ABSTRACT:

Sesbania grandiflora (family: Fabaceae) commonly known as 'sesbania', is widely used as Indian folk medicine. Sesbania grandiflora has the common names of Agati, Corkwood Tree and West Indian Pea. Traditionally Sesbania grandiflora is used alone or with other medicinal plants to treat a variety of ailments. Research studies leading to extraction, isolation and biological study of plant constituents have now formed the major field of study.

KEYWORDS:

Sesbania grandiflora, Anticancer, Antioxidant, Cardioprotective, Antiulcer, Hepatoprotective, Anti-inflammatory

1. INTRODUCTION:

Sesbania grandiflora (family: Fabaceae) is known as agati or the hummingbird tree (or scarlet wisteria), a small tree believed to have originated either in India or Southeast Asia and grows primarily in hot and humid tropical areas in the world. A native to Asian countries such as India, Malaysia, Indonesia and the Philippines where it is commonly seen growing on the dikes between rice paddies, along roadsides and in backyards vegetable gardens. Most sesbania species can be described as soft, semi or slightly woody, 1-4m tall perennial nitrogen fixing trees. Sesbania grandiflora has large red or white flowers, up to 10cm in diameters. The plant’s first outstanding feature is its extremely fast growth rate, especially during the first 3 or 4 years after planting. In Australia and in India, plantations have attained heights of 8m in under 3 years.

Sesbania is grown as a cover crop and green manure during the summer months. In the process of growing cover crops involves the soil incorporation of sesbania while green or soon after flowering for the purpose of soil improvement. The major benefit obtained from growing Sesbania is the addition of organic matter to the desert soils. During the breakdown of organic matters by microorganisms, compounds are formed that are resistant to decomposition – such as gums, waxes and resins. These compounds help bind together soil particles as granules or aggregates. A well-aggregated soil tills easily, is well aerated and has a high water infiltration rate. The tree provides forage, firewood, pulp and paper, food, green manure and landscape decoration. It also has potential for reforesting eroded land and grassy wastelands through the tropics. The wood is of low quality. The flowers of Sesbania grandiflora are eaten as a vegetable in Southeast Asia; the young pods are also eaten along with the leaves.

2. DESCRIPTION:
A short-lived, quick growing, soft-wooded tree, 6-9m high and 0.6m in girth; leaves 15-30 cm long, abruptly pinnate; leaflets 41-61, linear-oblong, deciduous; flowers 6-10cm long with showy, fleshy white, pink or red petals; pods 30cm or more long, rather flat and somewhat 4-cornered, non-torulose, septate with swollen margins and 15-50 pale coloured seeds.  

3. ORIGIN AND DISTRIBUTION:  
It is found in Tropical Asia and North Australia. In India it is found at West Bengal, Assam, Karnataka and North-Eastern states. It is cultivated as an ornamental plant, grows wild in hedges and shady forests.  

4. PLANT DESCRIPTION:  

Taxonomical description:  
- Kingdom: Plantae - Plant  
- Subkingdom: Tracheobionta-Vascular Plant  
- Super division: Spermatophyta - Seed Plant  
- Division: Magnoliophyta-Flowering Plant  
- Class: Magnoliopsida- Dicotyledons  
- Subclass: Rosidae  
- Order: Fabales  
- Family: Fabaceae - Pea Family  
- Genus: Sesbania Scop. - Riverhemp  
- Species: *Sesbania grandiflora* (Linn.) Poir.-Vegetable hummingbird  

5. VERNACULAR NAMES:  
- English: Swamp pea, Sesban, West Indian pea  
- Hindi: Agast, Basna, Hadga, Hathya, Daincha, Basma  
- Sanskrit: Agastyah, Agasti, Agati, Anari  
- Kanada: Agasi, Agaci  
- Malay: Agatti, Atti, Argatti, Akatti  
- Tamil: Aittikkirai, Peragathi  
- Telegu: Avesi, Avasinara  
- Bengali: Agathi, Agati, Agusta, Bagphol, Bak, Bake  
- French: Pois valliere, Colbrivegetal, Fleur papillon  
- Spanish: Paloma, Cresta de gallo, Pico de flamenco  

6. PHYTOCHEMICALS:  
The plant *Sesbania grandiflora* (Linn.) contains Grandifloral, arginine, cystine, histidine, isolucine, phenylalanine, tryptophan, valine, threonine, alanine, aspartic acid, asparagine, a saponin yielding oleanic acid, galactose, rhamnose and glucuronic acid, and it also contains flavonol glycoside, kaempfrol.  

7. TRADITIONAL MEDICINAL USES:  

The root-bark of the red-flowered variety is useful in vitiated condition of vata and arthralgia. The bark is astringent, cooling, bitter, tonic, anthelmintic and febrifuge. The pounded bark is externally applied to cure scabies. The juice of the bark is good for dyspepsia, diarrhea and gastralgia.  

The leaves are acrid, bitter, sweet, cooling, aperient, tonic and diuretic and contain a non-poisonous saponine like substance. The leaf juice is used as nasal catarrh, nycatopia and cephalagia. Leaves are chewed to disinfect mouth and throat and are useful in stomatalgia.  

The flowers are cooling, bitter, astringent, acrid and antipyretic. The juice of the flowers is applied to the eyes for nycatopia and is used for intermittent fevers. The fruits are sweet, bitter, laxative and alexiteric and are useful in flatulent-colic, astringent, cooling, bitter, tonic, anthelmintic, febrifuge, cure scabies, dyspepsia, diarrhea and gastralgia, astringent, antipyretic, for nycatopia naemia, emaciation and vitated conditions of tridosa.  

8. PHARMACOLOGICAL ACTIVITIES:  

8.1 Anticancer activity  
Ethanol extract of *Sesbania grandiflora* of both leaves and flowers showed anticancer activity in Swiss albino mice against Ehrlich Ascites Carcinoma cell line at the doses of 100 and 200 mg/kg body weight intraperitoneally. The extracts significantly (p<0.05) decreased the levels of lipid peroxidation and significantly (p<0.05) increased the levels of GSH, SOD and CAT. The results showed that the ethanol extract of Sesbania grandiflora was effective in inhibiting the tumor growth in ascitic models and that is comparable to 5-Fluorouracil.  

8.2 Antioxidant and Cardioprotective effect:  
*Sesbania grandiflora* was evaluated for the cardioprotective effects against cigarette smoke-induced oxidative damage in rats. Adult male Wistar-Kyoto rats were exposed to cigarette smoke for a period of 90 days and consecutively treated with *S. grandiflora* aqueous suspension (SGAS, 1000 mg/kg body weight per day orally) for a period of 3 weeks. The results suggested that chronic cigarette smoke exposure increases the oxidative stress, thereby disquieting the cardiac defense system and *S. grandiflora* protects the heart from the oxidative damage through its antioxidant potential.  

8.3 Antiurolithiatic activity:  
The leaf juice of *S. grandiflora* was evaluated for median lethal dose, gross behavioral changes, antiurolithiatic and antioxidant activities. The antiurolithiatic activity was evaluated by a calculi-producing diet model, using gentamicin (subcutaneously) and 5% ammonium oxalate.
in rat feed to induce calcium oxalate-type stones. The leaf juice of *S.grandiflora* was safe orally and exhibited no gross behavioral changes except for an increase in urination. The leaf juice of *S. grandiflora* showed significant antiurolithiatic activity against calcium oxalate-type stones and also exhibited antioxidant properties¹.

### 8.4 Hepatoprotective activity:
Oral administration of an ethanolic extract of *S. grandiflora* leaves (200 mg/kg/day) for 15 days produced significant hepatoprotection against erythromycin estolate (800 mg/kg/day)-induced hepatotoxicity in rats. The increased level of serum enzymes (aspartate transaminase, alanine transaminase, alkaline phosphatase), bilirubin, cholesterol, triglycerides, phospholipids, free fatty acids, plasma thiobarbituric acid reactive substances and hydroperoxides observed in rats treated with erythromycin estolate were significantly decreased in rats treated concomitantly with sesbania extract and erythromycin estolate¹².

### 8.5 Anxiolytic and anticonvulsive activity:
The anticonvulsive activity of *S. grandiflora* leaves was evaluated using a variety of animal models of convulsions like pentylenetetrazol (PTZ) and strychnine (STR)- induced seizures in mice. The benzene:ethyl acetate fraction (BE) contained a triterpene as a major component. Mice treated with BE preferred to remain in the open arm of the elevated plus maze indicating anxiolytic activity. The BE raised the brain contents of gamma-aminobutyric acid and serotonin. Thus the triterpene containing fraction of S. grandiflora exhibits a wide spectrum of anticonvulsant profile and anxiolytic activity¹³.

### 8.6 Wound healing activity:
Wound healing activity of methanol extract of bark of *Sesbania grandiflora* (L.) had been evaluated by using excision wound model in Wistar albino rats. Methanol extract showed significant wound healing activity at 10% w/w dose when compared to standard 1% framycetin sulphate. The results confirmed that methanol extract of bark of *Sesbania grandiflora* (L.) showed significant wound healing activity¹⁴.

### 8.7 Antiulcer activity:
The ethanolic extract of the bark of *S. grandiflora* prevented acute gastric injury in rats. Stress and non steroidal anti-inflammatory drugs-induced lesions were significantly prevented by the extract. At a dose of 36.75 mg/kg (p.o.) the extract did not modify the volume, pH and hydrochloric acid contents of gastric secretion. At the doses used the animals had no depressive, excitatory or sleepness symptoms, suggesting that probably centrally acting components involved in antiulcer action are not found in the extract. The results were suggested that *S. grandiflora* has antiulcer potential¹⁵.

### 8.8 Antibacterial activity:
The antibacterial activity of *Sesbanial grandiflora* used in traditional pharmacopeias in Burkina Faso was evaluated. Aqueous, methanol and hydro-acetone extractions were carried out on the leaves, stems, and granules, pods of fruit and roots of the plant. The phytochemical groups were identified by the tests of characterization and then quantified by the tests of proportioning of total phenols, flavonoides and tannins. Extracts expressed a good antibacterial activity¹⁶.

### 8.9 Anthelmintic activity:
Seed oils of *Sesbania grandiflora* were investigated for their anthelmintic property against *Pheritima pasthuma*. Three concentrations (10, 50 and 100 mg/ml) of each oil were studied in the bioassay, which involved the determination of time of paralysis and time of death of the worm. *Sesbania grandiflora* showed the highly significant anthelmintic activity in both the parameters (paralysis and death)¹⁷.

### 8.10 Anti-inflammatory and anti-arthritic activity:
It had been examined the effects of prophylactic administration of extracts of bark of *Sesbania grandiflora* (300mg/kg b.w. p.o.) on the development of carrageenan induced paw oedema and adjuvant-induced arthritis to assess influence of high NO level in the form of exogenous herbal extracts of bark of *Sesbania grandiflora* in the progress of inflammation. Inflammation was assessed by measuring paw swelling and arthritis was assessed by measuring primary and secondary paw swelling and changes in thymus, spleen and body weight. It was also claimed that exposure to extracts of *Sesbania grandiflora* during inflammation process may be modulate the inflammation process due to presence of the isolated triterpenoidal compounds¹⁸.

### 9. CONCLUSION:
In recent years, ethno medicinal studies received much attention as this brings to light the numerous little known and unknown medicinal virtues especially of plant origin. Pharmacological screenings of *Sesbania grandiflora* revealed its medicinal potential and represents as a valuable medicinal plant with several medicinal properties. As the pharmacologists are looking forward to develop new drugs from natural sources, development of modern drugs from *Sesbania grandiflora* can be emphasized for the control of various diseases. A systemic research and development work should be undertaken for the conservation of *Sesbania grandiflora*.
and development of products for their better economic and therapeutic utilization.

10. REFERENCES: