Pharmacological Profile of Plant Sesbania grandiflora

Mohd Mushahid*, Abdul Wadood Ansari, Abhishek Yadav, Arti, Krishanu Samanta
Pharmacy College, Itaura, Chandeswar Azamgarh

Abstract: ***Sesbania grandiflora*** **(Linn) belonging to family Leguminosae, commonly known as sesbania.** ***Sesbania grandiflora*** **(Linn) often planted for its edible flowers and pods in tropical countries. It is originated in India Southeast Asia and grows primarily in hot and humid areas of the world. It is also found from northern Luzonto Mindanao in settled areas at low and medium altitudes and in the Philippines. Different parts of plant, like root, stem, bark, leaves, flowers, fruit are used as medicine and food. Traditionally this plant used for treatment of disease like diarrhoea, dysentery, fever, cough, and cold. The antioxidant properties of Sesbania grandiflora are due to the presence of diverse types of phytochemical constituents. The leaves of plant have been used in local traditional medicine since ancient times. The other of species sesbania are** ***Robinia grandiflora Linn, Aeshynomene grandiflora Linn, Sesban grandiflora Poir, Agati grandiflora (L.) Desv.*** **A small, erect, quick-growing short-lived, soft-wooded tree sparsely branched. Bole straight and cylindrical, the wood white and soft. The tree is 5 to 12 meters in height. The leaves are 20 to 30 centimetres long and pinnate having 20 to 40 pairs of leaflets, which are 2.5 to 3.5 centimetres long. The flowers are white and 7 to 9 centimete long. The pods are linear, 20 to 60 centimetres long, 7 to 8 millimetres wide, pendulous, and somewhat curved, and contain many seeds.** ***Sesbania grandiflora*** **one of the medicinal plants used for anti-oxidant activity, it also has pharmacological properties like anti-cancer, anti-helminthic, anti-diabetic, anti-ulcer, hepato-protective, anti-bacterial, anti-viral, hypolipidemic, anti-tuberculosis, cardio protective, anti-arthritic, immuno-modulatory, anti-inflammatory, analgesic, wound healing and as a tablet binder. It contains several kinds of alkaloids, flavonoids, saponins, tannin, diterpenes, triterpenoids, glycosides and phenols. This plant found numbers of phytoconstituent these substances have the major impact on diabetes mellitus (hypoglycaemic activity).**

Keywords: ***Sesbania grandiflora*****, antioxidant, anti-cancer, anti-bacterial, anti-ulcer**

INTRODUCTION

The use of medicinal plants is very important for people's health. In addition to their nutritional value, the majority of therapeutic herbs are utilized as food (Maoulainine, 2012). Commonly referred to as agate or hummingbird tree, *Sesbania grandiflora* is a plant that is a member of the fabaceae family. India, Malaysia, Indonesia, and the Philippines are the primary locations for this plant. Typically soft, semi- or slightly woody, *Sesbania grandiflora* plants grow to a height of 1-4 meters and have red, white flowers up to 10 cm in diameter. It's pretty poor grade wood.

The plant grows at a rate of roughly three to four years. Forage, firewood, pulp and paper, food, green manure, and landscape design are all provided by *Sesbania grandiflora* trees. The leaves, pods, and flowers of *Sesbania grandiflora* are consumed as vegetables on a daily basis. *Sesbania grandiflora's* purple flowers are poisonous, whereas its white flowers are not (S., 2018). *Sesbania grandiflora* contains tannins, flavonoids, coumarone, steroids, triterpene, alkaloids, and more in every part of the plant (M.B, 2011). The plant has a lot of vitamins and minerals in its leaves and blossoms. The herb generally reported for anti-inflammatory, analgesic and antipyretic properties. *Sesbania grandiflora* leaves are used as a treatment for thrombosis, diarrhoea, and inflammatory illnesses. They are also used to combat a few significant bacterial pathogens (N, 2016) (Binte Arfan N, 2016). Additionally, the bark has been used as an astringent tonic, infusion for smallpox and other eruptive fevers, and for the treatment of diarrhoea, dysentery, dyspepsia, and mouth and alimentary canal ulcers (Kirtikar KR B. B., Second edition 1991). *Sesbania grandiflora* leaves juice has reported for the treatment of bronchitis, cough, vomiting, wounds ulcers, diarrhoea and dysentery. The flowers of plant are used for the antimicrobial activity. The root powder of this plant is used in form of pest by mixing in water and applied externally as a poultice or rub for rheumatic swelling (Aye MM, 2019).

Plant profile (Prodip Roy, 2021) (Basu., 1991)

Sesbania grandiflora

The name of plant: *Sesbania grandiflora* L.

Common name: hummingbird tree Agate.

English name: Swamp pea, Sesban.

Hindi name: Agati, Basn, Agustiya, Augest.

Marathi name: Hadga.

Telegu name: Avasinara, Avesi.

French name: Pois valliere, Colbrivegetal.

Spanish name: Pico de flamenco Cresta degallo, Paloma.

Punjabi name: Jainta.

Bengali name: Bake, Agati, Bak, Agathi, Bagphol Jayant, Agusta.

Sanskrit name: Agati, Agasti Agastyah, Anari.

Traditional or Ayurveda name: Agastya, Vakrapushpa, kumbha.

Biological source of the plant: it contains of dry leaves of Sesbania grandiflora L. and plant belongs in family fabaceae.

Taxonomical Description: (al. L. P., 2017)

Kingdom: Plantae.

Subkingdom: Tracheobionta.

Division: Magnoliophyte.

Class: Magnoliopsida.

Subclass: Rosidae.

Order: Fabales.

Family: Fabaceae.

Genus: Sesbania.

Species: *Sesbania grandiflora* L.

Botanical Description: The plant is roughly 6 to 9 meters tall and 0.6 meters in diameter. Sesbania is a short-lived, fast-growing plant. The plant has soft wood. The plant's leaves are between 15 and 30 centimetres in length. With around 41 to 61 leaflets, the leaves have an abruptly pinnate structure that resembles linear-oblong deciduous leaves. The plant has flowers that are 6 to 10 cm long. The petals of the flower are red, pink, and white, and they are slightly meaty. Plants produce fruit, sometimes known as pods, that are 30 cm or longer and contain between 15 and 50 seeds. (al. A. C., 1992)

Geographical Location: In India, *Sesbania grandiflora* grows wild in a variety of places including Karnataka, Assam, West Bengal, and the northeastern regions. It is accessible in tropical regions such as Asia and northern Australia in other nations. (Kirtikar KR B. B., 1991)

Morphology: *Sesbania grandiflora* is a tree with sparse branches that grows quickly. Different portions of plants have distinct morphological characteristics. the plant's root, stem, flower, leaves, fruit, and seeds are its constituent parts (Fig 1).

(Fig. 1)- Plant

(Fig. 2)- Leaves

Leaves: The paripinnate constructed leaves of the *Sesbania grandiflora* plant can reach a length of 15 to 25 cm. Each plant leaf has between 20 and 50 leaflets, each measuring 12-44 x 5-15 mm and arranged in the opposite direction. Single leaflet has a length 2 to 4cm and 10-15mm breadth. Stem: both inner and outer bark are present in steam. the hue of bark is light grey, facture of bark is corky, heavily furrowed. The plant's wood is white and delicate (Fig B).

Flower: The base of the leaf is where the *Sesbania grandiflora* blossom appears. White, pink, or crimson petals adorn the fleshy plant blossoms. The flower has five petals and is 7.5–10.0 cm long. The standard petal is often upright, while the wing petals are dispersed around the sides of the flower

Fruits: The plant's fruit is also known as pods, and they are green in colour and appear flat. The pod is straight, sub-cylindrical, and slightly curved. Pods are between 5 to 8 mm in width and 30 to 45 cm in length.

Seed: The seeds are cylindrical or bean like elliptical having olive green or red brown colour. About 6 to 8 seeds contains in one pod. (Venkataeshwarhu G, 2012) (Dwivedi C, 2014)

Phytochemistry: The leaves of the *Sesbania grandiflora* plant contain 73.1g of moisture, 3.1g of minerals, 2.2g of crude fibres, 11.8 mg of carbs, 8.4g

of protein, 93 mg of energy, 1,130 mg of calcium, 80 mg of phosphorus, and 3.9 mg of iron, protein and amino acids, including arginine, asparagine's, leucocyanidin, cysteine, histidine, isoleucine, phenylalanine, tryptophan, valine, threonine, alanine, aspartic acid, and cyaniding, are found in large quantities in the Sesbania grandiflora plant. Galactose and rhamnose are found in sugar compounds. Leaves of plant contain different phytoconstituents such as alkaloids, triterpenoids, carbohydrates, tannin, saponin, flavonoids, anthocyanins, steroidal glycosides, and phenolic compounds are found in diverse regions of the plant. Also found in Iosflavanoids, isovestitol, medicarpin, sativan, and betulinic acid are in the root part. Leucocyanidin and cyaniding are examples of active ingredients found in seeds. The delphinidin glucosides, tannins, grandiflora, proteins, cyaniding, cysteine, isoleucine, asparagine, kaempferol, phenylalanine, valine, nicotinic acid, vitamin C, and oleanolic acid are all found in the blooms of the *Sesbania grandiflora* plant (Hasan N, 2012), (T., 2011), (Arunabha M, 2015).

Medicinal Uses of its various parts: Different components of this plant have different medicinal properties, and its formulations are traditionally used as medicines to treat a variety of illnesses and infections (T, 2011), (AK, 2009).

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

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

Pharmacological Activities:

Antiviral activity: Flower extracts from *Sesbania grandiflora* that were methanolic were reported to exhibit antiviral properties against cox-sackie, vaccinia, vesicular stomatitis, herpes simplex-1, and herpes simplex-2. The main source of the antiviral effect is the flavonoid content (Krishna.P. Laladhas, 2010).

Anti-inflammatory activity: A methanolic leaf extract of *Sesbania grandiflora* demonstrated anti-inflammatory properties in a rat paw oedema model caused by formaldehyde at a level of 400 mg/kg of body weight. Dexamethasone at a dose of 0.5 mg/kg body weight served as the standard drug in this research (Rajan., 2015).

Anti-bacterial activity: The diffusion method of disc agar was employed. In order to evaluate the antimicrobial efficacy of aqueous Chloroform and ethanolic *Sesbania grandiflora* extracts against *Staphylococcus* and *S. pyogenes*, *S. pneumoniae*, *S. aureus*, S. epidermis, S. mutans, B. cereus and B. subtilis. The grandiflora Sesbania the extract of chloroform exhibited the most inhibitory zone that is hostile to *B. subtilis*, *S. aureus*, as well as *S. pneumonia* (Sankar Pajaniradje, 2014).

The antibacterial activity of *Sesbania grandiflora*, which is employed in traditional pharmacopeia, 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 (Jothi Karumari R, 2014).

Hepatoprotective activity: *Sesbania grandiflora* leaves ethanolic extract was found to provide hepatoprotection against *Erythromycin etiolates* at a dose of 200 mg/kg/day (Pari L, 2003). In rat models of ccl4-induced hepatotoxicity, the ethanolic and aqueous extracts of *Sesbania grandiflora* flowers exhibit hepatoprotective action. The necessary dosage is 200 mg/kg BW (Ishwer Kale, 2012).

Anti-cancer activity: Ethanol extract of leaves and flowers of plant *sesbania grandiflora* reported for anticancer activity which performed on Swiss albino

mice and the dose was 100 and 200mg/kg body weight (Sreelatha S, 2011).

Antiulcer activity: By employing an ethanolic bark extract, the Sesbania grandiflora plant shielded rats against acute stomach damage. The active dose was 36.75 mg/kg. The absence of depressed, excitatory, or sleepy effects in the animals at the levels employed suggested that the extract did not contain any centrally active components that are involved in its anti-ulcer action. The findings demonstrate the antiulcer potential of the plant *Sesbania grandiflora* (Jayme Antonio Aboin Sertie, 2001.).

Wound healing activity: The methanol extract of bark from the plant *Sesbania grandiflora* was tested for its ability to heal wounds using a wound model in Wister albino rats. Compared to the standard 1% Framycetin sulphate, a dose of 10% w/w was needed to produce significant wound healing activity. The findings showed that a methanol extract of *Sesbania grandiflora* bark had significant wound-healing efficacy (Karthikeyan, 2011).

Anti diabetic activity: In rats with alloxan-induced diabetes, the 70% alcoholic *S. grandiflora* flower extract had significant antidiabetic effects at doses of 250 mg/kg and 500 mg/kg given for 28 days. Serum total cholesterol, SGPT, SGOT, TG, and BUN levels were also significantly lower. Histopathological analyses showed that the pancreatic cell's injured islet had healed and grown again (Ramesh T, 2008).

Immunomodulatory activity: Oral administration of methanolic *Sesbania grandiflora* extract at doses of 200 mg/kg and 400 mg/kg produced a significant immunomodulatory effect in rats that were made hypersensitive by sheep red blood cells (Saravana Kumar Arthanari, 2012).

Conclusion: Herbal medicines and medicinal plants are used from long time as a traditional medicine, in that *Sesbania grandiflora* is one of traditional medicinal plant. From the above study, it is concluded that the all part of plant *Sesbania grandiflora* used as traditional medicines due to various active constituents present in parts of plant. The parts of plant reported for different activities like antibacterial, Anti-inflammatory, antiulcer, antidiabetic, wound healing, anticancer activity etc. Further research are needed to above pharmacological activity or medical property are responsible whose phytoconstituents or secondary metabolites.

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