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PHARMACOGNOSTICAL AND PHYTOCHEMICAL EVALUATION OF STEM OF FLEMINGIA STROBILIFERA W.ATION

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Abstract: **Flemingia strobilifera W.Ation is a very useful medicinal plant. The present study deals with the pharmacognostical and preliminary phytochemical study of stem including HPTLC following standard procedures. Stem of the Flemingia strobilifera W.Ation is collected, authentified and used for the study. Stem of Flemingia strobilifera W.Ation can be identified with multilayered cork with tannin content, penta to multiseriated medullary rays, blunted trichome, simple starch grain, tannin, calcium oxalate, 3-5 layered pericyclic fibre with tannin. Powder microscopy of the stem shows rhomboidal crystal, simple and compound starch grains, fragment of simple Trichome. Cork cell in surface view with tannin content is found. Purity test shows loss on drying (7.351% w/w), total ash (0.8% w/w), alcohol soluble extractive (3.375% w/w) and Water-soluble extractive values (3.343% w/w). Preliminary analysis revealed the presence of carbohydrates, saponins, glycosides, steroids and tannin. HPTLC study of alkaloid showed the presence of five and four spots in short and long UV respectively. The information generated by this study provides relevant Pharmacognostical and Preliminary Physico-chemical data needed for proper identification and authentication of stem of Flemingia strobilifera W.Ation.**

Keywords: **Fabaceae, Ayurveda, Flemingia strobilifera, Trichome.**

I. INTRODUCTION

Flemingia strobilifera W.Ation is one among the family Fabaceae and also very useful medicinal drug in the treatment of many diseases like Fever, Hysteria and Scabies [1] etc. The present work aims at identification and standardization of stem of *Flemingia strobilifera* W.Ation. using pharmacognostical and pharmaceutical tools. So far no work has been carried out on the identification and standardization of stem of *Flemingia strobilifera* W.Ation, hence the study has been carried out

II. MATERIALS AND METHODS

Collection and Authentification: The plant is identified by local traditional practitioners, growing in Bangalore, Karnataka, India, was authenticated by expert taxonomist as on the basis of characters given in Indian Medicinal plants [2]. The fresh plant sample was collected from its natural habitat, Karnataka, in the month of November 2017 and voucher specimen has been preserved in the pharmacognosy laboratory of IPGT and RA, vide no 6210/17-18. The collected plant sample was shaken to remove adherent soil and dirt. The leaves were separated from the stem and then stem was washed with running fresh water and few pieces stored in solution of AAF (Alcohol: Acetic acid: Formalin) in the ratio of (90:5:5) [3] to utilize them for microscopic studies. The remaining stems were shade dried and then powdered with mechanical grinder and passed through mesh no.80# and preserved in an air-tight glass container.

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Morphological characters were studied by observing the stem as such and also with the help of the dissecting microscope. For detailed microscopical observation, free hand thin transverse section passing through the stem was taken, and cleared with chloral hydrate and observed as such for the presence of any crystals, then were stained with Phloroglucinol and Hydrochloric acid to notice the lignified elements like fibers, vessels etc. of the meristele and other parts [4]. Photographs of the section were taken with the help of Canon digital camera attached to Zeiss microscope. Powder characters were observed and histochemical tests carried out, according to the standard guidelines of practical pharmacognosy[5]. Physicochemical parameters and Phytochemical screening were carried out as per the guidelines of Ayurvedic Pharmacopoeia of India[6]. Physicochemical parameters and Phytochemical screening were also carried out as per the guidelines of Ayurvedic Pharmacopoeia of India. HPTLC[7] was carried out for the analysis.

III. RESULTS AND DISCUSSION

Morphology:

Stem is branched, cylindrical, dark brown colored. It is pubescent with dense hair(Fig 1).

Fig 1: Flemingia strobilifera stem

Microscopic description:

Transverse section of *Flemingia strobilifera* W.Ation stem shows following features:

Cork is multilayered and with thick, compactly arranged, barrel shaped cells(Fig. 2, Fig. 3) consisting heavily tannin content and also with some isolated starch grains. Medullary rays are pentaseriate to multiseriate. Trichome is blunted and tannin, prismatic crystal of calcium oxalate(Fig. 4) present in it. Starch grains are simple(Fig. 6). Xylem shows Intraxyllary pittings. Pitted parenchyma is found in the pith region. Pericyclic pockets are circullary arranged all over the cortical zone. 3-5 layered pericyclic fibres with tannin is found(Fig. 5).

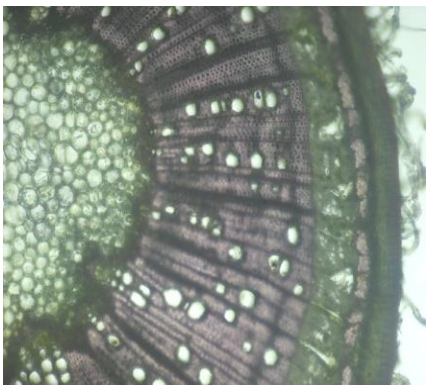

Fig 2: TS of Stem

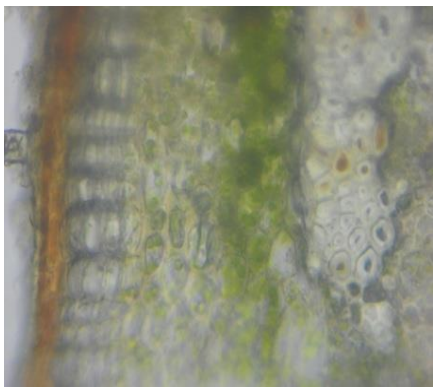

Fig 3: Epidermis, cortex, Fibres

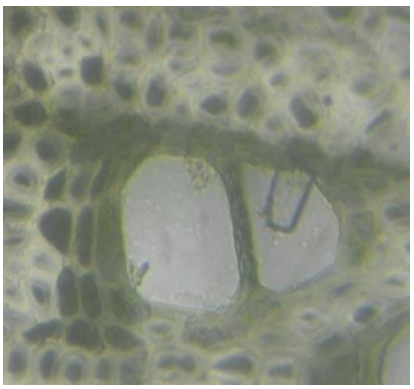

Fig 4: Prismatic crystal

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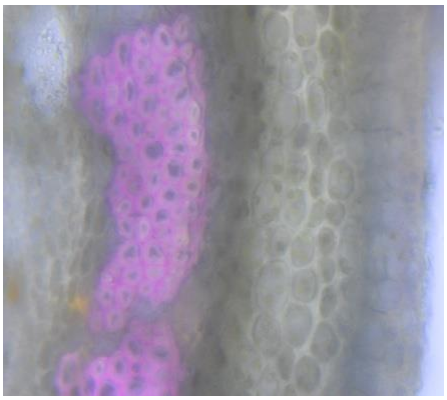

Fig 5: Fibre sheeth and phloem

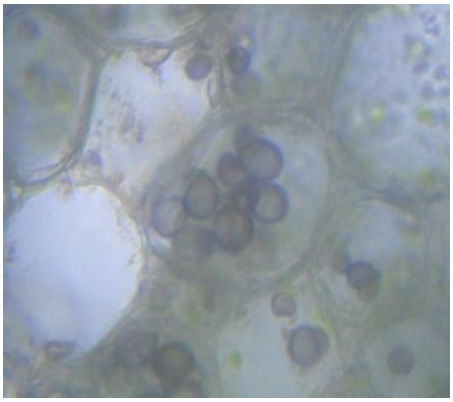

Fig 6: Starch grains

Histochemical Test:

To confirm the presence and absence of the chemical constituents the material was subjected to various tests. Lignin, calcium oxalate crystals, tannin were present in the stem.

Table No 1: Histochemical Test

Reagent	Observation	Characteristics
Phloroglucinol Concentrated HCl(1:1)	Pink colour	Lignin present
Phloroglucinol Concentrated HCl(1:1)	Effervescene	Crystal present
FeCl3 solution	Black colour	Tannin present

Powder microscopy

Organoleptic tests

Colour- yellowish green

Taste- strong asringent

Odour- Slightly aromatic

Touch- smooth

Microscopic Characters

Following features are found on microscopic examination of Stem powder:

Rhomboidal crystal(Fig. 9), Simple and compound starch grains(Fig. 10), fragment of simple trichome(Fig. 11), cork cells in surface view with tannin content.

On staining – Lignified border pitted vessels are found. Group of lignified fibres, Lignified fibres passing through medullary rays, Lignified parenchymal cells are also found on staining(Fig 7, Fig 8).

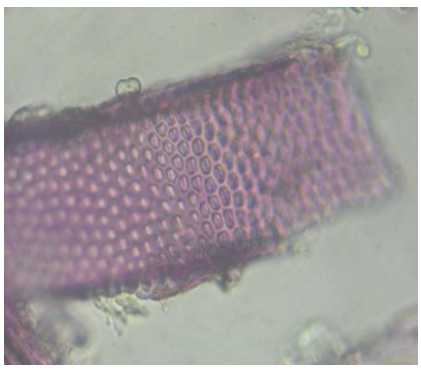

Fig 7: Bordered pitted vessel

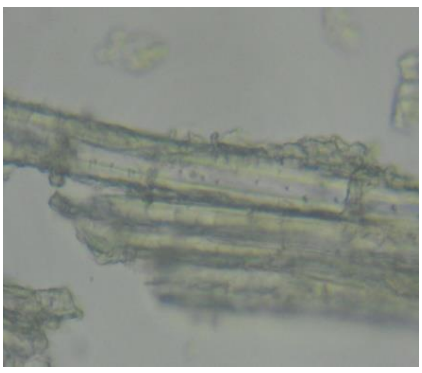

Fig 8: Fibres

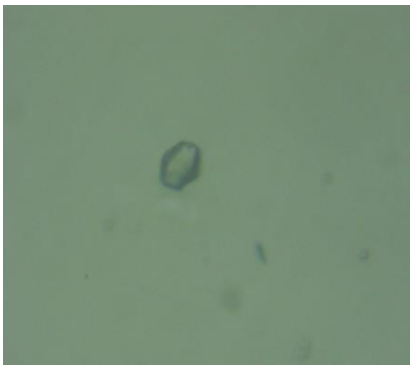

Fig 9: Rhomboidal crystal

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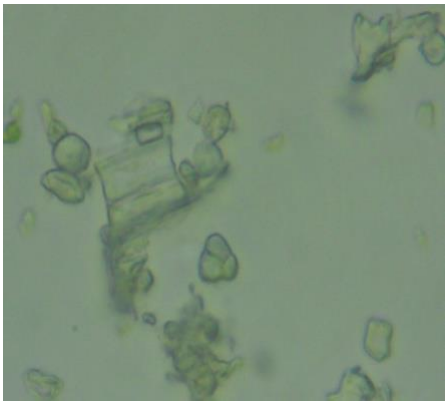

Fig 10: Simple and compound starch grains

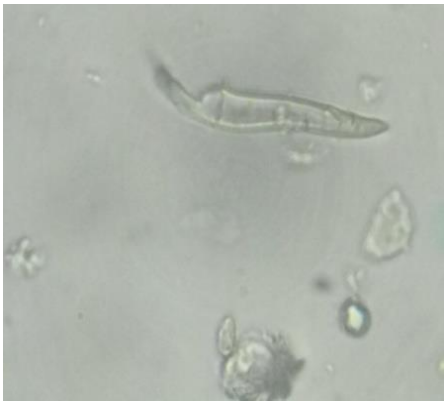

Fig 11: Simple unicellular trichome

Phytochemical constituents

Physicochemical parameters were studied to observe the purity of the drug. The loss on drying was not more than 7.351% w/w, ash value was not more than 0.8% w/w, water soluble extractive was not more than 3.343% w/w and the methanol soluble extractive was not more than 3.375%w/w. Qualitative analysis showed presence of carbohydrates, saponins, alkaloids, tannin and triterpenoids and fixed oil [Table. 2].

Table No: 2 Physico-chemical Analysis

S. No.	Name of the Test	*F. strobilifera* W.Ation Stem
1.	Loss on Drying(%w/w)	7.351
2.	Ash value(%w/w)	0.8
3.	Water soluble extractive (%w/w)	3.343
4.	Alcohol soluble extractive (%w/w)	3.375
5.	pH value	6

Table No: 3 Results of qualitative tests for various functional groups in *F. strobilifera* W.Ation Stem

Sl. No.	Name of the test	*F. strobilifera* W.Ation Stem
1.	Carbohydrates	+
2.	Protein	–
3.	Amino acid	–
4.	Steroid	+
5.	Glycoside	+
6.	Saponin glycoside	+
7.	Flavonoid	–
8.	Tannin	+
9.	Alkaloid	–

'+' Present, '-' Absent

Chromatographic analysis (HPTLC)

Alkaloids were extracted and studied for high performance thin layer chromatography profile at 254nm(Fig. 12, Fig. 14) and 366nm(Fig. 13, Fig. 15) frequency. Chromatographic techniques were carried out as per the standard protocol. Solvent system which were designed for TLC i.e. Toluene: Ethyl acetate (9:1v/v) was used for HPTLC studies. The results are shown in the Table no. 4.

Table No: 4 HPTLC Profile of stem of *F.strobilifera* W.Ation at 254 nm and 366 nm.

	Number of spots	Rf value
Short UV 254	5	0.01, 0.06, 0.09, 0.88, 0.96
Long UV 366	4	0.01, 0.10, 0.33, 0.96

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Fig 12: TLC Plate at 254 nm

Fig 13: TLC Plate at 366 nm

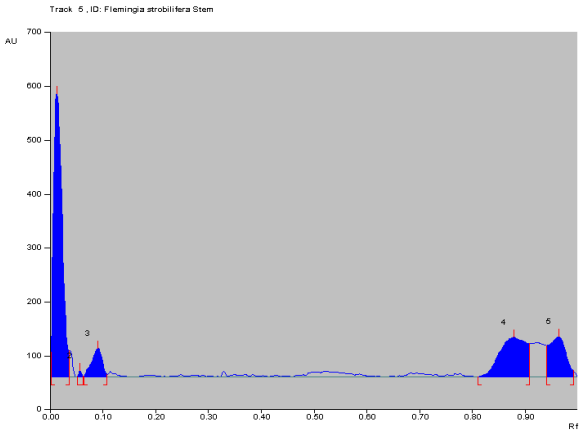

Fig 14: Peak Display at 254nm

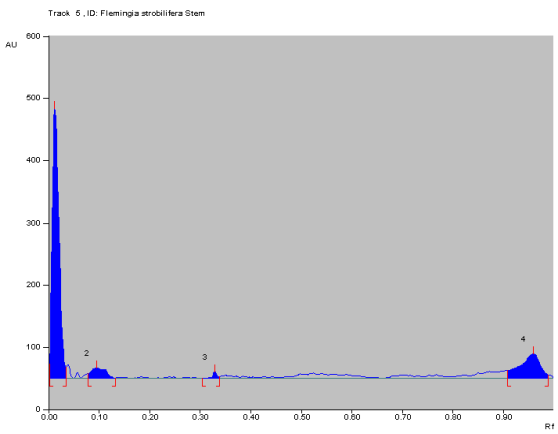

Fig 15: Peak Display at 366nm

IV. CONCLUSION

Stem of *Flemingia strobilifera* W.Ation can be identified with multilayered cork with tannin content, penta to multiseriated medullary rays, blunted trichome, simple starch grain, tannin, prismatic crystals of calcium oxalate, 3-5 layered pericyclic fibre with tannin. Powder microscopy of the stem shows rhomboidal crystal, simple and compound starch grains, fragment of simple Trichome. Cork cell in surface view with tannin content is found. Purity test shows loss on drying (7.351% w/w), total ash (0.8% w/w), alcohol soluble extractive (3.375% w/w) and Water-soluble extractive values (3.343% w/w). Preliminary analysis revealed the presence of carbohydrates, saponins, glycosides, steroids and tannin. HPTLC study of alkaloid showed the presence of five and four spots in short and long UV respectively. Obtained physico chemical and phytochemical parameters can be considered as the standards for genuinity of the plant. The observed pharmacognostical characters, phytochemical parameters and HPTLC findings may be useful to establish the botanical standards for identification and standardization of stem of *Flemingia strobilifera* W.Ation.

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