



PHARMACOGNOSY, POWDER ANALYSIS AND PHYTOCHEMICAL STANDARDIZATION OF *SESBANIA GRANDIFLORA* (L) POIRET FLOWER

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Abstract: Plants are being explored as a major source of medicinal compounds. *Sesbania grandiflora* (L) Poiret is commonly known as “Agasti” belongs to Family Fabaceae, which is native to tropical region and has been used medicinally for centuries. It is widely used in Ayurveda for the treatment of various diseases and also used as Bhavana Dravya for many formulations in Rasa Shastra. It is also used in Unani and Siddha medicine for various ailments. All parts of the plant are used i.e., Root, Stem, Bark, Leaves, Flowers and Fruits are used as Food and Medicine. Since, ancient time people have been using plants in many ways as a source of medicine. In recent years, Ethno-medicinal studies received much attention as this brings to light the numerous little known and unknown medicinal features especially of plant origin. The present review on *Sesbania grandiflora* (L) Poiret is an attempt made on Pharmacognosy, Powder analysis and Phyto-chemical analysis of Agastya Pushpa.

Index Terms - Agastya Pushpa, Pharmacognosy, Powder analysis, Phyto-chemical study.

I. INTRODUCTION

Throughout Human history, most of the people relied on natural products and plants for promoting and maintain good health. *Sesbania grandiflora* (L) Poiret has unique medicinal properties and used as an herbal drug for its Anti-biotic, Anti-helminthic and Anti-tumor properties. The origin of the plant is unknown but it is grown well in many South East Asian countries where the Annual rainfall is more. *Sesbania grandiflora* (L) Poiret is a perennial branching tree growing up-to a height of 15m with white, Pink (or) Red flowers with 15-22mm long Calyx. The leaves are 30 cm long and pinnately compound. The flowers and tender pods of this plant are used as supplement meals and also as a vegetable. Traditionally Agastya Pushpa is used for treating Cathurthika jvara, Naktandhya, Kasa, Kshaya, Tandrika Cikitsa etc.,

Based on the above discussed properties this plant was considered as a plant of interest. The medicinal value of many plants lies in Chemical substances that produce a definite action in the body. Pharmacognosy of a Plant gives a comprehensive knowledge regarding its method of Identification and determination of Quality and Purity of the Raw drugs. Phytochemicals are also called as secondary metabolites which are having great utility in Pharmaceuticals.

The aim of the present study is to evaluate the Pharmacognosy, Powder analysis and Phytochemicals which are present in the Agastya Pushpa.

MATERIALS AND METHODS:

Collection of Plant Material:

The Flowers of *Sesbania grandiflora* (L) Poiret was collected in surroundings of Tirupati District.

PHARMACOGNOSTIC STUDY:

Pharmacognostic evaluation is the first and foremost step to determine identity and to assess the quality and purity of the crude drugs. It has played a pivotal role in the Discovery and Development of new drugs and Therapies and has been continuing to do so even today. It is also found that often Substitutes and Adulterants are sold in markets from where the Physicians of today and Drug manufacturers procure their raw drug for daily requirements. Thus, there is urgent need to undertake Pharmacognostical study of the drug.

Pharmacognosy and Powder Analysis was done at SRI DHARMASTHALA MANJUNATHESHWARA CENTRE FOR RESEARCH IN AYURVEDA AND ALLIED SCIENCES, UDUPI, KARNATAKA.

Pharmacognosy of *Sesbania grandiflora* flower:

- ✓ Name of the Sample: Agastya Pushpa
- ✓ Scientific Name: *Sesbania grandiflora* (L)Poiret.
- ✓ Family : Fabaceae
- ✓ Plant part: Flower

Macroscopic Properties of Flower:

Size : Length 25 to 30 cm

Touch : Mildly crunchy and fibrous

Colour : Creamish Light White

Taste : Madhura Rasa, Tikta Anurasa

Odour : Slightly Aromatic

Clusters hanging at leaf base have 2-5 large or Giant flowers which are White, Pink or Red and appears like Pea which are 5-9 cm in length, curved about 3.5 cm wide before opening. After that they are 7.5 to 9 cm long with short Axillary racemes and are borne on Unbranched Pendulous Inflorescence. Flowers are fleshy in touch and having slightly aromatic odour.



Macroscopy of Agastya Pushpa (*Sesbania grandiflora* (L)Poiret)

Microscopic study of *Sesbania grandiflora* (L) Poiret) Flower:

Whole flower is used for the Present study.

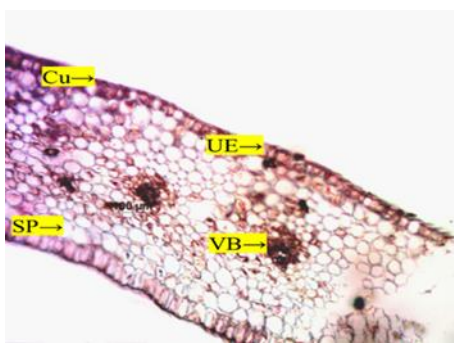
Microscopy of *Sesbania grandiflora* (L) Poiret) Petal:

Transverse section of the Petal shows outer Epidermis which consist of single layered Tubular Shaped Spongy Parenchyma cell filled with Pink colour cell sap. Inner Epidermis consists of four-layer Parenchyma cell which contains Pink colour cell sap. Ground tissue consists of Homogenous Mesophyll of Spongy Parenchyma. Vascular bundle is open, Collateral and is situated in the central position of the section.

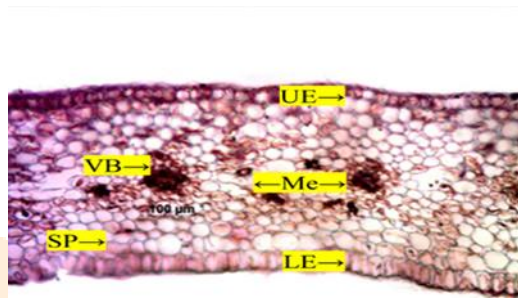
Microscopy of *Sesbania grandiflora* (L) Poiret) Staminal Tube:

- Epidermis, Palisade cells, Collenchyma, Air sacs, Immature and Mature Endothecium is present in Transverse section of Staminal Tube.

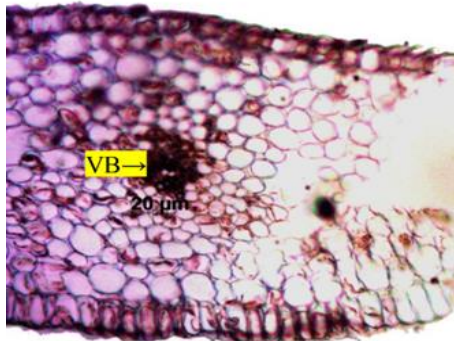
Figure: Microscopy of *Agastya Pushpa* (*Sesbania grandiflora* (L) Poiret)



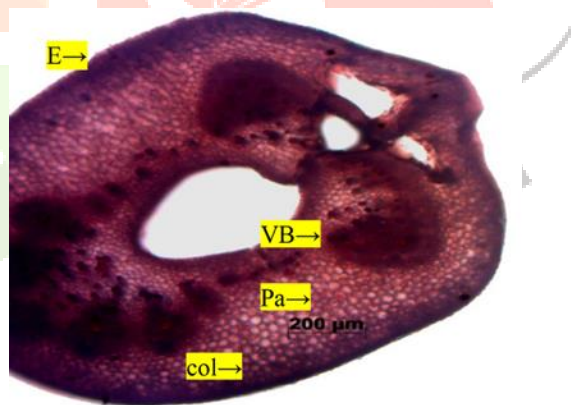
T. S of Petal containing Epidermis



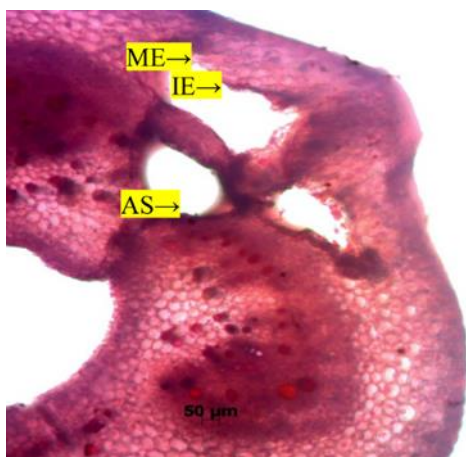
Epidermis with Vascular bundle, Xylem



T.S of Petal



T.S of Staminal tube



A portion of Staminal Tube enlarged



Vascular Bundle

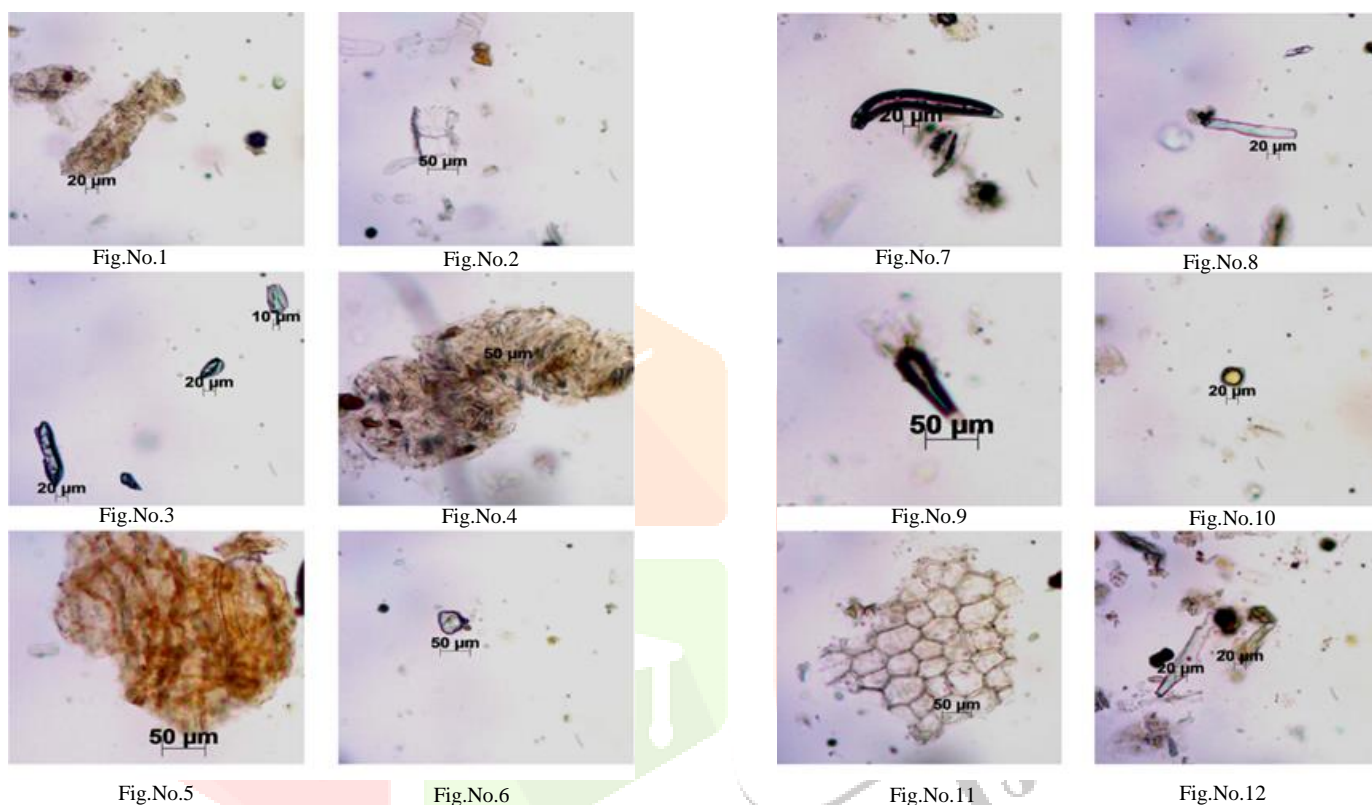
Cu – Cuticle; **LE** – Lower Epidermis; **Me** – Mesophyll; **Pal** – Palisade cells; **SP** – Spongy Parenchyma; **T** – Trichome; **UE** – Upper Epidermis; **VB** – Vascular Bundle.

AS – Air sac; **Col** – Collenchyma; **IE** – Immature Endothecium; **ME** – Mature Endothecium; **VB** – Vascular Bundle.

Powder Analysis of Agastya Pushpa:

Pinch of *Sesbania grandiflora* (L) Poiret Flower dried powder previously sieved was put on the slide and mounted in Glycerine and Powder characters are observed under the Zeiss AXIO Trinocular Microscope attached with Zeiss Axio Camera under bright field light.

FIGURES REPRESENTING POWDER ANALYSIS



1. Fibrous layer from Anther
2. Epidermis
3. Sclereid, Staminal tube fragments
4. Aerenchyma
5. Sclerenchyma with pits
6. Pollen
7. Trichome
8. Sclereid
9. Staminal tube fragments
10. Pollen
11. Parenchyma cells
12. Glandular trichomes

Microscopic Characters:

It is noticed that Fibrous layer from Anther, Sclereid and Staminal tube, Trichomes, Sclereid, Pollen and Glandular trichomes measures about 20µm, Epidermis and Aerenchyma measures about 60µm, Sclerenchyma with pits, Pollen, Staminal tube fragments and Parenchyma cells measures about 50µm.

PHYTOCHEMICAL STUDY:

Preparation of Flower extracts:

5gm of Agastya Pushpa fine Powder is dissolved in glass jar with 20ml of Distilled water or Normal tap water whose p^H should be 7 i.e., Neutral. It should be kept for 12 hours by closing with a lid. Later on, clear solvent is extracted by filtering the dissolved solvent by using Filter paper.

Phytochemical screening

The presence of different Phytochemicals extracted in different solvents was confirmed by the following tests. Phyto-chemical studies were conducted in Sri Venkateswara Ayurveda college, Dravyaguna department laboratory.

I. Tests for Alkaloids

1. Dragondroff's Test: To 1 ml of the extract, 1 ml of Dragondroff's reagent was added; formation of orange red precipitate

indicated the presence of alkaloids.

2. Wagner's Test: To 1 ml of the extract, 2 ml of Wagner's reagent was added; the formation of a reddish-brown precipitate

indicated the presence of alkaloids.

3. Mayer's Test: To 1 ml of the extract, 3 ml of Mayer's reagent was added, the formation of full white precipitate confirmed the presence of alkaloids.

4. Hager's Test: To 1 ml of the extract, 3 ml of Hager's reagent was added; the formation of yellow precipitate confirmed the presence of alkaloids.

II. Test for Carbohydrates

- 1. Molisch Test:** To 2 ml of the extract, 1 ml of α -naphthol solution and concentrated sulphuric acid through the sides of test tube were added. Purple or reddish violet colour at the junction of the two liquids revealed the presence of carbohydrates.
- 2. Fehling's Test:** To 1 ml of the extract, equal quantities of Fehling's solution A and B were added, upon heating formation of a brick red precipitate indicated the presence of carbohydrates.
- 3. Benedict's test:** To 5 ml of Benedict's reagent, 1 ml of extract solution was added and boiled for 2 minutes and cooled. Formation of a red precipitate showed the presence of carbohydrates.

III. Tests for Reducing Sugars

- 1. Fehling's test:** Mix 1 ml Fehling's A and 1 ml Fehling's B solutions, boil for 1 minute. Add equal volume of test solution. Heat in boiling water bath for 5- 10 min. First a yellow, then brick red precipitate is observed.
- 2. Benedict's test:** Mix equal volume of Benedict's reagent and test solution in test tube. Heat in boiling water bath for 5 min. Solution appears green, yellow or red depending on amount of reducing sugar present in test solution.

IV. Test for proteins

- 1. Biuret Test:** To 1 ml of the extract, 1 ml of 40% sodium hydroxide solution was added followed by 2 drops of 1% copper sulphate solution. Formation of a violet colour showed the presence of proteins.
- 2. Lead Acetate Test:** To the extract, 1 ml of lead acetate solution is added. A white precipitate indicated the presence of proteins.

V. Xantho-protein Test

To 1 ml of the extract, 1 ml of concentrated nitric acid was added. A white precipitate is formed, it is boiled and cooled. 20% of sodium hydroxide or ammonia is subsequently added orange color indicated the presence of aromatic amino acids.

VI. Test for Amino-acids

- 1) Ninhydrin test:** Heat 3 ml test solution and 3 drops 5% Ninhydrin solution in boiling water bath 10 minutes purple or bluish colour appears.
- 2) Test for Tyrosine:** Heat 3 ml test solution and 3 drops Million's reagent solution shows dark red colour.
- 3) Test for Tryptophan:** To 3 ml test solution and few drops glyoxalin acid and Conc. H_2SO_4 reddish violet ring appears at junction of two layers.

VII. Tests for steroids

1. **Libermann Burchard Test:** The extract was dissolved in 2 ml of chloroform in a dry test tube. 10 drops of acetic anhydride and 2 drops of concentrated sulphuric acid were added. The solution turned red, then blue and finally bluish green, indicated the presence of steroids.
2. **Salkowski Test:** Dissolve the extract in chloroform and equal volume of concentrate sulphuric acid and Shake well. Chloroform layer appears red and acid layer appears greenish yellow represented the steroid components in the tested extract.

VIII. Tests for Glycosides

1. **Legal Test:** The extract was dissolved in Pyridine and Sodium nitro pruside solution was added to make it alkaline. The formation of pink red to red colour showed the presence of glycosides.
2. **Keller Killiani Test:** The 1 ml extract was dissolved in acetic acid containing traces of ferric chloride and it was then transferred to a test tube containing sulphuric acid. At the junction, formation of a reddish-brown colour, which gradually became blue confirmed the presence of glycosides.

IX. Test for Saponins

1. **Foam Test:** 1 ml extract was diluted with distilled water to 20 ml and shaken in a graduated cylinder for 15 minutes. Development of stable foam suggests the presence of saponins.

X. Test for Flavonoids

1. To 1 ml of extract, few drops of dil. Sodium hydroxide was added. An intense yellow color appeared in it, which become colorless on the addition of a few drops of dil. Hcl acid indicates the presence of Flavonoids.

XI. Test for Tannins

1. To 1 ml of the extract, ferric chloride was added, formation of a dark blue or greenish black colour product showed the presence of tannin.
2. To the extract, potassium dichromate solution was added, formation of a precipitate showed the presence of tannins and phenolic compounds.

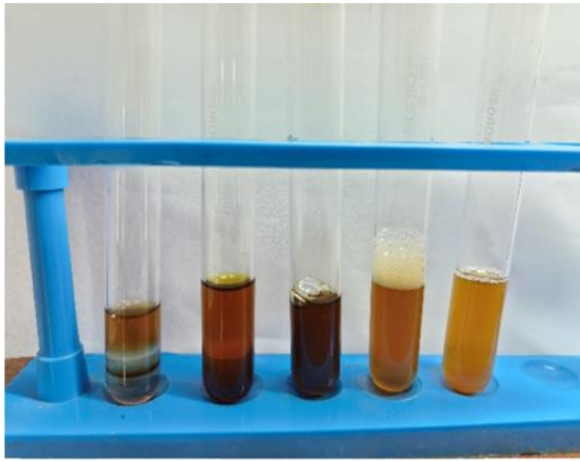
XII. Test for Triterpenoids

1. **Salkowski test:** The extract was mixed with 2 ml of Chloroform and Conc. Hydrochloric acid 3ml is carefully added to form a layer. A reddish-brown colouration of the interface is formed to show a positive result of the presence of Triterpenoids.

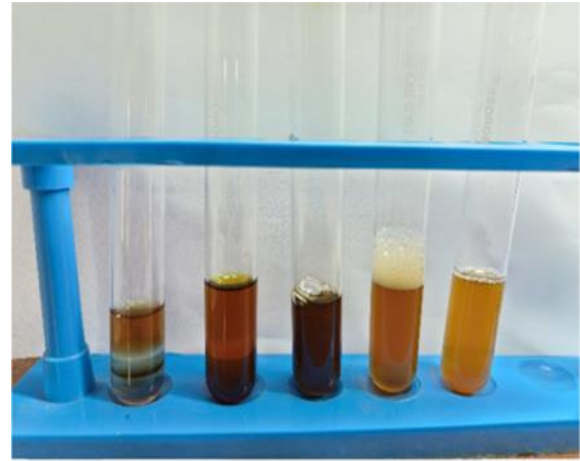
XIII. Test for Starch

1. **Iodine test:** Mix 3ml of test solution and few drops of dilute iodine solution. Blue colour appears it disappears on boiling and reappears on cooling.
2. **Tannic acid test for Starch:** with 20% tannic acid, test solution gives ppt.

Image: Phytochemical study of Agastya Pushpa Churna



Steroids
Glycosides
Tannins
Saponins
Triterpenoid



Steroids
Glycosides
Tannins
Saponins
Triterpenoid

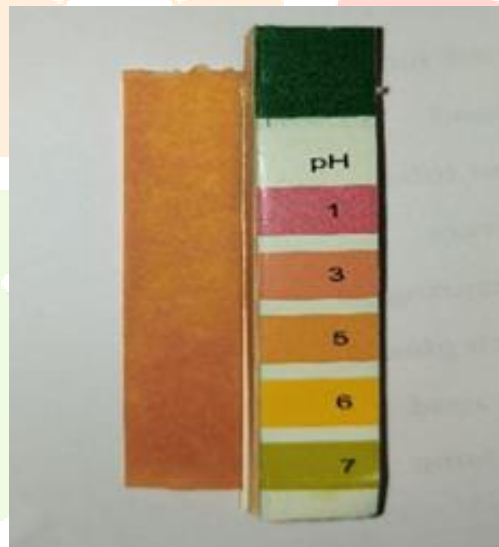


Image: Agastya Pushpa Churna: P^H: 5

Table Showing Phytochemical Results:

S.No.	PHYTOCHEMICAL	TEST NAME	AGASTYA PUSHPA CHURNA
1.	Alkaloids	Mayer's Test	-
2.	Carbohydrates	Benedict's Test	+
3.	Reducing sugars	Benedict's Test	+
4.	Proteins	Lead acetate Test, Biuret test	+
5.	Xantho-Proteins	Xantho-protein test	+
6.	Amino acids	Ninhydrin Test	+
7.	Steroids	Salkowski reaction	+
8.	Glycosides	Keller-Killiani test	+
9.	Saponins	Foam test	+
10.	Flavonoides	Flavonoid test	-
11.	Tannins	Ferric chloride test	+
12.	Triterpenoids	Salkowski test	+
13.	Starch	Iodine test	-

+ Positive; - Negative

The Phytochemical analysis of Powder extract of *Sesbania grandiflora* (L) Poiret flower was analyzed for the presence of compounds such as Carbohydrates, Sugars, Proteins, Xanthoproteins, Steroids, Glycosides, Saponins, Flavonoids, Tannins.

DISCUSSION:

In Ayurveda, the various parts of the plant are used as human aliment for treating cancer, helminthic disease, diabetes, ulcer, hepatotoxicity, microbial infection, viral infection, hyperlipidemia, tuberculosis, cardiovascular disease and arthritis. This plant also has different property such as immunomodulatory, anti-inflammatory, analgesic and wound healing. Epidermis, Palisade cells, Collenchyma, Air sacs, Immature and Mature Endothecium is present were identified in Transverse section of Staminal Tube. The major phytoconstituents present in each fraction were determined using the standard testing procedure. Powder analysis shows the presence of Anther, Sclereid and Staminal tube, Trichomes, Sclereid, Pollen and Glandular trichomes, Epidermis and Aerenchyma, Sclerenchyma with pits, Pollen, Staminal tube fragments and Parenchyma cells.

CONCLUSION:

The Pharmacognosy of the flower helps in proper identification of the drug to avoid substitutes and controversy. The phytochemical parameters may helpful in standardization of plant materials. The result of this study indicates presence of several phytochemical in plant extract, which can be responsible for biological activity. For the better efficacy and safety *Sesbania grandiflora* (L) Poiret flowers needed further studies, for its mechanism and active principles responsible for various activities. This reported study would be helpful to the researchers, students and another who will be working on the flower of *Sesbania grandiflora* (L) Poiret.

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