



# Phyto-pharmacological appraisal of *Sesbania grandiflora* on in traditional uses.

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## Abstract

*Sesbania grandiflora* (family: Fabaceae) commonly known as 'sesbania', is widely used as Indian medicine. *Sesbania grandiflora* has the common names of Agati, Corkwood Tree and West Indian Pea. The plant contains rich in tannins, flavanoids, coumarins, steroids and tri terpenes, isoflavanoids, isovestitol, medicarpin, and sativan and betulinic acid. The plant used in colic disorder, jaundice, poisoning condition, smallpox, eruptive fever, epilepsy etc., Flower extract used in various diseases like nasal catarrh, headache, laxative, aperitif, gout, ozoena, bronchitis, pain. *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

Herbal research, *Sesbania grandiflora*, Fabaceae

## Introduction

*Sesbania grandiflora* (family: fabaceae) is known as agate or the hummingbird tree (or scarlet wisteria), a small tree believed to have originated either in India or south East 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 road sides 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, upto 10cm in diameters. The plant has an 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 sesbania is the addition of organic matter to the desert soils. During the breakdown of organic matters by micro-organism. 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.

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The wood is 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.

### Qualitative analysis

QA of phytochemicals Test for carbohydrates a) Molish's test Two milliliter of Molish's reagent was to 2 mL of extract and shaken well. Then 2 mL of concentrated H<sub>2</sub>SO<sub>4</sub> was added on the sides of the tubes. A reddish violet ring appeared immediately at the junction of two layers indicating the presence of carbohydrates (Santhi et al., 2011). b) Fehling's test To the extract add equal amount of Fehling's reagent and mix well, heat gently. Formation of brick red precipitate indicated the presence of reducing sugars. Test for Tannins Five milli litre of extract was added to few drops of 1% lead acetate. A yellow precipitate indicated the presence of tannins (Thenmozhi et al., 2011). Test for steroids (Khan et al., 2010) Leaf extract was mixed with 1mL chloroform and later 2-3 drops of conc. H<sub>2</sub>SO<sub>4</sub> was added. Pink or red colour formation indicated the presence of steroids (Khan et al., 2010). Test for Terpenoids (a) Libbermann-Burchard reaction To 200 mg of plant material 10 mL of chloroform were added and filtered using whattman filter paper no: 1 then 2mL acetic anhydride was added and a 3drops of concentrated H<sub>2</sub>SO<sub>4</sub> along the sides of the tubes. Blue, green ring indicates the presence of steroids (Siddiqui et al., 2009). (b) Triterpenoids detection (Siddiqui et al., 2009). In a test tube 2 (or) 3 granules of tin is added & dissolved in 2ml of thionide solution. Add test solution to it. Pink colour produced which indicates the presence of Triterpenoids

### Soil improvement:

*Sesbania grandiflora* is often maintained in gardens and around crop fields for its nitrogen contribution to the soil. The light shade cast by its canopy does not block much light, allowing the growth of companion plants. Falling leaflets and flowers recycle nutrients to the ground. Due to its fast growing habit, seedlings are used for green manuring similar to annual green manure crops. Fruits, falling leaflets and flowers make excellent green manure or mulch and improve soil fertility. It is a well-suited annual for dense planting, growing for short periods and ploughing under to improve soil before planting food crops. *S. grandiflora* is ideal for rehabilitating eroded soils.

### Fibre

At a very short rotation of 3-4 years, *S. grandiflora* is capable of producing much higher cellulose raw material per unit area than most of the other pulp woods. Even trees 3-4 years old can be pulped without debarking and are suitable for chemical pulping for use as cheap printing, writing, magazine and newsprint paper. The fibres are short. Fibre can also be blended with long-fibred bamboo pulp in suitable proportions to provide good strength. On a 3 year rotation, about 41 ton of pulp can be harvested from one hectare area in a year.

### Gum or resin

Bark exudates and seed endosperm gums are produced from agathi. The clear gum from the bark is used in foods and adhesives as a substitute for gum arabic. The bark also yields tannins. Ornamental, boundary or barrier or support: *S. grandiflora* is widely planted for beautification because of its giant showy flowers and long pods. It can be used as a live fence or a live support for crops such as vanilla and pepper. Health benefits and therapeutic uses: Agathi has several health benefits and the plant features in a number of traditional therapies for thousands of years. In Ayurveda, agathi leaves are used to treat fever, sinus, and respiratory problems. It also acts as a coolant, purgative, and worm-killer. According to the 155 National Symposium on Vegetable Legumes for Soil and Human Health (February 12-14, 2016) book, "Home Remedies," the agathi leaves are anthelmintic, diuretic, laxative, and can aggravate pitta. It has the potential for the treatment of toxicosis, itching, and excess kapha. The flowers are acrid, bitter, and astringent. Local healers use the flowers to treat night blindness, headaches, catarrh, cough, and fevers. Several studies confirm these benefits, and illuminate several others. Antioxidant property of the aqueous suspension of agathi leaf protected rats from oxidative heart damage resulting from exposure to cigarette smoke. Ethanol flower extracts had great wound healing potential. Agathi also help to decrease serum cholesterol levels in hyperlipidemic rats. Ethanol extracts of agathi plant exhibited anticancer activity in carcinoma induced rats

### Ecology

*S. grandiflora* is well adapted to hot, humid environments. It is a lowland species that lacks tolerance for cool temperatures (below about 10 °C). It has an outstanding ability to tolerate water logging and is ideally suited to seasonally flooded environments. When flooded, it initiates floating, adventitious roots, and protects their stems.

It seems to prefer a bimodal rainfall distribution, growing rapidly during the wet season, but is capable of withstanding prolonged dry seasons of up to 9 months. It is not wind resistant. It is commonly seen growing on rice bunds, along roadsides, in home gardens and in mixed crop lands. Climate and Soil It is best adapted to regions with annual rainfall of 2,000-4,000mm and is also grown successfully in semi-arid areas with 800mm annual rainfall and up to 9 months dry season. It is adapted to the lowland tropics up to 800m, occasionally to 1,000m msl and the environments with mean annual temperatures of 22- 30°C. It is frost sensitive and intolerant to extended periods of cool temperatures. Poor shade tolerance, less than that of *S. sesban*. *S. grandiflora* is more suitable for the wetter/humid sites. It can be grown on a wide range of soils including those that are poor and waterlogged. It tolerates saline and alkaline soils and has some tolerance to acidic soils. Agathi may grow in alkaline, poorly drained, saline, low fertility soils. It is well adapted to heavy clay soils. Varieties In agathi, no varieties have been identified till now through systematic breeding programme. But based on the flower colour, agathi can be classified in to four distinct groups, which are as follows: Sita: This group produce white colour flower. Pee-ta: It is a yellow flowered strain. Neela: This group of plant produce blue colour flower. Lohita: It is a red flowered strain. Among these four groups, white and red flowered

### **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.

### **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 activity

### **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 probablycentrally acting components involved in antiulcer action are not found in the extract. The results were suggested that *S. grandiflora* has antiulcer potential<sup>15</sup>.

### **Antibacterial activity**

The antibacterial activity of *Sesbania 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 activity<sup>16</sup>.

### **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* Columbia Journal of Pharmaceutical Sciences 43 and development of products for their better economic and therapeutic utilization.

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Nil

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