

## A REVIEW ON THE MEDICINAL VALUE OF SESBANIA GRANDIFLORA LEAVES AND FLOWERS

**ABSTRACT :** *Sesbania grandiflora* is a leguminous tree of family Fabaceae. It is fast-growing and soft-wooded, and it grows to heights of 5–20 metres (16–66 feet). The leaves are regular and rounded, and grow to 15–30 cm (6–12 in) long, with leaflets in 10–20 pairs or more and an odd one. The flowers white, red or pink and are oblong, 1.5–10 cm (1–4 in) long in lax, with two to four flower racemes. The calyx is campanulate and shallowly two-lipped. The fruits, or seed pods, look like flat, long, thin green beans. They are slender, falcate or straight, and 30–45 cm (12–18 in) long, with a thick suture, and each contains approximately thirty 8 mm (0.3 in) seeds. The tree thrives under full exposure to sunshine and is extremely frost sensitive. *S. grandiflora* leaves are highly nutritious and have been shown to contain significant amounts of proteins, fat, carbohydrates, fiber, and minerals such as iron, calcium, and phosphorus. The young leaves are edible and are quite often used to supplement meals. The plant has also been reported to be a potent antidote for tobacco and smoking related diseases

**Key words:** *Sesbania grandiflora* , leaves, flowers, pharmacological activities.

**Introduction :** *Sesbania grandiflora*,[2] commonly known as vegetable hummingbird,[3] katurai, agati, or West Indian pea, is a small

leguminous tree native to Maritime Southeast Asia and Northern Australia. It has edible flowers and leaves commonly eaten in

Southeast Asia and South Asia.[4]. *Sesbania grandiflora* is a fast-growing tree. The leaves are regular and rounded and the flowers white, red or pink. The fruits look like flat, long, thin green beans. The tree thrives under full exposure to sunshine and is extremely frost

sensitive.

It is a small soft wooded tree up to 3–8 m (10–26 ft) tall. Leaves are 15–30 cm (6–12 in) long, with leaflets in 10–20 pairs or more and an odd one. Flowers

are oblong, 1.5–10 cm (1–4 in) long in lax, with two to four flower racemes. The calyx is campanulate and shallowly two-lipped. Pods are slender, falcate or

straight, and 30–45 cm (12–18 in) long, with a thick suture and approximately 30 seeds 8 mm . It is native to Maritime Southeast Asia (Malaysia, Indonesia, Philippines, Brunei) to Northern Australia, and is cultivated in many parts of South India and Sri Lanka. It has many traditional uses.[4] It grows where there is good soil and a hot, humid climate. Leaves of *Sesbania grandiflora* can possibly be utilized as a remedy for thrombosis, diarrhea, and inflammatory diseases and against couple of significant bacterial pathogens.1-4 The juice of the leaves of *S. grandiflora* has been purportedly utilized in the treatment of bronchitis, cough, vomiting, wounds ulcers, diarrhea, and dysentery. The flowers have revealed antimicrobial activity. Powdered roots of this plant are mixed in water and

applied externally as a poultice or rub for rheumatic swelling.<sup>5</sup> The leaves are traditionally used to treat nasal catarrh, nyctalopia and cephalgia.

Studies demonstrate that, *S. grandiflora* have antioxidant, antiuroithiatic, anticonvulsive, antiinflammatory, anti-helminthic, antibacterial and anxiolytic activity. The aim of this review article is focused *Sesbania grandiflora* one of the medicinal plants used for antioxidant activities. It contains several kinds of alkaloids, flavonoids, saponins, tannin, diterpenes, triterpenoids, glycosides and phenols.

## Medicinal properties

### 1) Antidiabetic activity

Ghanshyamet al. [9] studied the 100, 200 and 400 mg/kg *S. Grandiflora* leaves for antihyperglycemic activity in glucose overloaded hyperglycemic rats and hypoglycemic activity in overnight fasted normal rats. The highest dose showed both of the activities. Nandiet al. [10] studied the 200 and 400 mg/kg *S. grandiflora* fruit using streptozotocin induced diabetic rats. The results showed *S. grandiflora* fruit extract included hypoglycemic agent significantly decreased the levels of blood glucose, cholesterol, triglyceride and low density lipoprotein, Lipid peroxidation significantly reduced and superoxide dismutase and catalase significantly increase. Radhikaet al. [11] studied the 500 and 750 mg/kg *S. grandiflora* leaves using alloxan induced diabetic rats for 45 days. The results showed that oral administration of this plant restored all the biochemical parameters such as plasma glucose, serum insulin, glycosylated hemoglobin, hepatic glycogen, glucokinase, glucose-6-phosphatase, and serum marker enzymes i.e., aspartate and alanine transaminase and alkaline phosphatase. Sangeethaet al. [12] studied the 300 mg/kg *S. grandiflora* leaves using streptozotocin induced diabetic rats for 30 days. The results showed the effects of this plant also restored all the biochemical parameters such as glucose, glycosylated hemoglobin, blood urea nitrogen, uric acid, creatinine, aspartate and alanine transaminase, alkaline phosphatase, glycogen content. *S. grandiflora* possesses the antidiabetic effect using multiple pathways. From the literature reviews that can be summarized these pathways as following: Inhibit enzyme Two proteins, namely SGF60 and SGF90 isolated from the flowers of this plant have been shown to possess significant inhibitory effect on digestive enzymes,  $\alpha$ -amylase and  $\alpha$ -glucosidase that responsible for the metabolism of carbohydrates [13]. Glycosylated hemoglobin that form by excess glucose reacts with hemoglobin, can be used as an excellent marker for diabetes, *S. grandiflora* plant extract significantly decreased this marker level [14, 15]. Hypouricemia activity In addition, a recent research showed that fructose-induced hyperuricemia plays a pathogenic role in metabolic syndrome [16, 17]. Thus, lowering uric acid may be a novel treatment target for preventing diabetes. The levels of urea, serum creatinine and uric acid were restored to near normal level by treatment with *S. grandiflora* leaves extract [18].

### 2) Antioxidant properties

Many studies reveal that antioxidants capable of neutralizing free radicals are effective in preventing experimentally induced diabetes in animal

models as well as reducing the severity of diabetic complications [19-20, 21]. The elevated oxidative stress marker and diminished antioxidant

status were normalized indicating the antioxidant potential of this plant [22]. Zarena et al. [23] reported the 29 kDa protein from *S. grandiflora*

leaves named agathi leaf protein (ALP) which possesses antioxidant and cytoprotective activities. Additionally, the level of lipid peroxidative

markers (thiobarbituric acid reactive substances and lipid hydroperoxides) was significantly reduced on treatment with *S. grandiflora*, the levels of both

enzymatic and non-enzymatic antioxidants were also found to be restored on treatment with this plant [66]. Increased hepatic metabolism

The hypoglycemic activity is thought to be due to increased hepatic metabolism. Aqueous homogenate of this plant administered orally to

animal model significantly increased hepatic glycogen and free amino acid content, decreased blood glucose, and triglyceride levels [24-25, 26]. Insulin

elevation The hypoglycemic activity is thought to be due to stimulation of synthesis and/or release of insulin from pancreatic beta cells and/or insulin

sparing effect [27]. In conclusion, the aim of this review is to focus on the potential utilization of phytochemical constituents which could contribute

more effectively to antidiabetic activity of *S. grandiflora*. It aims to explore a proposed use of this plant for complementary alternative medicine

and especially for human consumption.

### **3) Miscellaneous**

Leaves of *Sesbania grandiflora* have the potential to be used as a remedy for thrombosis, diarrhea, and inflammatory diseases and against few important bacterial pathogens [28,29]. The juice of the leaves of *S. grandiflora* has been reportedly used in the treatment of bronchitis, cough, vomiting, wounds, ulcers, diarrhea, and dysentery. The flowers have reported antimicrobial activity. Powdered roots of this plant are mixed in water and applied externally as a poultice or rub for rheumatic swelling [5]. The leaves are traditionally used to treat nasal catarrh, nyctalopia and cephalgia. Studies show that, *S. grandiflora* possess antioxidant, antiurothiatic, anticonvulsive, anti-arthritis, anti-inflammatory, antihelminthic, anti-bacterial and anxiolytic activity [30-31].

### **4) Antimicrobial**

Gandhi et al, 2017 reported that anti-biofilm and antibacterial efficacy of *S. grandiflora* plays a vital role over biofilm producing

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<https://spast.org/index.php/techrep/index>

pathogens and act as a good source for controlling the microbial population. [32].Saifudinet.al, 2016 reported that flower acts as a promising

material to develop the active ingredient of anti-plaque toothpaste as well as mouthwash solution [33]. It has been reported that a biofilm is strongly associated with the drug resistance property [34]. Hence, eradication of biofilm is often considered to be a difficult task and therefore use of plant products to inhibit biofilm may be a viable alternative [35].Ramesh et.al, 2015 showed brain oxidative damage restored by *Sesbania grandiflora* in cigarette smoke-exposed rats [36]. Earlier, the lead author and associates presented cardioprotective action of *S. grandiflora* aqueous suspension that restored the antioxidant status and retained the levels of micronutrients in cigarette smoke-exposed rats [37,38]. Afterwards,

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