iJRASET
International Journal For Research in Applied Science and Engineering Technology



INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Volume: 10 **Issue:** V **Month of publication:** May 2022

DOI: https://doi.org/10.22214/ijraset.2022.42418

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International Journal for Research in Applied Science & Engineering Technology (IJRASET)
ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.538
Volume 10 Issue V May 2022- Available at www.ijraset.com

A Comparative Pharmacognostic Study on the Stem of Gymnema sylvestre (Retz) R. Br.

Miss. Prajwali D Bhalerao[1], Sunayana R Vikhe[2], Pravin Aladi[3]
[1, 2, 3]*Department of Pharmacognosy, Pravara Rural College of Pharmacy, Pravaranagar, Loni. Maharashtra. 413736 India*

Abstract: ***Gymnema sylvestre is commonly used in indigenous system of medicine to control diabetes mellitus as well as various other diseases. and is a source of various chemical constituents which are medicinally important. There is much scope to study pharmacognosy of this plant. Pharmacognostic study of stem was performed. For quantitative microscopy of stem authors observed epidermis, endodermis, pith, Xylem, cortex. The Methanolic and petroleum ether extract of studied plant material showed the presence of saponin, proteins, sugars, alkaloids while starch is absent in stem. Phytochemical analysis of plant material showed saponins, proteins, reducing sugars and fats present in all samples. As well as various pharmacological as well as physicochemical tests. In this research article we will study the comparison between different types of extracts and its pharmacognostic parameters of stem of gymnema sylvestre.***

Keywords: Gymnena Sylvestre, Pharmacognosy, Microscopy, Quantitative Tests, Pharmacognostic study.

I. INTRODUCTION

Gymnema sylvestre is a medicinal Pant belonging to the family Apocynaceae. It is Mainly found in central and southern of India and tropical of Africa. It is slow- growing, medicinal woody climber. In Ayurveda it is called as' Meshshringa'. And it has antidiabetic and anti-obesity activities Various Parts of this plant also used in treatment of asthma, eye complaints, inflammation and snake bite, laxative, diuretic cough suppressant. Is also shows hepatoprotective, antimicrobial, antihypercholesterolemic and sweet suppressing activities. [5] Leaves of This plant contain gymnemic acids: a mixture of at least 17 different sapponins, acidic glycosides and anthraquinones. [6]

II. MATERIAL AND METHODS

Plant Material: Fresh stem of Gymnema sylvestre were collected From Igatpuri District Nashik, State. Maharashtra. For Pharmacognostic Study.

A. Morphological Study



Fig 1. TS. of gymnema sylvestre

B. Physicochemical Tests

1) Moisture Content and Volatile Matter

Loss on drying: (Gravimetric Method) : 2gm of crude Drug powder were placed into porcelain crucible. Dried in the oven at 100-150^0 C. Cool in desicators and weight measured. Hence the loss on drying was found to be 10% w/w. [1]

C. Ash Values

1) *Total Ash:* About 2 gm of powder was taken into porcelain crucible previously heated and weighed. The powder was evenly scattered in fine layer on bottom of the crucible. Then the crucible was heated in furnace at a temperature not exceeding 450^0 C until free from carbon, cooled and weighed. The percentage of total carbon free ash was calculated with reference to air dried powder. It was found to be NMT 4%.

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2) *Acid Insoluble Ash:* Carbon free ash was boiled with 25 ml of 2 M hydrochloric acid for 5 min, filtered through ash less filter paper, was washed with hot water, and then the filter paper was dried in oven, ignited in crucible previously weighed, cooled and weighed. The percentage of the acid insoluble ash was calculated with reference to the air dried powder. It was found to ne NMT 10%. [1,8]
3) *Water Soluble Ash:* Carbon free ash was boiled with 25 ml of water for 5 min, filtered through ash less filter paper, was washed with hot water, and then the filter paper was dried in oven, ignited in crucible previously weighed, cooled and weighed. The percentage of the acid insoluble ash was calculated with reference to the air dried powder. It was found to ne NMT 0.1%. [1]

D. Pharmacological Test

Foaming Index: 1 gm of coarse powder was weighed, and 100 ml of water were added. Cool and filter. The decoction or filtrate collected in a 100 ml volumetric flask. Volume adjusted. Decoction pored as 1ml, 2ml, 3ml etc, upto 10ml. the height of foam were measured. The foaming index was found to be 250.[1]



Fig 2: foaming index

E. Preliminary Qualitative Phytochemical Screening of stem of gymnema sylvestre

The preliminary phytochemical study of the methanol extracts of stem of Gymnema sylvestre revealed the presence of alkaloids, anthraquinones, catechin, coumarin, flavonoids, phenols, steroids, tannins, terpenoids and xanthoprotein.[2] The Methanolic and Petroleum ether extract of stem of gymnema sylvestre shows Presence of Following Phytoconstituents.

Table no 1: 2 Preliminary phytochemical screening of Methanolic and Petroleum ether extract of stem sample of G. sylvestre. [1,2,7,9]

Sr. No	Test	Reagent	Plant extract	
			Petroleum ether	Methanolic
1	Alkaloid	Dragendroff's reagent Mayer's reagent Hager's reagent Wagner's reagent	- - - -	Red ppt White ppt Yellow ppt Red ppt
2	Gymnema	Prepare the aqueous solution of powder, shake and add dil. HCL	Foam/ Precipitate	Foam/ precipitate
3	Coumarin Glycosides	Alkali Test	-	Green Fluroesence
4	Carbohydrates	Molisch's Test	-	-
5	Tannins	Ferric Chloride test Lead acetate Test Dilute Iodine solution	Blue color White ppt Red Color	Blue Color Pale white Red color
6	Steroid/ Triterpenoid	Liebermann Burchard test	Blue Color	Green color

		Salkowski Reaction	Chloroform layer Shows red green Fluorescence -
7	Flavonoids	Shinoda test	Red precipitate Red ppt
8	Xanthoproteins	Xanthoprotein test	White Precipitate White ppt
9	Saponin	Foam Test	Foam lasts for More then 15 sec Foam lasts for 15 sec

F. Quantitative Phytochemical Tests: [2]

Table No: 2

Sr.no	Phytochemical Content	Method	Calculation	Result
1	Crude Fiber	-	By formula	34% w/w
2	Total Sterol Content	Liberman-burchard reaction	Calibration Curve	0.1837 ± 0.0046 W/W
3	Triterpenoid Content	-	By Formula	19.76 ± 0.02 W/W
4	Tannin Content	Folin-Denis Method	Calibration Curve	111.53 ± 15.13 µg/g

G. Microscopic Characteristics of Powdered Drug: [1, 16]

Coarse Crude Powder Of stem of plant gymnema sylvestre was observed under microscope to study the microscopic characteristic. Aricular fibres, lignified with pitted wall vessels and Simple and compound starch grains are observed.



Fig: 3 Coarse Powder

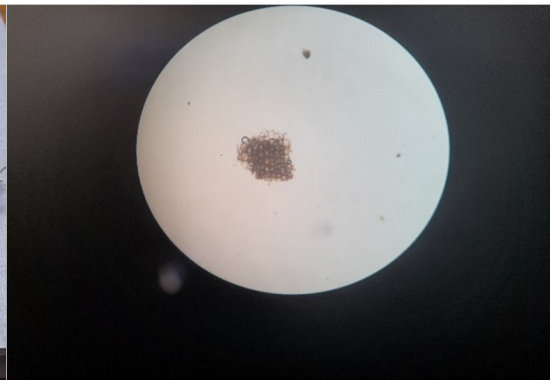


fig: 4 Stone Cells



Fig: 5 Fibre

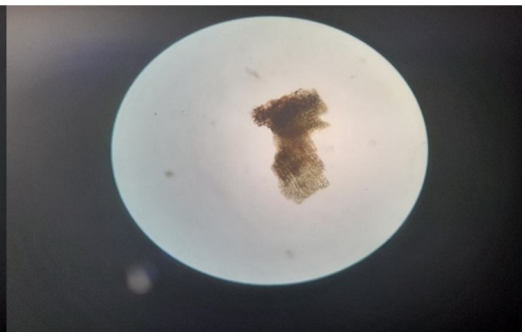


Fig: 6 Starch Grains



Fig: 7 Xylem Vessels



Fig: 8 Corticle Cells

H. Chromatography

TLC Profile of methanolic and petroleum ether extract of stem of gymnema sylvestre. After extraction of stem of gymnema sylvestre. Separation was taken place with the help of column chromatography Two Fractions was collected from column chromatography i . e petroleum ether and methanolic. For methanolic extract petroleum ether: Ethyl acetate (9:1) used as a solvent system while for petroleum ether extract chloroform: Methanol (2:0 to 2:1) used as a solvent system. [10,11,15]

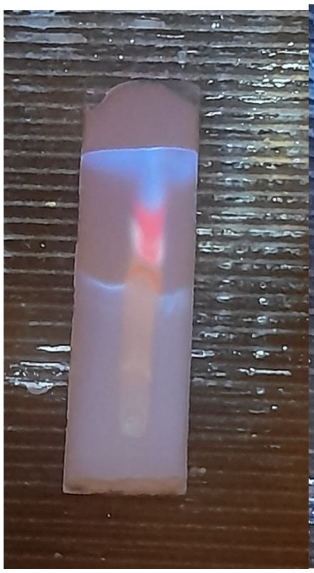


Fig no 9: Methanolic extract
Rf value: 4.8

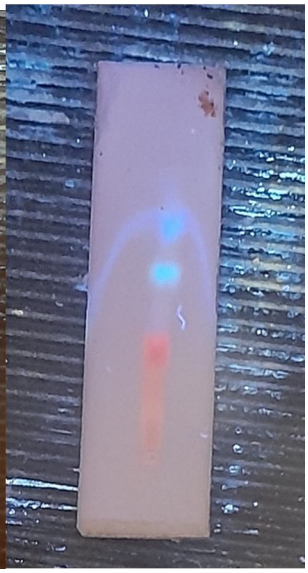


Fig No 10: Petroleum ether extract
Rf value: 3.7

I. Microscopy

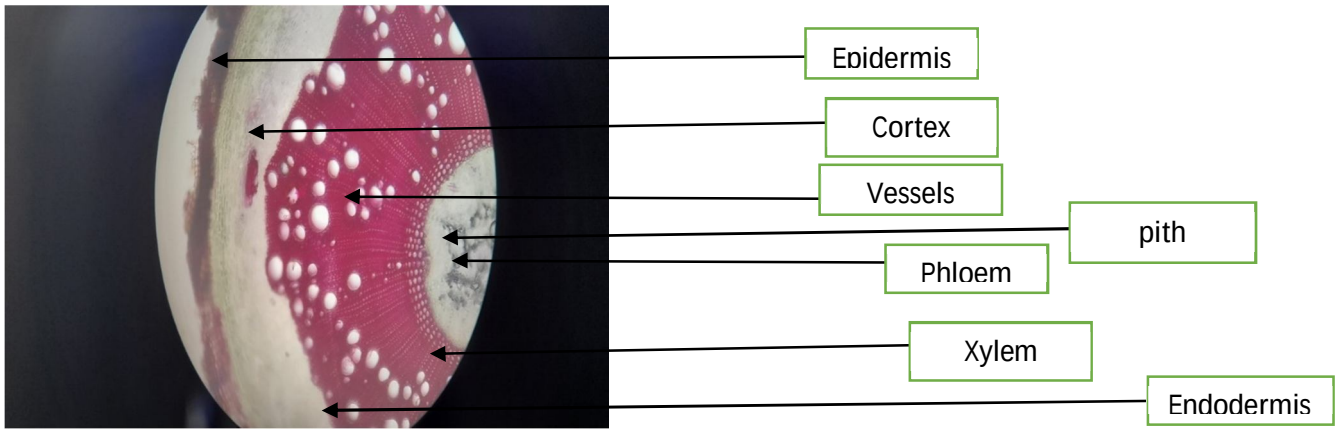


Fig 11: TS of stem of gymneam sylvestre

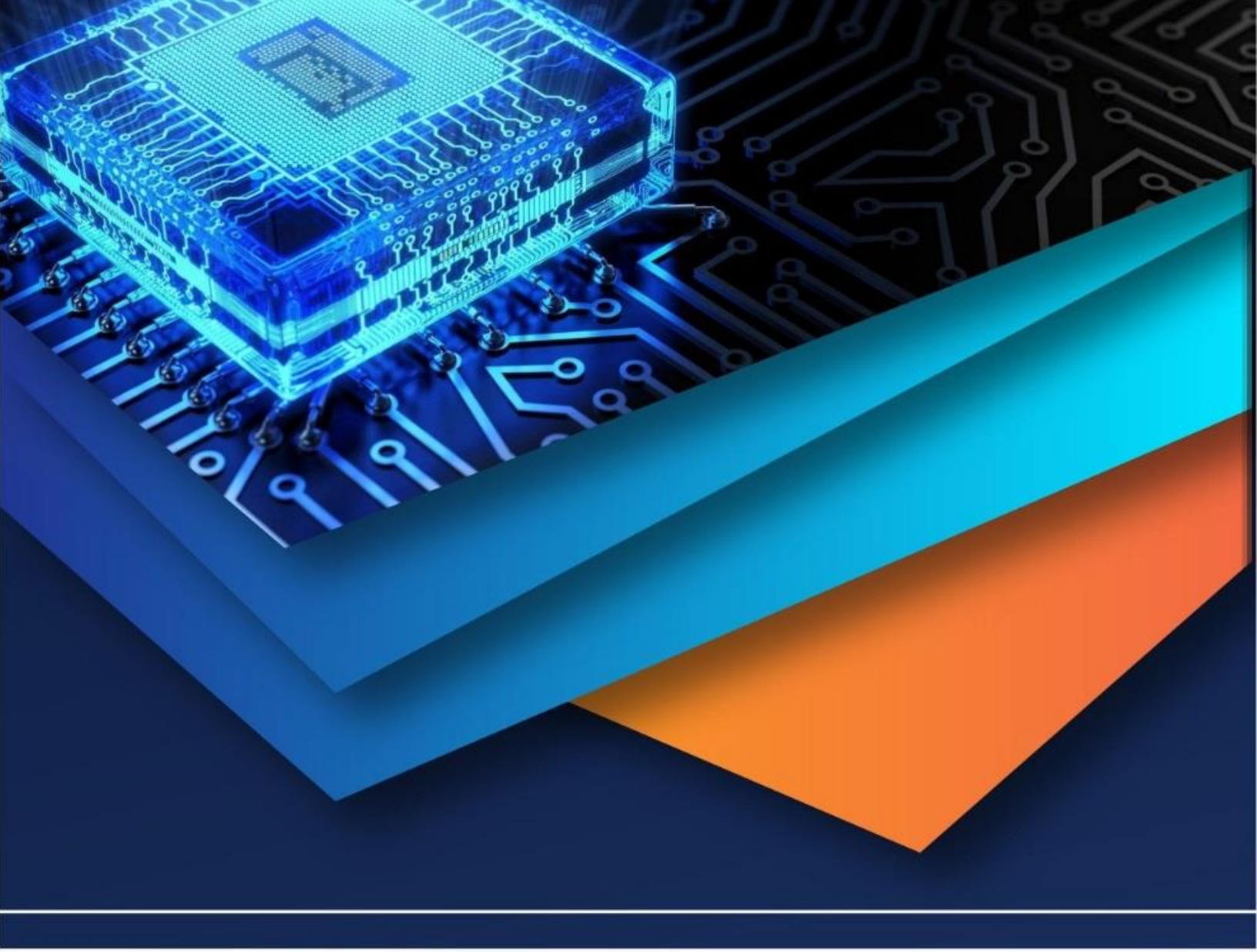
Stem of gymnema sylvestre was cut in transverse sections and stain in Phloroglucinol and conc. HCl [1:1] Reagent. And observed under microscope. The TS of stem shows circular outline with wavy margin. Trichomes are multicellular, uniserate. Epidermis forms a single outermost layer consisting of barrel to rectangular cells. A thick cuticle covers the epidermis. The outer region of cortex is made up of 3–4 rows of polygonal or oval parenchymatous cells. A distinct endodermis is Present. The vascular tissues occur in following sequence—primary phloem, secondary phloem, cambium, secondary xylem, primary xylem, interaxillary phloem and pith are present. [1,13,14]

III. CONCLUSION

From the present investigation it can be concluded that TS of stem of gymnema sylvestre shows epidermis, endodermis, cortex, vessels, pith, phloem, xylem, when stained with Phloroglucinol: conc. HCL [1:1] proportion. Histochemical analysis confirms that the methanolic and petroleum ether extract of stem of gymnema sylvestre shows presences of alkaloid, carbohydrate, tannin, steroid, Flavonoids and xanthoproteins. Physicochemical studies shows % total moisture present in stem powder of plant also foaming index shows presences of saponin. Chromatographic studies confirms that the methanolic and petroleum ether extract shows great rf value in solvent system like petroleum ether: ethyl acetate (9:1) and Methanol: chloroform (2:0 to 2:1) respectively.

REFERENCES

[1] Practical Pharmacognosy, Techniques and Experiments By Dr. K. R Khandelwal. 29th edition: April 2018. Page No: 19.1-19.10.
[2] Experimental Pharmacognosy, A Comprehensive Guide. By Dr, SS. Khadabadi. First edition may 2011. Page no: 3.1-3.16, 4.1-4.38.
[3] A Comparative Pharmacognostic Study on the Leaf, Stem and Root Components of Gymnema sylvestre (Retz) R. Br. ex. Sm Ganesh C. Nikalje, Saurabha B. Zimare & Nutan P. Malpathak.
[4] Saneja A, Sharma C, Aneja KR, Pahwa R (2010) Gymnema sylvestre (Gurmar): a review. Der Pharm Lett 2(1):275–284
[5] Komalavalli N and Rao MV, In vitro micropropagation of Gymnema sylvestre: multipurpose medicinal plant.PlantCellTissOrg61:97–105 (2000)
[6] Dateo GP and Long L, Gymnemic acid, the antisaccharine principle of Gymnema sylvestre: studies on isolation and heterogenesity of gymnemic acid A1. J Agric Food Chem 21:899–903 (1973).
[7] Trease GE, Evans WC (eds) (2002) Trease and Evans pharmacognosy, 15th edn. W. B. Saunders, Edinburgh/London/New York/Philadelphia/St. Louis/Sydney/Toranto, pp 3–4, 528–533, 538–547
[8] Anonymous (1955) Pharmacopoeia of India, 1st edn. Government of India, Ministry of Health Manager Publication, Delhi, pp 370–864
[9] Phytochemical screening and antibacterial activity of Gymnema sylvestre (Retz) R . Br ex. Schultes and Morinda pubescens J.E. Smith var. pubescens Murugan M, Mohan V. R and Thamodharan V.
[10] Chemical constituents from the stems of Gymnema sylvestre LIU Yue 1 , XU Tun-Hai 2 , ZHANG Man-Qi 3 , LI Xue 1 , XU Ya-Juan 1, 4*, JIANG Hong-Yu 5*, LIU Tong-Hua 2 , XU Dong-Ming.
[11] Plant Drug Analysis. A Thin Layer Chromatography Atlas Second Edition H. Wagner, S. Bladt. Springer. Page no 306-318.
[12] Studies On Gymnema Sylvestre – A Medicinally Important Plant Of The Family Asclepiadaceae S. Najafi1*, S. S. Deokule2 1 Department of Biology, Faculty of Science, Zabol University, Zabol, Iran. 2 Department of Botany, Pune University, Pune, India.
[13] Saneja A, Sharma C, Aneja KR, Pahwa R (2010) Gymnema sylvestre (Gurmar): a review. Der Pharm Lett 2(1):275–284.
[14] A Comparative Pharmacognostic Study on the Leaf, Stem and Root Components of Gymnema sylvestre (Retz) R. Br. ex. Sm Ganesh C. Nikalje, Saurabha B. Zimare & Nutan P. Malpathak.
[15] Sunayana Vikhe, Sunil Nirmal, Antiallergic and antihistaminic actions of Ceasalpinia bonducella seeds: Possible role in treatment of asthma, Journal of Ethnopharmacology, 216, 2018, Pages 251-258, https://doi.org/10.1016/j.jep.2017.12.007.(https://www.sciencedirect.com/science/article/pii/S0378874117304385)
[16] Vikhe S, Kunkulol R. Microscopic Investigations and Pharmacognosy of Striga orobanchioides Benth. Pharmacogn J. 2020;12(6):1325-31.



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