3. Review of Literature

3.1. *Diplocyclos palmatus* Linn.

**Fig-01 Diplocyclos palmatus Linn.**

**Botanical Name:** *Diplocyclos palmatus* (Linn)

**Synonyms:** Bryonia laciniosa

**Family:** Cucurbitaceae

**Eng:** Shivalingee, Lollipop

**Hin:** Shivalingi

**Kan:** Lingatondi

**Mal:** Sivlingakkaya, Neyyunni

**San:** Lingini

**Tam:** Sivlingakkay Aiviralkkovali

**Tel:** Lingadauda

*Diplocyclos palmatus* Linn. is a slender much branched tendril climber, distributed throughout India, on hedges and bushes up to 1,200 m, from thick permanent root stock, tendrils 2-fid, leaves simple, alternate, membranous, 5-lobed, scabrid above, pale and smooth beneath deeply yellow, unisexual, males in small fascicles of 3-6, female solitary or few, fruits sub sessile globose, smooth berry, brick red when ripe with white vertical lines, seeds yellowish brown (Arya Vaidya, 2006) and Lingini or baja is bitter, tonic used in bilious attack. Leaves as external application for inflammation. Various parts of plant used in headache, ague, colic pain, enlarged
spleen, paralysis of tongue, delirium and convulsions, foaming at mouth was reported (Joshi, 2000). *Diplocyclos palmatus* Linn is a lesser heard medicinal plant of Ayurveda with the fruits having important use in the area of reproductive medicine (female infertility, aphrodisiac, tonic, leucorrhoea etc.). Lollipop Climber is a perennial climber with hairless stem, becoming thickened and white dotted on the ridges when older, leaves are broadly ovate, 3.5-14 x 4-14.5 cm, palmately lobed. Lobes are linear lance shaped to elliptic, hairless. Leaf stalk 1.5-9.0 cm long. Flowers are small, white or yellowish, male in stalkless clusters of 2-8, along with 5 female flowers in the same axil. Sepal cup is 3-4 mm long in male, 1.5-2.5 mm long in female, sepals smaller than tube. Flower of male larger than female.

Fruit is solitary, or in clusters of 2-5. It is ovoid-round, 1.5-2.5 cm. When ripe, it is red with longitudinal white stripes, and reminds one of lollipop, hence the common name. It is found including the Himalayas, at altitudes of 200-1500 m. flowering: August-October. The small flowers of Lingini or Shivalingi are of greenish yellow in colour.

The female flowers of the plant are borne in fascicles and the male ones are solitary. The plant’s corolla is about 3-4 mm, with ovate-oblong, acute, pubescent lobes. The fruit or berry of the plant is rounded, with a diameter of 2-3 cm and the bluish-green coloured fruit has eight vertical white streaks. They ripe red and bear a few brown, obovate seeds. The compressed seeds have a length of 4 mm and width of 3 mm and they are usually encircled by a prominent raised band. The plant generally flowers between the months of August and September and fruits in September and October in central India. Lingini or Shivalingi is commonly found throughout India and it is most common and typically found in village hedges was studied (Vadnere et al., 2013).

Locally in India its seeds are being used for promoting conception in women. Plant is used against snake-bite. Its leaves are used in inflammation. Roots are used for treatment of asthma. The seeds are used for increasing sperm count also as an aphrodisiac. The main active constituents of the plants are Bryonin, a bitter principle, punicic acid, and source of seed oil, non ionic glucomannon and goniothalamin was studied (Parag et al., 2013). The seeds of *Diplocyclos palmatus*. Contained 23% oil and 15% protein. The UV, IR, $^1$H-NMR and $^{13}$C-NMR spectrometry of the oil, and oxidation, reduction and gas liquid chromatography (GLC) of the methyl ester of conjugated fatty acid isolated by preparative thin layer chromatography (TLC) showed the presence of
punicic acid (Gowrikumar et al., 1981) and traditional healers use the leaves and the seeds of this plant for treatment of fevers. It is also taken in impotency and used as a tonic. Whole plant is used to treat adenopathy, ague, asthma, bronchitis, carbuncles, cholera, colic, consumption, cough, delirium, fertility, headache, megalosplenyb, paralysis, phthisis, snake bite. The chloroform extract of *Bryonia laciniosa* has exhibited significant anti-inflammatory activity was reported (Gupta, 2003). Analgesic and antipyretic activity of methanol extract of *Bryonia laciniosa* also has been shown in standard animal models (Sivakumar et al., 2004).

Antitumor and antioxidant activities of *Bryonia laciniosa* against Ehrlich's Ascites Carcinoma (Sivakumar et al., 2005) and also effects of seed on sexual behavior of male rats was studied (Chauhan et al., 2010). Ethnobotanical survey of *Diplocyclos palamatus* is made to document the formulations used by Banjara tribe of Umarkhed region of Maharashtra specially practicing in reproductive disorders.

Tribals have their own practices for treating different reproductive disorders. However, for tribals it is an aged old concept and they have own practices of birth control, during ethnobotanical survey of Banjara tribe of Umarkhed it was found that local medicine men are using certain formulation (Bhogankar, 2006). Anti-diabetic activity of *Diplocyclos palamatus* in septozotocin induced diabetic mice (Jaynarayan, 2012) and Anti-arthritic activity of ethanolic seed extracts of *Diplocyclos palamatus*, in experimental animals was studied (Parag & Subhash, 2013).

Analgesc and anti-inflammatory activity of seed extracts of *Diplocyclos palamatus* (Parag & Subhash, 2013) and also In-vitro Cytotoxicity of *Bryonia Laciniosa Naud on Human Cancer cell lines to be studied (Alpan, 2011). Anti-inflammatory activity of extract of *Bryonopsis laciniosa* leaves in carrageenan Induced rat hind paw edema model to be studied (Sayaji et al., 2010).

Malaria is an acute usually chronic disease caused by Plasmodium and transmitted through female Anopheles mosquito. The disease is frequent in tribal and rural areas. Although a number of synthetic medicines have been used for the treatment of malaria, but they have adverse effects and their high cost is beyond the reach of common people. It is, therefore, worthwhile to look towards anti malarial herbal drugs (Dwivedi et al., 2007) and Anti-Microbial Activity of the ethonolic extract of *Bryonopsis Laciniosa* leaf, Fruit and Seed was studied (Bonyadi et al., 2009).
Fig- 02. Infected leaves of *Diplocyclos palmatus*. Showing symptoms of *Cercospora apiis*

*Cercospora apiis* is one of the most important of pathogenic fungi causing leaf spot. During survey conducted during (2010-11), for medicinal plants and their foliar fungi in Mirzapur and Sonebhadra forests, causing severe infection on leaves of *Diplocyclos palmatus*. (Fig02). This is a new host record for *Cercospora apiis* was studied (Archana & Dubey, 2012). Papya ring spot virus in the Philippines to be a continuing threat to the once profitable for Papya industry less than a decade.

Production in Southern Taglog reached its peak level in 1981 with 36,000 metric tons but it declined to as low as 10,000 metric tons in 1987 when PRV become an epidemic. Papya ring spot spread rapidly in short period of time now inflicting 75% damage to papaya plants was reported (Pablito et al., 1990). The anti-hyperglycemic and anti-hyperlipidemic potential of the ethanolic extract of seeds of *Bryonia laciniosa* Linn. And its saponin fraction in streptozotocin-induced diabetic rats was studied (Patel et al., 2012). The shape of the seeds of *Bryonia laciniosa* is quite similar to the icon of Lord Shiva that is the ‘Shivling’ due to which the plant is locally known as Shivlingi. In India, Gond and Bharia tribes of the Patalkot Valley, Madhya Pradesh worship this plant. According to them, this herb is a boon for the childless parents. The leaves, roots and seeds extracts of the plant were studied on various health problems in women like infertility and menstrual disorders. In the vajikaranrasayana (Ayurvedic system of
medicine) is described as the herb enriching the quality and quantity of rasa. The enriched rasa helps in attaining longevity, good memory, intelligence. ‘Strirativallabhpugpak’ described in ancient text to improve sexual behavior and as a general tonic (Harsh Bhatia et al., 2012).

**Taxonomic Classification**

**Domain:** Eukaryota, **Kingdom:** Plantae, **Subkingdom:** Viridaeplantae, **Phylum:** Tracheophyta, **Subphylum:** Euphyllophytina, **Infra phylum:** Radiatopses, **Class:** Magnoliopsida, **Subclass:** Rosidae, **Superorder:** Violanae, **Order:** Cucurbitales, **Family:** Cucurbitaceae, **Subfamily:** Cucurbitoideae, **Tribe:** Benincaseae, **Genus:** Bryonia, **Species:** laciniosa - L. Botanical name: Bryonia laciniosa L (Rasagna et al., 2012). A strong son preference is seen in many societies, even today. Most of the factors that compel people to favor a male offspring are social in origin. With the average family size decreasing rapidly and preference for male child remaining the same, the female population is showing a downward trend.

North India has the lowest sex ratio in the world. Various methods are adopted by people to get a son. Sex determination tests and female feticide are still reported from this region. North India had also documented the use of various Sex Selection Drugs (SSD) in this region for having a male child was studied (Bandyopadhyay & Singh, 2007) and Ethnologic fruit extract of Bryonopsis laciniosa possess good antimicrobial activity against selected test bacteria and fungi ie Candida albicans and Trichophyton rubrum and also can be used as a very good treatment for acne if added to daily diet. Further, the selected plant have also possessed antimicrobial potentials against all test bacteria and fungi which explain that their use in everyday life will produce a resistant or immunity to clash against microorganisms was studied (Sudhanshu et al., 2012).

In Vitro Rhizogenesis in Bryonopsis laciniosa (L.) rooting from explants like leaf, stem, nodal and cotyledon, explants derived calli and regenerated shoots on MS medium. Among the explants tested leaf and cotyledon cultures showed high frequency rooting on MS medium (Caroline & Mallaih, 2011) and the Ethno medicinal plants used by the tribes of Dindori district, the tribals depend on the herbal medicines for curing various gynecological disorders was studied (Ankur Shrivastava 2013).

*Diplocyclos palmatus* have been traditionally reported to be used as anthelmintics (Mahendra et al., 2012) and also ethnomedicinal plants used to cure
jaundice in Kammam District of Andhra Pradesh, India was studied (Ratna et al., 2011). The anti-inflammatory effect of the leaves of *Bryonia laciniosa* was evaluated using carrageenan, dextran, histamine, serotonin induced rat paw oedema and cotton pellet induced granuloma (chronic) models in rats Malaya Gupta *et al.* (2003) and Goniothalamin isolated from the indigenous plant, *Bryonopsis laciniosa* L., was highly effective against the larvae of the mosquito, *Culex quinquefasciatus* was reported (Kabir *et al.* 2003).

3.2. *Abutilon indium* (Linn.) Sweet

**Fig- 03 Abutilon indium** (Linn.)

**Botanical name**: Abutilon Indicum (Linn) Sweet  
**Synonym**: Abutilon Asiatic, Sida guineensis, Schumach  
**Family**: Malvaceae  
**English**: Country mallow, Flowering Maples, Chinese Bell –flowers  
**Hindi**: Kangahi  
**Kannada**: Ghani  
**Malayalam**: Atibala, KanKatika  
**Sanskrit**: Tutta  
**Tamil**: Tutt;Thuththi; Peruntutti  
**Telugu**: Tutiri-chettu; Thuteribenda  

It is found in hotter parts of India. Found as a weed in the sub Himalayan tract and other hills up to 1.200M, the use of the root in gout, polyuria and haemorrhagic disease, the drug exhibits immunological activity (Khare, 2007) and *Abutilon indicum*
is a perennial shrub, softly tomentose and up to 3 m in height. The leaves are evergreen, Base-cordate, stipulate, filiform, ovate, acuminate, toothed, rarely subtrilobate and 1.9-2.5 cm long. Petiole 1.5-1.70 cm long, cylindrical, yellowish in colour, stellate and hairy.

The flowers are yellow in color, peduncle jointed above the middle. The petioles are 3.8-7.5 cm long; stipules 9 mm long; pedicels often 2.5-5 mm long, axillary solitary, jointed very near to top and the seeds are 3-5 mm, kidney shaped, reniform, tubercled or minutely stellate hairy, black or dark brown. It is used as anthelmentic, antiemetic, anti-inflammatory, in urinary or uterine discharge, piles, and antidote. It is used in treatment of fever, dry cough, bronchitis, gonorrhea and leprosy was reported (Mohite et al., 2012).

Properties and uses Root is demulcent, diuretic, nerve tonic, fever, and arthritis. Leaves are used in bleeding piles, diuretic, demulcent and toothache. Seeds are expectorant, aphrodisiac, laxative, gonorrhea. Bark is astringent and diuretic, decoction of leaves is used as an eye wash and mouth wash in toothache. Flowers are local placation to boils and ulcer (Nadkarni, 2005) and Atibala is a drug in Ayurvedic and Unani medicine, it is useful as a febrifuge, anthelmentic, and anti-inflammatory, in urinary and uterine discharges. Various plant parts are used in convulsions, cramps, colic, dysentery, bronchitis was reported (Joshi, 2000).

Bronchial asthma is considered as a chronic inflammatory disorder of the airways. It is reported to have anti-inflammatory action and is used internally for inflammation of the bladder. Clinical studies done on Indian asthmatic patients have proved the effectiveness of *Abutilon indicum* in bronchial asthma was studied (Archana et al., 2008). Free radical induced oxidative damage has long been thought to be the most important consequence of the aging process. Such conditions are considered to be important causative factors in the development of diseases such as diabetes, stroke, arteriosclerosis, cancer, and cardiovascular diseases.

These radicals also affect the equilibrium between pro-oxidants and antioxidants in biological systems, leading to modifications in genomes, proteins, carbohydrates, lipids and lipid peroxidation, a scrutiny of literature revealed some notable pharmacological activities of the plant such as antibacterial, analgesic, antimalarial, antifertility, hepatoprotective, and wound healing was studied (Pawan et al., 2011).

Flowers of *Abutilton indicum* is slightly protandrous, opening and closing times of flower are temperature and light dependent. Bagging experiments and pollen-ovule
ratio reveal that it is a facultative autogamous taxon. Butterflies \textit{(Lepidoptera)} and Bees \textit{(Hymenoptera)} are the regular flower visitors. Butterflies are just visitors as they do not take any part in pollination while, \textit{Apis} sp., and \textit{Bembix} sp. are found to be the pollinators of \textit{Abutilon indicum} was studied \textit{(Rubina et al., 2010)}.

The traditionally used for treatment of several disease like bronchitis body ache, toothache, jaundice, diabetes, fever, piles, ulcers, cystitis, diarrhea, hepatoprotective, male contraceptive and \textit{Abutilon indicum} root extract shows analgesic effect \textit{(Naveen et al., 2009)} and Peptic ulcer disease is one of the most common gastrointestinal disorders, which causes a high rate of morbidity particularly in the population of non-industrialized countries. Peptic ulcer occurs due to an imbalance between the aggressive (acid, pepsin and \textit{Helicobacter pylori}) and the defensive (gastric mucus and bicarbonate secretion, prostaglandins, innate resistance of the mucosal cells) factors.

In Ayurveda, peptic ulcer mostly refers to Amlapitta or \textit{Parinamasula}. \textit{Amlapitta} is a disease of the gastrointestinal tract, especially of the stomach. \textit{Amlapitta} literally means, pitta leading to sour taste. Number of drugs including proton pump inhibitors, prostaglandins analogs, histamine receptor antagonists and cytoprotective agents are available for the treatment of peptic ulcer was studied \textit{(Dashputre et al., 2011)}.

World Health Organization has declared mosquito as “public enemy number one”, because mosquitoes are responsible for the transmission of various dreadful diseases. They represent a significant threat to human health because of their ability to vector pathogens that cause diseases that afflict millions of people worldwide. Mosquitoes constitute a major public health problem as vectors of serious human diseases. Several species belonging to genera \textit{Aedes}, \textit{Anopheles} and \textit{Culex} are vectors for the pathogens of various diseases like Dengue fever, Dengue haemorrhagic fever, Malaria, Japanese Encephalitis and Filariasis.

Earlier efforts to control mosquito vectors concentrated mainly on the application of broad spectrum insecticides but it resulted in environmental pollution. Plant extracts act as general toxicants like larvicides, oviposition attractants/ deterrents, insect growth regulators, repellents and adulticides, the crude leaf extracts of \textit{Abutilon indicum} were evaluated for larvicidal, pupal deformities and adult emergence inhibition activity against vector mosquitoes was reported \textit{(Arivoli et al., 2011)}.
Anti-diarrhoeal activity of *Abutilon indicum* was evaluated by gastro intestinal motility, castor oil-induced diarrhoea and prostaglandin E2 -induced enteropooling in rats (Chandrashekhar *et al.*, 2004) and the aqueous extract of *Abutilon indicum* was tested for hepatoprotective activity against carbon tetrachloride- and paracetamol-induced hepatotoxicities in rats (Porchezhiana *et al.*, 2005) and also the immunomodulatory activities on specific and non-specific immunity were studied by heamagglutination antibody (HA) titer, delayed type hypersensitivity (DTH), neutrophil adhesion test and carbon clearance test was studied (Dashputre *et al.*, 2010).

Plants used for traditional medicine contain a wide range of substances that can be used to treat chronic as well as infectious diseases. Fungi are ubiquitous in the environment and infection due to fungal pathogens has become more frequent. Skin infection due to dermatophytes has become a significant health problem affecting children, adolescents and adults (Rajalakshmi *et al.*, 2009) and *Abutilon indicum* is used for treatment of in-vitro anti-arthritic pharmacological models (Vallabh *et al.*, 2009) and also Methanolic extract of leaf of *Abutilon indicum* for its cytotoxic and antimicrobial activity, against various Gram-positive, Gram-negative bacteria and fungi using disk diffusion technique. For cytotoxic activity, brine shrimp lethality bioassay was studied (Muhit *et al.*, 2010).

The plant is also reported to possess analgesic activity (Ahmed *et al.*, 2000) and the antioxidant activity of Methanol leaf extracts of *Abutilon indicum* was prepared and screened for *in vitro* antioxidant activities using Ferric Reducing Antioxidant Power (FRAP) assay (Javed & Iffat, 2012) and also Diuretics are the drugs that increase the rate of urine flow; clinically useful diuretics also increase the rate of excretion of Na+ (natriuresis) and an accompanying anion, Usually Cl- Most clinical applications of diuretics aim to reduce extracellular fluid volume (edema) by decreasing total body NaCl content was studied (Gunasekaran *et al.*, 2010).

Cisplatin (cis-diaminedichloroplatinum II) is one of the most effective chemotherapeutic agents and plays a major role in the treatment of a variety of human solid tumors including those of the head, neck, testis, ovary, and breast. Ethyl extract of *Abutilon indicum* efficacy as a protective agent against cisplatin-induced ototoxicity (Mohana *et al.*, 2013) and Anti-Arthritic activity in In-vitro studies in male albino rats using Freund’s adjuvant induced arthritis model was studied (Nitin, 2012).
Abutilon indicum protects the liver from carbon tetrachloride induced hepatotoxicity (Sharma et al., 2013) and also the invitro antioxidant activities of ultrasonic bath sonicator assisted extract of ethanol extract of Abutilon indicum leaf was tested for total phenolic content and DPPH (2,2-diphenyl, 2-picryl hydrazyl) radical scavenging assay was studied (Sowjanya et al., 2012).

The modulatory influence of ethanol extract of Abutilon indicum leaves on hepatic antioxidant status and lipid peroxidation against alcohol-induced liver damage in rats (Dharmendra & Radhey, 2008) and also the analgesic activity of methanolic, hydro alcoholic and aqueous extracts of Abutilon indicum stem in experimental models was studied using acetic acid induced writhing and hot plat method in healthy mice was studied (Gunosindhu et al., 2010).

A water soluble galactomannan has been isolated from the seeds of Abutilon indicum containing D-galactose and D-mannose in 2:3 molar ratio. Acid catalysed fragmentation, periodate oxidation and methylation showed that the seed gum has mannanopyranosyl units, some of which are substituted at o-6 by two α-D galactopyranosyl units (Vandana et al., 1997) and Alcohol , water extracts of Abutilon indicum leaves showed significant hypoglycemic effect in normal rats was reported (Seetharam et al., 2002).

The antimicrobial activity was studied using the agar well diffusion assay extract of Abutilon indicum was found to be most effective against Staphylococcus aureus followed by Bacillus sublitis whereas in case of Gram negative bacteria, extract was found to be most effective against Escherichia coli showing the maximum zone of inhibition followed by Pseudomonas aeruginosa .The activity of the extract against S. aureus and B. subtilis was comparable to that of standard drug ciprofloxacin was reported (Dhirender et al., 2010).

The isolation and identification of flavonoids present in the flowers of Abutilon Indicum such as luteolin, chrysoeriol, luteolin 7o β glucopyranoside, chrysoeriol 7-o- β -glucopyranoside, apigenin7-o – β - glucopyranoside, quercetin 3- o- β - glucopyranoside , quercetin 3- o -α -rhamno pyranosyl and β- glucopyranoside (Irena & Maris, 2002). Plants exhibited considerable variation in the floral density, number of pollen/plant, pollen viability, and percentage of fruit-set and seed-set in different seasons of the year was studied (Pravendra et al., 2012).
Female sexual dysfunction (FSD) is a prevalent, yet largely unrecognized, disorder. Approximately 30–50% of women report sexual complaints, though the number that are distressed about sexual dysfunction and would seek treatment is a smaller proportion. *Abutilon indicum*, one of the plants from Ayurvedic system of medicine has been traditionally claimed to enhance the libido (Khadabadi & Bhajipale, 2011). Anti-anxiety activity of alcoholic extract of *Abutilon indicum* leaves on Elevated plus Maze Model (Jayasree et al., 2013). Gout is a medical condition characterized by recurrent attacks of acute inflammatory arthritis- a red, tender, hot, swollen joint due to the disorder of purine metabolism and occurs when its final metabolite, uric acid deposits in the form of monosodium urate in joints, tendons, liver, kidney and in the surrounding tissues which triggers a local immune mediated inflammatory reaction (Kousalya et al., 2013) and the effect of *Abutilon indicum* seed powder on genital organs and fertility of female albino rats was studied (Naveen 2014).

The root of *Abutilon indicum* (L) sweet was subjected for evaluation for its efficacy against gouty arthritis in female albino wistar rats (Kousalya et al. 2014) and also possesses the anti-inflammatory and anti-proliferative activity of ethanolic leaf extract of *Abutilon indicum* for potential chemopreventive agent against lung cancer A549 cell line was studied (Kaladhar et al. 2014).

Diuretic effects of *Abutilon Indicum* (Linn.) leaves in Rats showed significant effect (Raj Kumar Chauhan and Nagori 2014) and in vitro anti snake venom potential of *Abutilon indicum* Linn leaf extracts against *Echis carinatus* (Indian saw scaled viper) was studied (Vineetha et al. 2014).

3.3. *Cassia occidentalis* Linn
Chapter 3

REVIEW OF LITERATURE

Fig- 04 **Cassia occidentalis** Linn

**Botanical name**: *Cassia occidentalis* (Linn)

**Synonym**: Senna occidentalis

**Family**: Leguminose

**Sub Family**: Caesalpiniaceae

**English**: Negro coffee, Stinking weed

**Hindi**: Kasaumdi, Barikasaumdi

**Kannada**: Doddagace

**Malayalam**: Ponnaviram, Ponnariviram

**Sanskrit**: Kasamardah

**Tamil**: Ponnavirai, Peraviral, Nattam takarai

**Telugu**: Kasinda

Throughout India, it grows abundantly on wastelands immediately after the rains. A diffuse offensively odorous under shrub with furrowed sub glabrous branches, leaflets 3-5 pairs, flowers yellow, in short peduncled few flowered racemes, fruits cylindrical or compressed, transversely septate glabrous pods containing 20-30 seeds ovoid, smooth and shiny dark olive green or pale brown. The plant is bitter, sweet, and thermogenic, purgative, expectorant. It is useful in cough, sweet, and thermogenic, purgative, expectorant. It is useful in cough, bronchitis, constipation, fever, epilepsy and convulsions (Arya Vaidya Sala, 1994) and also *Cassia occidentalis* Linn is a common weed scattered from the Himalayas to the Western Bengal, South India, Burma and Ceylon was revealed (Nadkarni, 2005). Growing throughout India up to an altitude of 1,500 m. it is used in expectorant, diuretic, leaves used internally and externally in scabies, ringworm and other skin disease (Khare, 2007).

**Synonyms and Common Names**: *Senna occidentalis*, *Cassia caroliniana*, *C. ciliata*, *C. falcata*, *C. foetida*, *C. frutescens*, *C. geminiflora*, *C. linearis*, *C. longisiliqua*, *C. obliquifolia*, *C. planisiliqua*, *C. sophera*, *Ditreuxa occidentalis* Fedegoso, fedegosa, yerba hedionda, brusca, guanina, martinica, platanillo, manjerioba, peieriaba, retama, achupa poroto, heduiabra, folha-de-pajé, kasiah, khiyar shember, pois piante, shih chueh ming, sinamekki, tlalhoaxin, wang chiang nan, senting, kachang kota, menting.

Fedegoso is a small tree that grows 5–8 m high and is found in many tropical areas of South America, including the Amazon. Indigenous to Brazil, it is also found in warmer climates and tropical areas of South. In vivo studies, fedegoso leaf extracts have
demonstrated an anti-inflammatory, hypotensive, smooth-muscle relaxant, antispasmodic, weak uterine stimulant, vasoconstrictor, and antioxidant activities in laboratory animals. These documented actions certainly help to explain its uses in traditional medicine systems for menstrual cramps and other internal inflammatory conditions. Fedegoso has also been used for many types of bacterial, fungal, and parasitic infections for many years in the tropical countries where it grows. In vitro clinical research on fedegoso leaves over the years has reported active antibacterial, antifungal, antiparasitic, insecticidal, and antimalarial properties. Some of its ethno-use in various regions of the world is as highlighted below. Table- 6 (http://www.raintree.com/fedegosa.htm).
Table: 02 Showing ethno-use *Cassia occidentalis* in various regions of the world

<table>
<thead>
<tr>
<th>Regions</th>
<th>Ethano Medicinal Use</th>
</tr>
</thead>
<tbody>
<tr>
<td>India</td>
<td>Abscesses, bites (scorpion), constipation, diabetes, edema, fever, inflammation, itch, liver diseases, liver support, rheumatism, ringworm, scabies, skin diseases, snakebite, wounds</td>
</tr>
<tr>
<td>Africa</td>
<td>Abscesses, bile complaints, birth control, bronchitis, bruises, cataracts, childbirth, constipation, dysentery, edema, erysipelas, eye infections, fainting, fever, gonorrhea, guinea worms, headache, hematuria, hemorrhages (pregnancy), hernia, increasing perspiration, inflammation, itch, jaundice, kidney infections, leprosy, malaria, pain (kidney), menstrual disorders, rheumatism, ringworms, scabies, skin diseases, skin parasites, sore throat, stomach ulcers, stomachache, swelling, syphilis, tetanus, worms, water retention, wounds</td>
</tr>
<tr>
<td>Brazil</td>
<td>Anemia, constipation, edema, fatigue, fever, gonorrhea, liver disorders, malaria, menstrual disorders, skin problems, tuberculosis, urinary disorders, water retention, weakness</td>
</tr>
<tr>
<td>Central America</td>
<td>Abortions, antifungal, athlete's foot, birth control, constipation, diarrhea, fungal infections, headache, menstrual disorders, menstrual pain, pain, respiratory infections, ringworm, spasms, uterine pain, urinary tract infections, urinary insufficiency, worms</td>
</tr>
<tr>
<td>Mexico</td>
<td>Chills, digestive sluggishness, dyspepsia, earache, eczema, edema, fatigue, fever, headache, inflammation (skin), laxative, leprosy, nausea, pain, rash, rheumatism, ringworms, skin problems, sores, stomachache, swelling, tumors, ulcers, venereal disease, water retention, worms, yellow fever</td>
</tr>
<tr>
<td>Panama</td>
<td>Colic, inflammation, spasms, stomach problems, worms, and as an antiseptic</td>
</tr>
<tr>
<td>Haiti</td>
<td>Acne, asthma, burns, colic, constipation, dropsy, eye infections, gonorrhea, headache, malaria, rheumatism, skin rashes and infections, and to increase perspiration</td>
</tr>
</tbody>
</table>
Cassia occidentalis is indigenous to Brazil, it is a naturalized plant in Nigeria where it is widespread and grows profusely. It is well incorporated into traditional medicinal practices in the West African region, where it is extensively used against fever. It has been reported to show good antibacterial activity, Emodin an antibacterial anthrquinone from the roots of Cassia occidentalis was reported (Chukwujekwu et al., 2006).

Protective effect of Cassia occidentalis on cyclophosphamide-induced suppression of humoral immunity in mice (Bila et al., 2001) and also Antimicrobial activity of Cassia occidentalis L (Leaf) against various human pathogenic was studied (Vedpriy et al., 2010). Chemical modification of Cassia occidentalis seed gum carbamoylation (Sarika et al., 2005) and toxicological reproductive study of Cassia occidentalis in female wistar rats was reported (Aragao et al., 2009).

In Unani literature, Kasondi has been reported to be used as antidote of poison, blood purifier, expectorant, anti-inflammatory agent and remedy for the treatment of liver disease (Jafri et al., 1999) and preliminary isolation of a myodegenerative toxic principle from Cassia occidentalis was studied (Hebert et al., 1983).

Cassia occidentalis was found to be effective in inducing differentiation and migration of mouse melanoblast cell line, in vitiligo, the active melanocytes in the epidermis are totally missing, whereas melanoblast cells in the outer root sheath of hair follicles are not affected. In an attempt to find potent repigmenting agents for vitiligo therapy, pod extracts was shown (Sumathy et al., 2011).

Mast cell degranulation at a dose of 250 mg/kg, showed dose dependent stabilizing activity towards human RBC, with is widely used in traditional medicine of India to treat a number of clinical conditions including allergy and inflammatory manifestations, anti-allergic, anti-inflammatory and anti-oxidant properties of Cassia occidentalis whole plant ethanolic extract was investigated and the anti lipid peroxidant effects on carrageenan-induced mouse paw oedema inhibition was studied (Sreejith et al., 2010).

They possess purgative, tonic, febrifugal, expectorant, and diuretic properties. The plant is also used to cure sore eyes, hematuria, rheumatism, typhoid, asthma, and disorder of hemoglobin and is also reported to cure leprosy. An infusion of the bark is given in
diabetes was shown (Laxmi et al., 2010). The relaxant effects of an aqueous extract of the leaf of plant *cassia occidentalis* were investigated in rat aortic rings with or without intact endothelium (Ajagbonna et al., 2001) and also leaves were screened for anti-nociceptive activity using acetic acid induced writhing test, hot plate test and tail immersion test in mice. In a similar way a screening exercise was carried out to determine the antipyretic potential of the extract using yeast induced pyrexia method in rats was reported (Sini et al., 2010).

The genus *Bothrops* is found in the Americas and is characterized by its adaptation to different types of environments. It is found in diverse ecosystems, even in flooded regions, and is responsible for the majority of snakebites.

In Brazil, *Bothrops moojeni* is a species that has been attracting increased medical attention because its venom is composed of a complex mixture of proteins with biological activity, and it is used as a model to evaluate new drugs. Snake bites can result in severe pain, oedema, bruising, redness and haemorrhagic blisters, which can progress to necrosis, which affects the skin, muscles and tendons and is a major cause of loss of organ function, *Cassia occidentalis*, are popularly used for snakebites was shown (Maraisa et al., 2013).

Herbs have been reported for their usefulness in the form of decoctions, infusions and tinctures in traditional system of medicines for treating skin diseases like psoriasis, leprosy (Sathya et al., 2012) and ethanolic extract from *Cassia occidentalis* against CCl4 induced oxidative stress was tested using wistar albino rats. The antioxidant activity was assessed by monitoring the levels of lipid peroxides, antioxidant enzymes like glutathione peroxidase, glutathione reductase, glutathione-Stransferase, superoxide dismutase and catalase, and non-enzymic antioxidants like reduced glutathione, vitamin-C, vitamin-E, cereloplasmin and uric acid in the liver tissues was studied (Ravi & Abbulua, 2011).

Hausas of Northern Nigeria, it is claimed by local (traditional) healers that the infusion of *Cassia occidentalis* leaves is used as a cure for hepatitis, aqueous extract on serum total proteins, albumin, bilirubin, alanine amino transferase (ALT), aspartate amino transferase (AST) and alkaline phosphatase (ALP) was studied (Nuhu & Aliyu 2008).
Cassia occidentalis was examined for their antifungal activity of fungi *candida albicans*, *Aspargillus calvatus* and *Aspargillus niger*. Different plants parts in terms of Minimal inhibitory concentration ranged between 200-1000 µg/ml was studied (Vipul & Anjan, 2011).

The in-vitro antimicrobial activity of *Cassia occidentalis* against *E. coli*, *P. multocida*, *S. typhi*, *S. typhimurium*, *S. pyogenes*, *S. pneumoniae* and *K. pneumoniae* was reported (Saganuwan et al., 2006).

The hepato-protective potentials of aqueous leaf extract of *Cassia occidentalis* on paracetamol-induced hepatotoxicity in adult wistar rats (Uzzi & Grillo, 2013) and Anti-diabetic activity of leaves of *Cassia occidentalis* was reported (Prabh et al., 2011).

The invitro cytotoxicity and antibacterial properties of *Cassia occidentalis* (whole plant) via alcoholic, hydro-alcoholic and aqueous extracts against eight human cancer cell lines from six different tissues and four bacterial strains was reported (Madhulika & Ajit, 2010).

*Cassia occidentalis* roots for their antimicrobial activity against various strains of bacteria and fungi, Minimum Inhibitory Concentration of the extracts was performed and the zone of inhibition (Krishna et al., 2010) and also possess the effect of *Cassia occidentalis* was studied on mitotic activity of root tip cells of *Allium cepa* L (Komal Arora, 2013).

Helminth infections are among the most widespread infections in humans, distressing a huge population of the world. Although the majority of infections due to helminths are generally restricted to tropical regions and cause enormous hazard to health and contribute to the prevalence of undernourishment, anaemia, eosinophilia and pneumonia. Anthelmintic activity of ethanolic extract of *Cassia occidentalis* Linn using adult earthworm *Pheritima posthuma* was studied (Sayyad et al., 2014).

Evaluation of invitro Anti-malarial activity of *Cassia occidentalis* (Choudhary & Nagori, 2014) and Anxiety and Depression are widespread psychiatric disorders affecting around 5% of the population, antianxiety and antidepressant activity of ethanolic and aqueous extract of *Cassia occidentalis* leaves, the antianxiety activity was tested by exposing rats to unfamiliar aversion in different methods like elevated plus maze model and actophotometer. The antidepressant activity was tested by using despair swim test
and tail suspension test was studied (Saba Shafeen et al., 2012). Tuberculosis still remains a leading cause of death in the world. There is currently considerable interest in natural products and their derivatives in the area of drug research for multidrug resistant tuberculosis (MDR-TB) and antibacterial natural leads from plants, isolated fractions and chemical constituents from leaves of *Cassia occidentalis* was studied (Yeragamreddy et al., 2013).

The interference in the growth of one plant by another can result either from competition which involves the removal of some factors (nutrient, water and light) from the environment, habitat or through chemical(s) released from one plant (donor) that effect to other (receiver) sharing the habitat.

The phenomenon known as “allelopathy” is now considered as important as competition for influencing plant growth both in natural and agricultural ecosystem. In natural or man managed agro-ecosystems, neighboring plants may interact with the growth and development of other species. The *Cassia occidentalis* was analyzed to evaluate the existence of allelopathic effect using fully viable seeds of mustard seeds (*Brassica campestris* L.) as bioassay material was studied (Saheli et al., 2012).

The *invitro* antioxidant activity of various aqueous and organic extracts of *Cassia occidentalis* leaves was investigated. The extracts and the reference standard, butylated hydroxyl toluene (BHT) were evaluated for DPPH, nitric oxide, superoxide and hydroxyl radical scavenging activity. The methanolic extract exhibited significant antioxidant activity was reported (Deepak et al., 2010).

The antibacterial potentials of *Cassia occidentalis* leaf extracts were investigated against eleven Gram-positive and four Gram-negative bacteria isolates was reported (Taiwo et al., 2013).

Neutron Activation Analysis (NAA) of *Senna occidentalis* Linn (Gwarzo et al 2014) and trace metal contents in the leaves of *Cassia occidentalis* Linn from some selected sites in Katsina, Nigeria was reported (Fatima Binta Suleiman 2014) and also green synthesis of silver nano particles and their antibacterial activity was reported (John De et al2014).

Neuroprotective effect of *Cassia occidentalis* against 3-Nitropropionic acid-induced neurotoxicity in rats was studied (Silva et al 2014).