

A Review on Medicinal Uses and Pharmacological Activity of *Sesbania Grandiflora*

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ABSTRACT: The *Sesbania grandiflora* is used in folk medicine for various diseases and infections like tuberculosis, anemia, microbial infections, etc. The *S. grandiflora* is also used as a potent anti-cancer, diuretic, purgative, anthelmintic, and hepatoprotective agent as traditional medicine. Approximately 60 global species are found which are a member of the genus *Sesbania*, they are generally found in Australia, Africa, and Asia. All parts of the plant have various therapeutic values. Pharmacologists are attempting to produce novel medications from natural sources, specifically *Sesbania grandiflora*. The current review is about the therapeutic value or pharmacological activity and the medicinal properties of *Sesbania grandiflora*.

KEYWORDS: *Sesbania grandiflora*, Folk medicine, Therapeutic value, Medicinal properties.

I. INTRODUCTION:

Most of the population of the world relies on herbs to combat a variety of diseases and infections. Herbal medicine is increasingly becoming more common in the twenty-first century for its low cost, easy availability, less or no side effects. Depending on active constituents, the plant's components are used to combat a variety of disease like diabetes, anemia, microbial infections, tuberculosis, leprosy, urinary stones, and gout, etc. [1,2,3]

S. grandiflora is commonly known as agati, West Indian pea, and belonging to the family "Fabaceae". It is found in many Asian countries like India, Malaysia, Indonesia and. [4]

The flower of *Sesbania grandiflora* is also utilized to make various popular human dishes such as a favorite south Indian dish Agathi keerai. The *Sesbania grandiflora* is used as a traditional medicine alone or with other medicinal plants to combat different diseases and infections like

swellings, headache, anemia, bronchitis, liver disorders, pains, and tumors, etc. The leaves of this plant are used for treating fever, itchiness, respiratory disorders, diuretic, purgative, anthelmintic, cigarette smoking-related respiratory problems, anemia, and an antidote for tobacco-related problems. Flowers have traditionally been used to heal a variety of medical conditions like headaches, cataracts, and night blindness by tribals. [5,6,7,8,9]

ORIGIN AND DISTRIBUTION:

Approximately 60 global species are found which are belonging to the genus *Sesbania*, they are generally found in Australia, Africa, and Asia. In India, *Sesbania grandiflora* is originated at West Bengal, Assam, Karnataka, Gujarat, Kerala, Tamilnadu, and North-Eastern states. [10,11,12]

TAXANOMY: [12,13]

Kingdom : Plantae
Subkingdom : Vascular Plant- Tracheophyta
Super division : Seed Plant- Spermatophyta
Division : Magnoliophyta
Class : Magnoliopsides
Subclass : Rosidae
Order : Fabales
Family : Fabaceae
Genus : *Sesbania*
Species : *Sesbania grandiflora* (Linn.)

VERNACULAR NAMES: [14,15]

English : Hummingbird tree, Swamp Pea, Agate
Latin : *Sesbania grandiflora*
Hindi : Agustiya, Augest, Agati, Basna
Marathi : Hadga
Telegu : Avesi, Avasinara
French : Colbrivegetal, Pois valliere, Fleur Papillon

Spanish : Paloma, Pico de flamenco Cresta de gallo,
 Punjabi : Jainta
 Bengali : Bak, Agathi, Bagphol, Bake, Agati, Jayant, Agusta
 Sanskrit : Agastyah , Anari, Agati, Agasti

MORPHOLOGICAL CHARACTERS:
 [16,17,18,19]

Tree : Sesbania grandiflora is a branched tree. It is 10-15 m in height and up to 12 cm in Diameter.

Leaves: The leaves are dark green in colour and 15-30 cm long. The leaves are oblong to elliptical in shape and are arranged opposite to each other.

Bark: The colour of the bark is lightly grey, corky and deeply furrowed. The wood of Sesbania grandiflora is soft in nature and white in colour.

Flowers: At the base of the branches, the flowers dangle in a cluster. The colour of the flowers are deep pink to red in colour. The shape of the flower is oblong and the

size of the flowers is 7-9 cm long. The flowers are acrid, astringent and bitter in taste.

Seed: The shape of the seeds are oblong and brown or dark green in colour.

Pod: The pods are sub-cylindrical or slightly curved and pale yellow in colour. Pods are 20-60cm long and 5-8 mm wide and contain 15-50 seeds. The colour of the pods is reddish-brown.

PHYTOCHEMICALS:

Mainly alkaloids, carbohydrates, flavonoids, glycosides, saponins, tannins, steroids, anthraquinone, proteins and terpenoids are present as phytochemical constituents of Sesbania grandiflora. [20,21,22,23,24,25]

MEDICINAL USES OF ITS VARIOUS PARTS: [14,26,27]

Various parts of this plant have various therapeutic value for this various part of this plant and their preparations are used as a medicine to combat various diseases and infections traditionally.

Table-1: Medicinal uses of various parts of Sesbania grandiflora

Parts	Medicinal uses
Flowers	To cure nyctalopia, fever, constipation, and headache.
Leaves	To treat cephalalgia, nyctalopia, arthritis, sinusitis, gout, nasal catarrh. Also, it is used as a mouth and throat disinfectant, Wounded healer.
Fruits	It is used as an alexiteric and laxative .
Bark	To treat eruptive fever, smallpox, diarrhea, scabies, malaria. Also, it is used as Anthelmintics.
Root	To treat a perverse condition of arthralgia.
Seed	The seed oil is used as anthelmintic.

PHARMACOLOGICAL ACTIVITIES:

A. Anticancer activity:

In Swiss albino mice, an ethanolic extract of leaves and flowers of Sesbania grandiflora has shown antitumor efficacy against the cell line of Ehrlich Ascites Carcinoma at the intraperitoneal dose of 100mg/kg and 200 mg/kg of body weight. The extracts considerably ($p < 0.05$) reduced lipid peroxidation while significantly ($p < 0.05$) increasing SOD, CAT, and GSH levels. The results demonstrated that the Sesbania grandiflora's ethanolic extract was equally efficient

as 5-fluorouracil at suppressing tumor growth in ascitic mice. [28]

Apoptotic cell death was seen in neuroblastoma (IMR- 32) and colon (HT-29) cell lines in an in vitro analysis of acetonic, aqueous, and ethanolic extracts of Sesbania grandiflora's leaf at concentrations of 50g/ml-300 g/ml. [29]

Methanolic leaf extracts of Sesbania grandiflora showed strong antiproliferative activity in the human lung cancer cell line A549 by activating caspase 3 and causing cell death through apoptosis.[30]

B. Antibacterial activity:

The disc agar diffusion method was used to test the antibacterial activity of aqueous, ethanolic, and chloroformic extracts of *Sesbania grandiflora* against *S.pyogenes*, *Staphylococcus aureus*, *S.epidermis*, *S.pneumonia*, *S.mutans*, *B.subtilis*, and *B.cereus*. *Sesbania grandiflora* chloroformic extract showed the highest inhibitory zone against *B.subtilis*, *S. aureus*, and *S.pneumonia*. [31]

In Burkina Faso, the antibacterial activity of *Sesbania grandiflora*, which is employed in traditional pharmacopeias, was tested. Aqueous, hydro-acetonic, methanolic extractions were performed on the plant's stems, leaves, and granules, as well as the roots, pods, and fruit. Groups of phytochemicals were identified using characterization assays and subsequently quantified using total flavonoids, tannins, and phenols proportioning tests. Antibacterial activity was observed in the extracts. [32]

C. Antiulcer activity:

It has been seen that in rats, an ethanolic extract of *S. grandiflora* bark protected against acute gastric injury. The extract considerably reduced stress and nonsteroidal anti-inflammatory drug-induced lesions. The animals showed no excitatory, depressive, or sleepiness symptoms at the doses 36.75 mg/kg used, implying that the extract lacks centrally active components involved in the antiulcer activity. Thus, according to the findings, *S. grandiflora* showed antiulcer properties. [33]

D. Wound healing activity:

Excision and incision wound models had been used to assess wound healing activities in Wistar rats. The rats were given a 2% and 4% w/w ethanolic extract of *Sesbania grandiflora* flower ointment on a simple ointment basis. When compared to control rats, both concentrations provided substantial effect, and Nitrofurazone ointment (0.2 %w/w) was used as the reference medication. [35]

When compared to conventional 1% Framycetin sulphate, the methanolic *Sesbania grandiflora*'s bark extract showed good wound healing activity in Wistar albino rats utilising an excision wound model at the concentration of 10% w/w. [34]

E. Anthelmintic activity:

A research of *Sesbania grandiflora* alcoholic extract's anthelmintic properties found that it had a substantial effect against Indian earthworm. When compared to the usual medicine Piperazine Citrate, a dosage of 50mg/ml not only induced worm paralysis but also caused worm death in a shorter amount of time. [36]

At concentrations of 100mg/ml, 150mg/ml, 200 mg/ml, anthelmintic activity was investigated in aqueous, acetonic and ethanolic extracts of *Sesbania grandiflora* flowers. At a dosage of 200mg/ml, the ethanolic flower's extract showed substantial anthelmintic action (*Pheretima posthuma*). Anthelmintic properties are aided by the presence of different phytochemicals. [37]

F. Antioxidant and Cardioprotective activity:

In rats, *Sesbania grandiflora*'s cardioprotective benefits against cigarette smoke-induced oxidative damage were examined. For 90 days, adult male Wistar-Kyoto rats were subjected to cigarette smoke. before being treated for 3 weeks with *Sesbania grandiflora* aqueous suspension (1000 mg/kg body weight orally every day). The findings indicate that continuous cigarette smoke exposure raises oxidative stress, which confuses the cardiac defense mechanism, and that *S. grandiflora* saves the heart from oxidative injury by virtue of its antioxidant capacity. [38,39]

G. Antidiabetic activity:

At doses of 250mg/kg and 500mg/kg administered for 28 days, the 70 percent alcoholic *S. grandiflora* flower extract showed considerable antidiabetic action in alloxan-induced diabetic rats. There was also a significant reduction in serum total level of cholesterol, SGPT, SGOT, TG, and BUN. Histopathological examinations revealed that the damaged islet of the pancreatic cell was repaired and regenerated. [40]

H. Hepatoprotective activity:

In ethanol-induced hepatotoxic rats, a study on the hepatoprotective efficacy of fruit of *Sesbania grandiflora* petroleum ether extract found a substantial reduction in ALT, AST, ALP, and total bilirubin levels at a dosage of 400mg/kg of body weight. Normal liver cells were also discovered after histopathological examinations. [41]

In CCl₄-induced rats, the hepatoprotective efficacy of ethanol, acetone extracts, aqueous

extracts of *Sesbania grandiflora*'s leaves were investigated. Biochemical markers such as serum glutamate oxalate transaminase, total bilirubin, alkaline phosphatase, and glutamate pyruvate transaminase in serum activity in rats were reduced by the ethanolic extract at a dosage of 300mg/kg body weight.[42]

I. Anti-inflammatory activity:

At a dose of 400mg/kg of body weight, a methanolic *Sesbania grandiflora* leaf extract showed anti-inflammatory action in a formaldehyde-induced rat paw oedema model. The standard medication in this trial was Dexamethasone at 0.5 mg/kg of body weight.[43]

J. Antiviral activity:

Methanolic *Sesbania grandiflora*'s flower extracts were found to have antiviral action against herpes simplex-1, herpes simplex-2, vaccinia, vesicular stomatitis, and cox-sackie. The flavonoid content is primarily responsible for the antiviral action.[44]

K. Immunomodulatory activity:

In rats provoked by red blood cells of sheep to produce hypersensitivity, oral treatment of methanolic *Sesbania grandiflora* extract at doses of 200mg/kg and 400 mg/kg resulted in considerable immunomodulatory effect.[45]

II. CONCLUSION:

Ayurveda and Unani medicine now utilise a variety of medicinal plants for the treatment purpose of various diseases and infections. As a medicinal plant, it is a gold mine of information. The various parts of the *Sesbania grandiflora* have a broad range of pharmacological activities to combat various diseases like nyctalopia, fever, constipation, headache diabetes, anemia, microbial infections, tuberculosis, leprosy, urinary stones, gout, bronchitis, pains, liver disorders, tumors, etc. For the preservation of *Sesbania grandiflora* and the creation of products for better economic and therapeutic use, systemic research and development effort should be undertaken.

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