

# A REVIEW ON FORMULATION TOPICAL GEL SESBANIA GRANDIFLORA LEAVES EXTRACT

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## Abstract

The *Sesbania grandiflora* is used in folk medication for a range of ailments and infections like tuberculosis, anemia, microbial infections, etc. The *S.grandiflora* is additionally used as a strong anti-cancer, diuretic, purgative, anthelmintic, and hepatoprotective agent as normal medicine. Approximately 60 international species are located which are a member of the genus *Sesbania*, they are generally determined in Australia, Africa, and Asia. All parts of the plant have a variety of therapeutic values. Pharmacologists are trying to produce novel medications from herbal sources, specifically *Sesbania grandiflora*. The modern-day evaluate is about the therapeutic price or pharmacological activity and the medicinal residences of *Sesbania grandiflora*. Various lookup results suggest that the leaves are a prosperous supply of precious foremost and secondary metabolites exhibiting the antimicrobial activity. *Papaya carica* is an essential fruit plant whose complete plant components are beneficial in many ways. The papaya positive aspects more attention due to its excessive share of nutritional vitamins and proteolytic enzymes. Both the flowers attain extra interest in current days owing to their medicinal values. *Sesbania grandiflora* has lengthy been used in people remedy in cure of diarrhoea, snake bite, malaria, smallpox, fever, scabies; ulcer, and belly disorders. Therefore, Present learn about was once designed to check out the antiulcer impact of ethanolic extract of leaves of *S.grandiflora*. The current lookup has been undertaken with the goal to formulate and consider the natural gel containing *Sesbania grandiflora* leaf extract. The gel method used to be designed via the usage of ethyl acetate extract in different concentrations and wasevaluated the usage of physiological measurements. The gel used to be organized by means of the use of Carbopol 934, Sodium CMC, *Sesbania grandiflora* extract, Glycerin, Methyl paraben, Propyl paraben and required quantity of distilled water. Then pores and skin pH (6.8-7) was maintained by way of drop clever addition of tri-ethanolamine. The physiochemical parameters of formulations (pH, viscosity, spreadability etc.) had been determined. Stability research had been carried out as per ICH pointers for three months at different temperatures and humidity. The consequences confirmed that method F5 containing 2.5% *Sesbania grandiflora* extract have better stability than different formulation. [1,2,3,4,5,6]

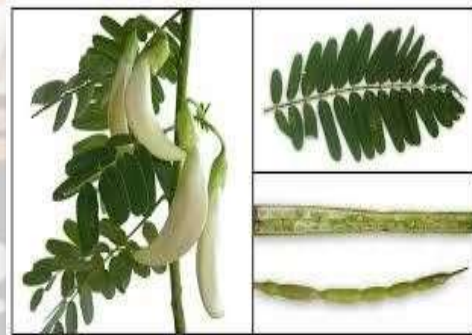
**Keyword:** *Sesbania grandiflora*, Ethyl acetate extract, Sodium CMC, Carbopol 934, Gel, Anti-inflammatory activity, Safety, etc. [6,4,1]

**Introduction :**

The use of medicinal vegetation as uncooked substances in the manufacturing of new capsules is ever increasing because of their potentials in combating the hassle of drug resistance in micro-organisms. Demand for medicinal flowers is growing in each creating and developed countries. Research on medicinal vegetation is one of the main areas of lookup globally<sup>1</sup>. *Sesbania grandiflora* (L.) Poir. typically recognised as august (H), agati (S), rain tree (E) belongs to family Caesalpiniaceae is a medium measurement tree, with green, glabrous, twining branches having leaves, flowers white, reddish or light creams. The different scientific names of sesbania are *Robiniagrandiflora* Linn, *Aeshynomene grandiflora* Linn, *Sesban grandiflora* Poir, *Agati grandiflora* (L.) Desv. A small erect quickgrowing short-lived soft-wooded tree carefully branched. Bole straight and cylindrical, the wooden white and soft. The tree is 5 to 12 meters in height. The leaves are 20 to 30 centimeters long, and pinnate having 20 to 40 pairs of leaflets, which are 2.5 to 3.5 centimeters long. The plant life are white and 7 to 9 centimeters long. The pods are linear, 20 to 60 centimeters long, 7 to eight millimeters wide, pendulous, and rather curved, and incorporate many seeds. Most of the populace of the world relies on herbs to fight a range of ailments and infections. Herbal medicine is increasingly becoming extra frequent in the twenty-first century for its low cost, handy availability, much less or no side effects. Depending on lively constituents, the plant's elements are used to fight a range of disease like diabetes, anemia, microbial infections, tuberculosis, leprosy, urinary stones, and gout, etc. *Sesbania grandiflora* is a small, loosely branching tree that grows up to 8–15 m tall and 25–30 cm in diameter. *Sesbania grandiflora* L. poir (also known as Agathi) belongs to the Fabaceae family. It is one of the most popular green vegetables and traditional medicinal plants of India. The major contributors of the phenolic substances in *Sesbania grandiflora* are simple phenolic acids. Apart from this, the other bioactive compounds reported in this plant are saponins. The juice of leaves of the *Sesbania grandiflora* have been reported to have anxiolytic, anticonvulsant, antihelmintic, expectorant, and antipyretic effects in the treatment of bronchitis, cough, vomiting, wounds, ulcers, diarrhoea, dysentery, etc. Agathi leaves are also known to have antibacterial, antifungal, antidiabetic, antioxidant and Anti-inflammatory properties.<sup>[6,7,8,9,10,11]</sup>



**Fig. Sesbania grandiflora plant**



**Fig. S.grandiflora leaves and flower**

**Scientific Classification :-** <sup>[16,17]</sup>

<b>Kingdom</b>	Plantae
<b>Clade</b>	Angiosperms
<b>Clade</b>	Eudicots

<b>Clade</b>	Rosids
<b>Order</b>	Fabales
<b>Family</b>	Fabaceae
<b>Sub family</b>	Faboideae
<b>Genus</b>	Sesbania
<b>Species</b>	Sesbania grandiflora.

### Discription :- Macroscopic Characteristics :-

*Sesbania grandiflora* is a fast-growing tree. The leaves are everyday and rounded and the vegetation white, purple or pink. The fruits seem like flat, long, skinny inexperienced beans. The tree flourishes beneath full publicity to sunshine and is extraordinarily frost sensitive. It is a small smooth 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 greater and an strange one. Flowers are oblong, 1.5–10 cm (1–4 in) lengthy in lax, with two to 4 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 about 30 seeds eight mm (0.3 in) in size<sup>[12]</sup>

### Microscopic characteristics :-

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

**Leaves:** The leaves are darkish inexperienced in color and 15-30 cm long. The leaves are rectangular to elliptical in form and are arranged opposite to every other.

**Bark:** The shade of the bark is gently grey, corky and deeply furrowed. The wooden of *Sesbania grandiflora* is tender in nature and white in colour.

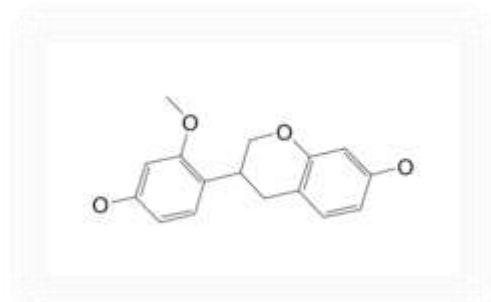
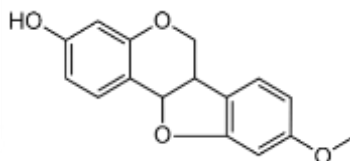
**Flowers:** At the base of the branches, the flowers dangle in a cluster. The shade of the flowers are deep purple to pink in colour. The form of the flower is rectangular and the size of the flowers is 7-9 cm long. The flowers are acrid, astringent and bitter in taste.

**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.<sup>[13,14,15]</sup>

### Chemical Constituents :-

The energetic components of *Sesbania* are leucocyanidin and cyanidin current in seeds, oleanolic acid and its methyl ester and kaemferol-3-rutinoside which are existing in flower. The bark contains tannins and gum, Isovestitol, Medicarpin, sativan, betulinic acid, isoflavonoid, hexadecanoic acid, melonic acid, leucocyanidin, cyaniding, oleanolic acid, kaemferol-3-rutinoside, etc.<sup>[18]</sup>

**Isovestitol****Medicarpin****Material and Methods :-****Collection of plant material :-**

The plant *Sesbania grandiflora* used to be gathered from Medicinal backyard of UIPS, Ujjain, M.P. and was authenticated through Dr. S. N. Dwivedi, Prof. & Head, Department of Botany, Janata PG College, APS, University, Rewa, M.P. and Voucher specimen No. SD/SG/210 used to be deposited in our department.<sup>[19]</sup>

**Preparation of plant powder:-**

The plant was once dried beneath coloration and then powdered coarsely with a mechanical grinder. The powder was handed thru sieve No. forty and saved in an hermetic container for similarly use.<sup>[19]</sup>

**Preparation of extracts :-**

About 250 g of dried powder leaf of plant was once subjected to Soxhlet apparatus. It used to be fist defatted with petroleum ether then exhaustively extracted with ethyl acetate solvent in a Soxhlet equipment for 36 hours. The temperature was once maintained at (40-50oC). The solvents had been eliminated through distillation under reduced stress and the ensuing semisolid mass was once vacuum dried the usage of rotary flash evaporator to obtain the extract.<sup>[19,20]</sup>

Ingredients	Taken Quantity	Role of Ingredients
Carbopol 934	3gm	Rheology modifier
Sodium CMC	1gm	Thickening,swelling property
Sesbania leaves extract	2.5%	Anti-inflammatory
Glycerin	2ml	Moisturizer
Methyl paraben	0.2ml	Preservative
Propyl paraben	5ml	Preservative
Triethanolamine	Qs	Neutralizer
Dist. water	Qs	Vehicle

### Topical gel formulation (15 g) table

#### Preparation of gel containing Extract :-

- 1) Different proportions of Carbopol 934 and Sodium CMC have been dispersed in 50 mL of distilled water with non-stop stirring.
- 2) Take 5 mL of distilled water was once taken and required extent of methyl paraben and propyl paraben have been dissolved by using heating on water bath.
- 3) Cool the solution, then to that introduced glycerin and mixed it with fist solution. Further required volume of Sesbania grandiflora plant extract used to be combined to the above combination and extent made upto one hundred mL by way of including closing distilled water.
- 4) Finally full mixed ingredients had been blended excellent to the Carbopol 934 gel with non-stop stirring and triethanolamine was added drop smart to the components for adjustment of required pores and skin pH (6.87) and to acquire the gel at required consistency.
- 5) The equal technique was once accompanied for instruction of manipulate pattern barring including any Sesbania grandiflora plant extract.<sup>[21]</sup>

#### Evaluation of topical gel Formulation :-

- **Physical Evaluation**

Physical parameters such as color and appearance were checked.

##### 1. Measurement of pH

pH of the gel was measured by using pH meter.

##### 2. Spreadibility

Spreadibility was determined by the apparatus which consists of a wooden block, which was provided by a pulley at one end. By this method spreadibility was measured on the basis of slip and drag characteristics of gels. An excess of gel (about 2 g) under study was placed on this ground slide. The gel was then sandwiched between this slide and another glass slide having the dimension of fixed ground slide and provided with the hook. A 1 kg weighted was placed on the top of the two slides for 5 minutes to expel air and to provide a uniform film of the gel between the slides. Excess of the gel was scrapped off from the edges. The top plate was then subjected to pull of 80 g. With the help of string attached to the hook and the time (in seconds) required by the top slide to cover a distance of 7.5 cm be noted. A shorter interval indicates better spreadibility. Spreadibility was calculated using the following formula:  $S = M \times L / T$

Where, S = Spreadibility,

M = Weight in the pan (tied to the upper slide),

L = Length moved by the glass slide and

T = Time (in sec.) taken to separate the slide completely each other.

##### 3. Homogeneity

All developed gels were tested for homogeneity by visual inspection after the gels have been set in the container. They were tested for their appearance and presence of any aggregates.<sup>[19]</sup>

#### 4. Viscosity

Viscosity of gel was measured by using Brookfield viscometer with spindle.<sup>[20]</sup>

#### 5. Stability study

The stability study was performed as per ICH guidelines. The formulated gel were filled in the collapsible tubes and stored at different temperatures and humidity conditions, viz. 25°C ± 2°C / 60% ± 5% RH, 30° C ± 2°C / 65% ± 5% RH, 40°C ± 2°C / 75% ± 5% RH for a period of three months and studied for appearance, pH, viscosity and spreadability.<sup>[21, 22]</sup>

#### Invitro assays of Anti-inflammatory activity<sup>[23]</sup>

1. Inhibition of protein denaturation assay
2. Membrane stabilization method
3. Hypotonic solution induced haemolysis
4. Heat induced haemolysis
5. Assay of cyclooxygenase and 5-lipoxygenase inhibition
6. Anti- cyclooxygenase activity 7. Anti-lipoxygenase activity
8. Assay of proteinase inhibition
9. Hyaluronidase inhibition assay

#### Activity of *Sesbaniagrاندiflora*:-

##### 1. Anti-inflammatory activity:

At a dose of 400mg/kg of physique weight, amethanolic *Sesbania grandiflora* leaf extract showed antiinflammatory motion in a formaldehyde-induced rat paw oedema model. The standard remedy in this trial was Dexamethasone at 0.5 mg/kg of physique weight.<sup>[24]</sup>

##### 2. Antibacterial activity:

The disc agar diffusion approach was once used to check the antibacterial endeavor of aqueous, ethanolic, and chloroformic extracts of *Sesbania grandiflora* towards *S.pyogenes*, *Staphylococcus aureus*, *S.epidermis*, *S.pneumonia*, *S.mutans*, *B.subtilis*, and *B.cereus*. *Sesbania grandiflora* chloroformic extract confirmed the easiest inhibitory zone towards *B.subtilis*, *S. aureus*, and *S.pneumonia*.<sup>[25]</sup>

##### 3. Antiulcer activity:

It has been considered that in rats, an ethanolic extract of *S. grandiflora* bark covered against acute gastric injury. The extract considerably reduced stress and nonsteroidal anti-inflammatory drug induced lesions. The animals confirmed no excitatory, depressive, or sleepiness signs at the doses 36.75 mg/kg used, implying that the extract lacks centrally lively aspects involved in the antiulcer activity. Thus, in accordance to the findings, *S. grandiflora* confirmed antiulcer properties.<sup>[26]</sup>

##### 4. Wound healing activity:

Excision and incision wound fashions had been used to investigate wound recovery things to do in Wistar rats. The rats have been given a 2% and 4% w/w ethanolic extract of *Sesbania grandiflora* flower ointment on a easy ointment basis. When compared to manage rats, each concentrations provided considerable effect, and Nitrofurazone ointment (0.2 % w/w) used to be used as the reference medication.<sup>[27]</sup>

### 5. Antidiabetic activity:

At doses of 250mg/kg and 500mg/kg administered for 28 days, the 70 percentage alcoholic *S. grandiflora* flower extract confirmed considerable antidiabetic motion in alloxan-induced diabetic rats. There was once additionally a sizeable discount in serum total degree of cholesterol, SGPT, SGOT, TG, and BUN. Histopathological examinations published that the broken islet of the pancreatic telephone was repaired and regenerated.<sup>[28]</sup>

### 6. Hepatoprotective activity:

In ethanol-induced hepatotoxic rats, a study on the hepatoprotective efficacy of fruit of *Sesbania grandiflora* petroleum ether extract found a good sized discount in ALT, AST, ALP, and total bilirubin degrees at a dosage of 400mg/kg of body weight. Normal liver cells had been also discovered after histopathological examinations.<sup>[29]</sup>

### 7. Antiviral activity:

Methanolic *Sesbania grandiflora*'s flower extracts have been observed to have antiviral motion against herpes simplex-1, herpes simplex-2, vaccinia, vesicular stomatitis, and cox-sackie. The flavonoid content is exceptionally accountable for the antiviral action.<sup>[30]</sup>

### 8. 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.<sup>[31]</sup>

### 9. Anticancer activity:

In Swiss albino mice, an ethanolic extract of leaves and plants of *Sesbania grandiflora* has shown antitumor efficacy towards the telephone line of Ehrlich Ascites Carcinoma at the intraperitoneal dose of 100mg/kg and 200 mg/kg of physique weight. The extracts notably ( $p < 0.05$ ) decreased lipid peroxidation whilst appreciably ( $p < 0.05$ ) increasing SOD, CAT, and GSH levels. The results demonstrated that the *Sesbania grandiflora*'s ethanolic extract used to be equally environment friendly as 5-fluorouracil at suppressing tumor growth in ascitic mice.<sup>[32]</sup>

### 10. Antioxidant and Cardioprotective activity:

In rats, *Sesbania grandiflora*'s cardioprotective advantages against cigarette smoke-induced oxidative injury were examined. For ninety days, grownup male Wistar-Kyoto rats have been subjected to cigarette smoke. earlier than being treated for three weeks with *Sesbania grandiflora* aqueous suspension (1000 mg/kg bodyweight orally each and every day). The findings point out that continuous cigarette smoke publicity raises oxidative stress, which confuses the cardiac defense mechanism, and that *S. grandiflora* saves the coronary heart from oxidative damage via advantage of its antioxidant capacity.<sup>[33]</sup>

### Conclusion :-

Natural treatments are extra desirable in the trust that they are safer with fewer facet outcomes than the synthetic ones. Herbal formulations have developing demand in the world market. It is a very appropriate try has made to set up the natural gel containing *Sesbania grandiflora* extract. The research printed that the developed single natural formula F5 consisting *Sesbania grandiflora* extract comparatively higher than later different formulations however all the formulations had been non irritant even though similarly pharmacological screening were may additionally implied to check and inspect the security profile of formulated gel to deal with a variety of irritation of skin.<sup>[34]</sup>

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