligation.(Rao V, 2000)

Ethanolic extract of *Bidens pilosa* L having compostiae inhibits gastric acid secretion, pepsin but stimulate mucus secretion. (Alvarez A, 1999)

Powder form of *Musa sapientum* having family scitaminaceae increase component of mucin and give anti ulcer effect in pylorus ligation. (Sanyal K, 1996)