



***Sesbania sesban* Linn. : An overview**

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Abstract

The history of herbal medicines is as old as human civilization. *Sesbania Sesban* Linn. (Fabaceae) found throughout the plains of India and commonly called as Jayanti. Herbals which form a part of our nutrition and provide us an additional therapeutic effect are in demand and *Sesbania Sesban* Linn. is one of such plant. The plant has got good medicinal importance. Flowers contain cyanidin and delphinidin glucosides, Pollen and pollen tubes contain alpha-ketoglutaric, oxaloacetic and pyruvic acids the leaves of *Sesbania Sesban* evaluated the topical anti-inflammatory activity, antidiabetic and CNS stimulant effect, in thyroid disorders, dysuria. The leaf of *Sesbania Sesban* has traditionally been used as purgative, demulcent, maturant, Anthelmintic and for all pains and inflammation. The renal protective effect of the aqueous extract of *Sesbania Sesban* leaves (250 and 500 mg/kg/day) in streptozotocin-induced diabetic rats were studied. Diabetic rats showed severe hyperglycemia with marked increase in proteinuria and albuminuria. The pharmacological action of active constituents of crude drugs and their therapeutical or pharmaceutical uses form an integral part of a pharmacognostic scheme. It mainly contains kaempferol trisaccharide, chikusetsusaponin-iv. *Sesbania Sesban* is a nitrogen fixing tree, seedling are tolerant to relatively high level of nitrogen. The present review summarizes the scientific information of various aspects of *Sesbania Sesban* Linn. Plant used in traditional system of medicine for variety of purpose.

Key-Words: *Sesbania Sesban* Linn. Medicinal Significant, anti-inflammatory activity, CNS Stimulant

Introduction

India is virtually a herbarium of the world. In India, we are using plants and herbs as the basic source of medicine because we are rich in them. Herbals which form a part of our nutrition and provide us an additional therapeutic effect are in demand and *Sesbania Sesban* Linn. is one of such plant¹.

Sesbania Sesban Linn. is well known medicinal plant commonly found in India and other tropical countries it is found throughout the plains of India.

Sesbania Sesban Linn., commonly known as 'Egyptian Sesban' is one of the six species of genus *Sesbania* which is commonly found to be grown in tropical region of India. The plant is widely grown for its nitrogen fixing ability and as wind shades. The plant has got good medicinal importance. According to ethno medicinal claims the poultice of leaves of *Sesban* Linn. Promotes suppuration of boils and abscesses and absorption of inflammatory rheumatic swellings. Juice of fresh leaves is credited with Anthelmintic properties².

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Sesbania sesban Linn. consist of dried bark of the plant *Sesbania Sesban* Linn. (Fabaceae) is found throughout the plains of India and commonly called as Jayanti (SANS) and Shevri (MAR)³. Several reports suggested that bark of *Sesbania Sesban* is used in diarrhea, spleen enlargement and inflammation. Seeds used in spleen enlargement. Flowers exhibit antifertility activity^{4,5}.

Different Species

Sesbania benthamiana, *Sesbania dalzielii*, *Sesbania drummondii*, *Sesbania exasperata*, *Sesbania formosa*, *Sesbania goetzei*, *Sesbania grandiflora*, *Sesbania hirtistyla*, *Sesbania hobdyi*, *Sesbania javanica*

Vernacular names

Arabic	: Sesaban
Bengali	: Jainti, Jayant
Burmese	: Yay-tha-kyee, Yethugyi
English	: Common Sesban, Egyptian rattle pod, Frother, Iver bean, Sesban, Sesbania
Hindi	: Jainti, Jait, Rawasan
Guj	: Jayanti, Rajashinganee
Kan	: Arinintajinamgi
Mal	: Semp, Atti
Punj	: Jainta

Tel	: Somita, Jalugu
Indonesian	: Janti, Jayanti, Puri
Javanese	: Janti
Luganda	: Mubimba, Muzimbandeya
Sanskrit	: Jayanti, Jayantika
Spanish	: Anil francés, Tamarindillo
Tamil	: Champai, Chithagathi,
Karunchembai	
Thai	: Sami, Saphaolom
Vietnamese	: Dien-dien ¹ .

Distribution

Chad, Egypt, Kenya, Uganda, Angola, Australia, Benin, Botswana, Burkina Faso, Burundi, Cameroon, Cape Verde, Central African Republic, China, Congo, Cook Islands, Cote d'Ivoire, Democratic Republic of Congo, Djibouti, Equatorial Guinea, Eritrea, Ethiopia, Fiji, French Polynesia, Gabon, Gambia, Ghana, Tonga, United States of America, Vanuatu, Vietnam, Zambia, Zimbabwe. The origin of *S. Sesban* is unclear, but it is widely distributed and cultivated throughout tropical Africa and Asia.

Leaves

Leaves paripinnate, compound 12-18cm long made up of 6-27 pairs of leaflets. long, narrow; leaflets in many pairs, rounded or oblong, usually asymmetric at the base, often glaucous; stipules minute or absent⁶.

Flowers

The raceme has 2-20 flowers which are yellow with purple or brown streaks on the corolla. Flowers attractive, yellow, red, purplish, variegated or streaked, seldom white, large or small on slender pedicels, solitary or paired in short axillary racemes, usually unpleasantly scented; all petals long clawed, standard orbicular or obovate.

Pods

Pods pale yellow, linear, usually 10-20 cm long, cylindrical or compressed, rarely oblong; up to 40 seeds are found in a pod; seeds oblong or sub quadrate, brown or dark green mottled with black. Two subspecies are recognized within *Sesbania Sesban*, namely ssp. *Punctata* (restricted to northern portions of sub-Saharan Africa) and ssp^{6,7}.

Young shoots

Straight, green and canescent

Wood

Sesban's wood is light in weight compared to the woods of *Calliandra* and *Leucaena*¹.

Ecology⁸**Soil requirements**

Grows in a wide range of soils from loose sands to heavy clays. Tolerates saline soils (1.0% salt concentration in the seedling stage to 1.4% at maturity); alkaline soils (pH <10); and acidic soils, as

well as water-logging and flooding. Tolerant of low P, but P application has a positive effect on growth and nodulation. Tolerant of metalliferous mine tailings high in Cu, Zn and Pb.

Moisture

Sesbania Sesban is native to monsoonal, semi-arid to sub-humid regions with 500-2,000 mm annual rainfall. Grows best where periodic water logging or flooding is followed by a progressively drier season.

Temperature

Sesbania Sesban is tolerant of cool highland-tropical or sub-tropical conditions, growing at up to 2,300 m altitude in Kenya and as far south as 27° latitude in Australia. These environments experience cool winter temperatures, with mean monthly minimum temperatures for the coldest month of 7-10°C and average annual temperatures ranging from 17-20°C. Tolerates light frosts, but will be killed by heavy frost.

Light

Has moderate shade tolerance

Cultivation and propagation^{9,10}

Sesbania Sesban grows well in the subtropics and is significant in extending the nitrogen-fixing forage trees into cooler, higher elevation regions of the tropics. It has outstanding ability to withstand water logging and is ideally suited to seasonally flooded environments. When flooded, it initiates floating, adventitious roots and protects its stems, roots and nodules with spongy, aerenchyma tissue. It is common along streams, swamp banks and moist and inundated bottomlands. *Sesbania Sesban* shows some tolerance.

Propagation methods

Sesbania Sesban has a hard, impermeable seed coat, and scarification is recommended to ensure uniform germination. For research purposes, soaking in sulphuric acid followed by rinsing in water is common. Hot water treatment or soaking in cold or tepid water for 24 hours may also be effective. The seed germination rate is 65% in about 16 days. Vegetative propagation using stem cuttings is not a widespread practice; *Sesbania Sesban* can also be established by tissue culture.

Environmental adaptation

Sesbania Sesban shows some cool tolerance. It grows well in the subtropics and is significant in extending the nitrogen fixing forage trees into cooler, higher elevation regions of the tropics up to 2,000 m. (Gutteridge and Shelton 1998). It is outstanding in its ability to tolerate waterlogging and is ideally suited to seasonally waterlogged environments. When flooded, it initiates floating adventitious roots and protects its stems, roots and nodules with spongy, aerenchyma tissue. Evans and Macklin (1990) report the rainfall

range of *Sesbania Sesban* as 500-2,000 mm. Another outstanding feature is its tolerance of both saline and alkaline soil conditions (Hansen and Munns 1985). However, its tolerance of highly acid, aluminium saturated soils is not known.

Biophysical limits

Altitude: 100-2300 m,

Mean annual temperature: (10 min.) 18-23 (45 max.) deg. C, Mean annual rainfall: 500-2000 mm.

Soil type: Tolerates seasonal or permanently waterlogged soils as well as saline, acidic and alkaline soils.

Reproductive Biology

Sesbania Sesban is assumed to be largely out-crossing, however interspecific hybridization is reported with *S. goetzei*; the carpenter bee is its main pollinator. Flowering starts shortly after the onset of the rains (in areas where there are 2 rainy seasons, it flowers and sets fruit twice). Pods are indehiscent and do not shed their seeds until well after pod maturity propagation and management to moisture stress and tolerates soil alkalinity and salinity⁸.

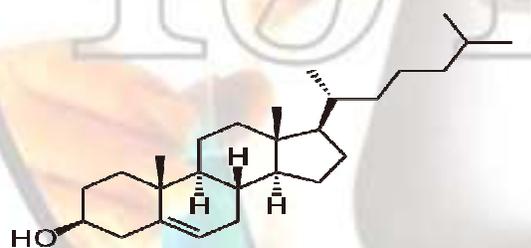
Chemical constituents^{6,7}**Major**

Pod: kaempferol trisaccharide

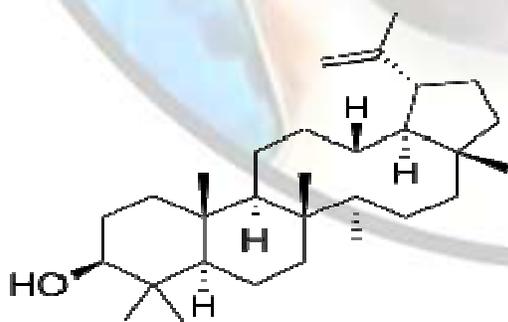
Leaf: chikusetsusaponin iv

Others: lupeol, α -amyrin, galactomannan, stigmasta-5, cholesterol, campesterol, β itosterol, linoleic acid, oleic acid, palmitic acid, stearic acid, lignoceric acid.

Leaf: 3-o-[α -L-rhamnopyranosyl]-oleanolic acid, Ilexoside XL VIII cholesterol, campesterol, β -sitosterol



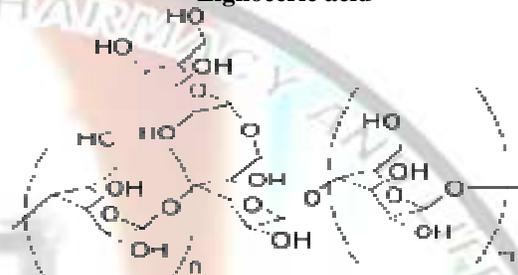
Cholesterol



Lupeol



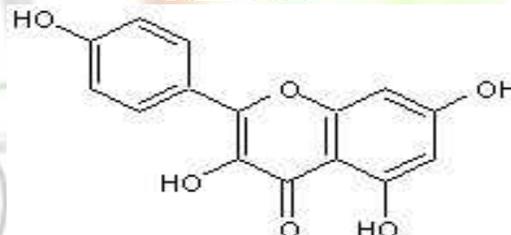
Lignoceric acid



Galactomannan



Palmitic acid



Kaempferol

Therapeutic uses**Anti inflammatory Activity**

The leaves of *Sesbania SESBAN* evaluated the topical anti-inflammatory activity of the crude saponins extract by carrageenan induced rat paw edema method by preparing the gel formulation. The activity was carried on Wistar albino rats, receiving two strengths of crude saponin gel at a concentration of 1% w/w and 2% w/w respectively and Diclofenac sodium gel (1% w/w) was used as reference drug. The crude saponins extract in 2% w/w gel formulation showed significant anti-inflammatory. The effects of exogenous administration of Petroleum ether, Chloroform and Methanol extracts of bark of *Sesbania Sesban* and *Sesbania grandiflora* in carrageenan induced inflammation model, the result of anti-inflammatory activity of extracts of above plants showed that petroleum ether extracts of bark of *Sesbania Sesban* and *Sesbania grandiflora* were having better anti-inflammatory activity as compare to other extracts in carrageenan induced paw oedema in rats¹¹.

Adjuvant-induced arthritis in the rat

Oral administration of petroleum ether extracts of bark of *Sesbania Sesban* (300mg/kg p.o. b.w.) twice each day during the 21 days of adjuvant induced arthritis

showed a significant decrease in injected paw oedema from 12th day till 21st day in petroleum ether extracts of bark of *Sesbania Sesban* and arthritis paw oedema maximum reduction was from 14th day till 21st day in all above plants extracts. In Non- injected paw all above plants extracts showed decrease in paw oedema was observed in arthritis and maximum decrease was on 12th day till 21st day. Body weight, spleen and thymus weight were observed¹².

Attenuating Effect

The attenuating effects of *Sesbania Sesban* leaves aqueous extract in streptozotocin (STZ)-induced diabetic rats at dose of 250 and 500 mg/kg per day was given to diabetic rats for 12 weeks. Cold and hot water tail immersion tests, photoactometer and Rota-rod tests were performed to assess degree of colder, thermal spontaneous motor activity and motor co-ordination changes respectively at different time intervals i.e., week 0, 4, 8 and 12. Tissue superoxide anion and total calcium levels were determined after 12 weeks to assess biochemical alterations. Histopathological evaluations of sciatic nerve were also performed. *Sesbania Sesban* was increased tail flick latency significantly in diabetic rats also reduced superoxide anion and total calcium levels¹³.

Antidiabetic Activity

The aqueous leaves extract of *Sesbania Sesban* was evaluated for its antidiabetic potential on normal and streptozotocin (STZ)-induced diabetic rats at the doses of 250 and 500 mg/kg body weight per day for 30 days. The fasting Blood Glucose Levels (BGL), serum insulin level and biochemical data such as glycosylated hemoglobin, Total Cholesterol (TC), Triglycerides (TG), High Density Lipoproteins (HDL) and Low Density Lipoproteins (LDL) were evaluated and all were compared to that of the known anti-diabetic drug glibenclamide (0.25 mg/kg b.w.). The statistical data indicated significant increase in the body weight, liver glycogen, serum insulin and HDL levels and decrease in blood glucose, glycosylated hemoglobin, total cholesterol and serum triglycerides when compared with glibenclamide¹⁴.

Potential Antifertility Activity

The different doses of *Sesbania Sesban* seed powder inhibit the ovarian function, change the uterine structure and prevent the implantation, thus, control the fertility of female albino rats. The root extracts of *Sesbania Sesban* showed oleanolic acid 3- β -Dglucuronide spermicidal activity^{15,16}.

CNS Stimulant Effect

In his study *Sesbania Sesban* was intended to evaluate the CNS stimulant activity of crude drug extract. The activity was carried out on albino mice. Caffeine was

used as a reference drug. The crude extract showed significant CNS¹⁷.

Other uses

Various medicinal uses for *Sesbania Sesban* have been recorded in Africa and Asia^{9,10}. The leaves and flowers are used in medicinal poultices and teas, which are said to have the effect of astringency, or contraction of body tissues. Bark exudates from *Sesban* produce a gum of medium commercial quality. The leaf of *Sesbania Sesban* has traditionally been used as purgative, demulcent, maturant, anthelmintic and for all pains and inflammation.

Fodder

The leaves and tender branches of *Sesbania Sesban* are high in protein (20-25% crude protein) and have high digestibility when consumed by ruminants, such as cattle and goats. Anti-nutritional factors are suspected to be present in Sesban fodder. Feeding *Sesban* fodders to monogastric animals (such as chickens, rabbits, and pigs) is not recommended

Conclusion

The present review on *Sesbania Sesban* suggests a significant biological potential of this plant. The physical constant evaluation is an important parameter in detecting adulteration or improper handling of the drug. Various ash values are important to determine purity of the drug i.e. the presence or absence of foreign inorganic matter. It is strongly believed that detailed information as presented in this review on various therapeutic actions of the constituents might provide detailed evidence for the use of this plant in different medicines. This study shows that the leaves and pods of *Sesbania Sesban* are rich in the chemical constituents which exert an action as anti-inflammatory, antidiabetic and CNS stimulant.

References

- Gomase P. (2012). *Sesbania Sesban* Linn. A review on its ethnobotany, phytochemical and pharmacological profil, *Asian journal of biomedical and pharmaceutical sciences*, 2:(12): 11-14.
- Kirtikar K. and Basu B. (1996). *Indian Medicinal Plants*. India International book distributors, Dehradun, 2.
- Wagh VD. (2009). Preliminary investigations of *Sesbania grandiflora* in development and evaluation of ocular dosage form. District level poster presentation con-test on Recent Trends in Pharmaceutical Sciences, 323.
- Van der Poel A F. (1991). Effect of processing on antinutritional factors and protein nutritional value of dry beans: A review, *Anim. Feed Sci. Technol.* 29:179-208

5. Van der Poel A F. (1991). Effect of different processing methods on tannin contents and in vitro protein digestibility of faba bean. *Anim. Feed Sci. Technol.* 33:49-58.
6. The Ayurvedic Pharmacopoeia of India, Govt. of India ministry of health and family welfare department of Indian system of medicine and homeopathy, (1999). part 1, Vol. 2:60.
7. Gupta A.K., Tandon N. and Sharma M. (2008). Quality standards of Indian medicinal plants, Indian council of medical research New Delhi, Vol. 6:269-71.
8. [http://www.tropicalforages.info/key/Forages/Media/html/Sesbania Sesban](http://www.tropicalforages.info/key/Forages/Media/html/Sesbania%20Sesban).
9. Evans D.O. and Macklin, B. (1990). Perennial Sesbania production and use. Nitrogen Fixing Tree Association, 41.
10. Evans D.O. and Rotar P.P. (1987). *Sesbania* in agriculture. Westview Press, Boulder, Colorado, U.S.A., 231.
11. Dande P.R., Talekar V.S. and Chakraborty GS. (2010). Evaluation of crude saponins extract from leaves of *Sesbania Sesban* (L.) Merr. for topical anti-inflammatory activity, *Int. J. Res. Pharm. Sci.* 1:(3): 296-299.
12. Patil R.B., Nanjwade B.K. and Manvi F.V. (2010). Effect of *Sesbania grandiflora* and *Sesbania Sesban* bark on carrageenan induced acute inflammation and adjuvant-induced arthritis in rats, *International Journal of Pharmaceutical Sciences*, 1:(1):75-89.
13. Pandhare R.B., Sangameswaran B., Mohite P.B., and Khanage S.G. (2012). Attenuating effect of *Sesbania Sesban* (L) Merr. extract on neuropathic pain in streptozotocin-induced diabetic rats: an evidence of neuroprotective effects, *Phytopharmacology*, 2:(1):190-201.
14. Pandhare R.B., Sangameswaran B., Mohite P.B. and Khanage S.G. (2011). Antidiabetic Activity of Aqueous Leaves Extract of *Sesbania Sesban* (L) Merr. in Streptozotocin Induced Diabetic Rats, *Avicenna Journal of Medical Biotechnology*, 3:(1):37-43.
15. Singh S.P. (1990). Fertility control of female through *Sesbania sesban* seeds, *Journal of research and education in Indian Medicine*, 9:(4):227-32.
16. Priya G., Saravanan K. and Renuka C. (1994-2010). Medicinal plants with potential antifertility activity- A review of sixteen years of herbal medicine research, *International Journal of PharmTech Research*, 4:(1):481-494.
17. Naik NN, Tare HL, Sherikar AK., Deore SR. and Dama GY. (2011). Central nervous system stimulant effect of extracts obtained from the barks of *Sesbania Sesban*. *International journal of Institutional Pharmacy and Life Sciences*, 1:(1):77-92.