ejpmr, 2025, 12(5), 586-594

SJIF Impact Factor 7.065

EUROPEAN JOURNAL OF PHARMACEUTICAL AND MEDICAL RESEARCH

www.ejpmr.com

Research Article

ISSN 2394-3211

EJPMR

PHARMACOGNOSTIC STANDARDISATION OF *POLYSCIAS SCUTELLARIA (SHIELD ARALIA)*

Evangeline Joan Arockiadoss[1]*, Dr. Mohideen Sulaiman[1] and Dr. Sakthi Priyadarsini Sethuraman[2]

[1]Department of Pharmacognosy, Tagore College of Pharmacy, Faculty of Medicine and Health Science, Rathinamagalam, Chengalpattu District, Tamil Nadu, India-600 127.

[2]Department of Pharmacognosy, SRM College of Pharmacy, Faculty of Medicine and Health Science, SRM Institute of Science and Technology, Kattankulathur, Chengalpattu District, Tamil Nadu, India-603203.

***Corresponding Author: Evangeline Joan Arockiadoss**

Department of Pharmacognosy, Tagore College of Pharmacy, Faculty of Medicine and Health Science, Rathinamagalam, Chengalpattu District, Tamil Nadu, India-600 127.

Article Received on 21/03/2025 **Article Revised on 11/04/2025** **Article Published on 02/05/2025**

ABSTRACT

Standardization was carried out based on a complete botanical evaluation of the leaves, which included morphology and microscopy, as well as WHO-recommended physicochemical testing. The standardization results may shed an immense amount of information on the botanical identity of the leaves of *Polyscias scutellaria.* The plant also known as 'Shield Aralia', is traditionally practiced in treating breast discomfort, wound healing, urinary tract issues, and body odour. The aim of the study involves the pharmacognostical investigation of *Polyscias scutellaria* thereby reporting the macroscopical and microscopical characters, quantitative microscopy, histochemical, powder microscopy, and physicochemical characteristics. The investigation results outline the morphological traits required for effective plant identification. The powder microscopical characters revealed the presence of epidermal fragments, collenchyma cells, vessels, simple pits, spiral and reticulate thickenings, micro sphenoidal and cluster crystals. The histochemical profile of different parts of the leaves showed the localization of cutin, mucilage, alkaloids, cluster crystals, starch, oil globules, lignin, and tannins in different parts of the tissue system. Studying the composition and properties of crude drugs exhibits knowledge of their physical and chemical characteristics, and this can be obtained through physiochemical analysis. Thus the results of our study document the detailed pharmacognostical profile of *Polyscias scutellaria* and in turn essential for correct identification and standardization of crude drugs.

KEYWORDS: Araliaceae, Ethnobotanical, Mangkokan, *Polyscias scutellaria*, Pharmacognostical study, Shield Aralia.

1. INTRODUCTION

Medicinal plants possess a high therapeutic value in the prevention and cure of ailments. Scientific research has enhanced our understanding of medicinal plants and novel medicines over the years. As people become more aware of the potency and side effects of synthetic drugs, there is an increasing interest in plant-based therapies in the Western world. The future growth of pharmacognostic analysis of herbal medications is heavily reliant on dependable approaches for correct herbal drug identification, standardization and quality assurance.[1] The term "medicinal plants" describes a wide range of plant species employed in herbalism, some of which have therapeutic properties. These medicinal plants have been recognized as a rich source of elements for the formation and synthesis of medications.[2] A large number of people on this globe still get their daily medical treatment from their traditional materia medica (medical plants and other things).[3]

Polyscias scutellaria commonly known as Shiled Aralia, is an Indonesian native plant of the Araliaceae family that has been used to treat a variety of illnesses.[4] In fact, the Araliaceae family includes a variety of native trees and shrubs, mostly from tropical areas of Indo-Malaysia and tropical America. The family includes a number of beneficial medicinal species as well as ornamental plants for backyard gardens.[5] Most of the more than 1,500 plant species of the Araliaceae family, and this is made up of more than 55 genera and includes species of Aralia, Eleutherococcus, and Panax, are used as traditional Chinese remedies.[6] As a result of biological components such triterpenoid saponins, diterpenes, flavones, coumarins, and phenols, over a hundred species have been employed as medicines.[7] A plant genus with roughly 116 species, Polyscias (Family Araliaceae), is commonly used for cosmetic purposes and may have therapeutic value. Additionally, it was discovered that Polyscias species contained saponins as main ingredients, which have been shown to have anti-

inflammatory, anti-toxin, antibacterial, antiviral, anti-dysenteric, anti-neuralgic, anti-rheumatic, and diuretic properties.[8]

Traditional uses of *Polyscias scutellaria* include the treatment of body odor, urinary tract problems, breast discomfort, and wound healing. Alkaloids, saponins, tannins, and flavonoids are a few of the documented chemical components.[9] Shield Aralia leaves have been shown in scientific studies to improve breast milk production1. Additionally, *Polyscias scutellaria* has been shown to promote hair development.[10] In addition to flavones (luteolin and apigenin), the leaves of *Polyscias scutellaria* contain flavonols (quercetin, kaempferol, and myricetin), which are believed to have antioxidant properties.[11] Increased blood circulation, increased antioxidant levels, and a reduction in anemic symptoms are all benefits of polyscias scutellaria. Numerous studies have demonstrated that *Polyscias scutellaria* lowers blood sugar levels.[12] The roots of *Polyscias scutellaria* (Figure 1) are used as diuretics, while the leaves are typically boiled and consumed as vegetables.[13]

In this current study the macro- and microscopical standards, physico-chemical parameters, and pharmacognostic standardisation of *Polyscias scutellaria* leaf were established and preliminary research on phytochemicals to create a marker a tool for determining the authenticity of plant material.

2. MATERIALS AND METHODS

2.1. Collection and authentication

The plant collected from Chithamur, Chengalpattu district of Tamil nadu, India during the month of July 2023 and authenticated at Department of Pharmacognosy, Siddha Central Research Institute (CCRS), Ministry of Ayush, Govt. of India, Chennai 600106.

The voucher specimen (Form No.PCOG002-ACF) and raw drug (Code No.P13072302S).

2.2. Pharmacognostic standardization

1. Quantitative microscopy (SOP No. PCOG-007-SOP)

Slides were made for vein islets, vein termination, epidermal number, stomatal number, stomatal index, and palisade ratio after rectangular cut leaf portions had been boiled in saturated chloral hydrate solution until colorless**.**

2. Powder microscopy (SOP No. PCOG-006-SOP)

The powdered material was cleared with a saturated solution of chloral hydrate before a pinch was mounted on a microscopic slide with a drop of 50% glycerol. Sample was given iodine solution treatment to Verify the grains of starch are present. Nikon was used to photograph the characters with a Zeiss ERc5s digital camera coupled to an ECLIPSE E200 trinocular microscope. Field light that is really brilliant. Diagnostic characteristics in photomicrographs were recorded and documented.

3. Histochemical tests (PCOG-008-SOP)

Plant sections were treated following the standard procedures:

1. Crystals

The section was mounted in water and one end of the cover slip was irrigated with acetic acid. While looking through the microscope, the water within the cover slip was replaced using a piece of filter paper at the opposite end of the cover slip.

-Formation of air bubbles indicated Calcium carbonate crystals.

-If no air bubbles were formed, the experiment was repeated with conc. HCl, wherein dissolution of crystal and formation of needles of Calcium sulphate indicated the presence of Calcium oxalate crystals.

2. Fats, Fatty oils volatile oils and resins

About 1 to 2 drops of Sudan-IV was added to the section and allowed to stand for a few minutes. Presence of fatty oil substances were indicated by orange-red/pink/red colored globules; while red coloured irregular contents indicated resin.

3. Starch

A drop of 2% iodine water solution was added - blue colour indicated starch.

4. Tannin

A drop of alcoholic ferric chloride was added - bluish black coloured contents indicated tannin.

5. Mucilage

A drop of ruthenium red was added - pink to red colored contents indicated mucilage.

6. Lignified cell walls

A drop of phloroglucinol was added to the section and allowed to stand for about 2 min or until almost dry. A drop of 50% HCl was added and observed over a cover-glass - cell walls stained pink to cherry red indicating presence of lignin.

7. Suberized or cuticular cell walls

A drop of Sudan red III was added and allowed to stand for a few minutes, warmed gently if necessary - cell walls-stained orange-red or red indicated suberin or cutin deposition over cell wall.

8. Alkaloids

A drop of Wagner's reagent was added - the presence of yellow to reddish brown coloured contents confirmed alkaloids.

3. PHYSICOCHEMICAL PARAMETERS

Ash Values

Total ash, acid-insoluble ash, water soluble ash and sulfated ash values of the *Polyscias scutellaria*

powder was obtained by reported methods . (Anonymous, 1985) and results are tabulated in the Table 2.

Extractive Values

Standard techniques were used to make extracts using a variety of solvents (Anonymous, 1985). In terms of the weight and values of air dried crudebark powder, the percentage of dry extracts was computed and results are tabulated in the Table 2.

Fluorescence Analysis

The powder of *Polyscias scutellaria* were examined in visible light, Short and long-UV to detect the fluorescent compounds by the standard method and the results are tabulatedin the Table 3

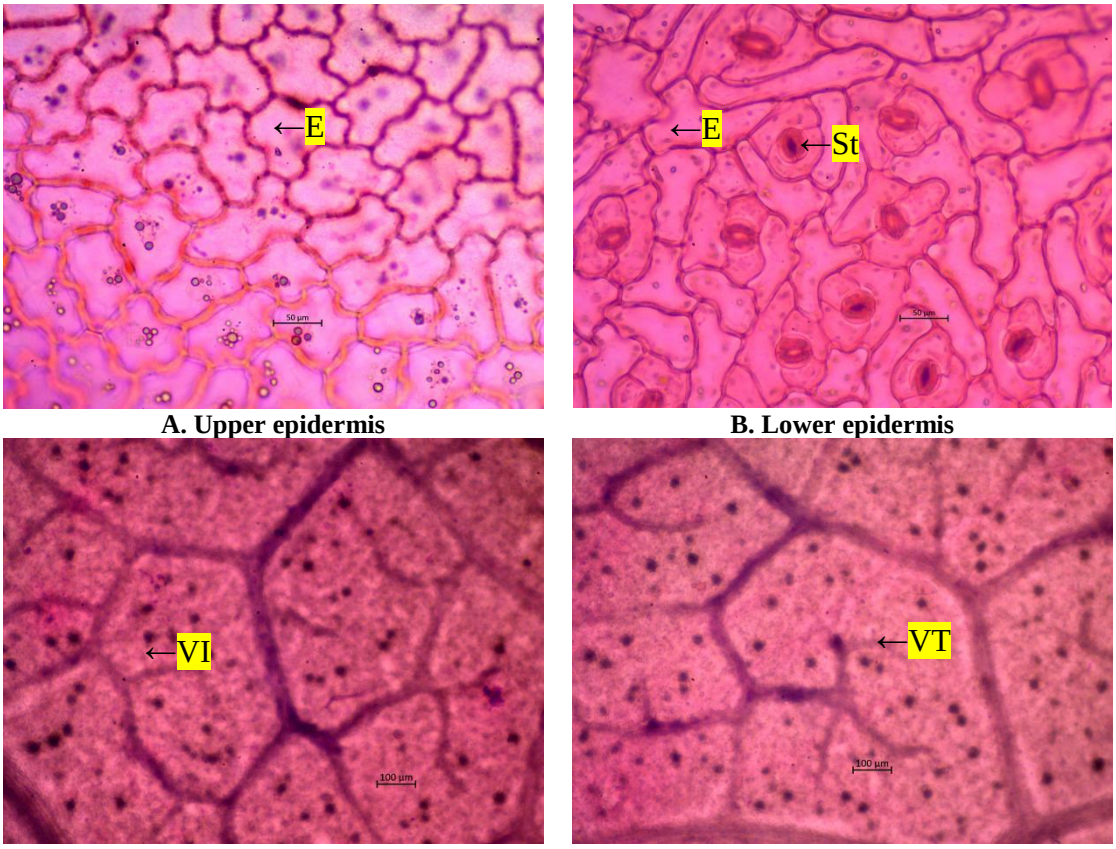
RESULT

1. Quantitative microscopy

The quantitative parameters obtained during microscopic observation of epidermal peelings of leaf were recorded (Table 1). The leaf is hypostomatic with diacytic, anisocytic and anamocytic stomata on lower epidermis; prominent type is diacytic stomata; the upper epidermal cells are larger than lower epidermis (Figure. 1).

Table 1: Qualtitative microscopy of *Polyscias scutellaria* leaf.

Parameters	Upper epidermis (/mm^2)	Lower epidermis (/mm^2)
Epidermal number	215 - 230	350 - 360
Stomatal number	-	60 - 65
Stomatal index	-	14.6 - 15.3
Palisade ratio	-	
Vein Islets	4 - 6	
Vein Termination	16 - 18	



A. Upper epidermis **B. Lower epidermis**

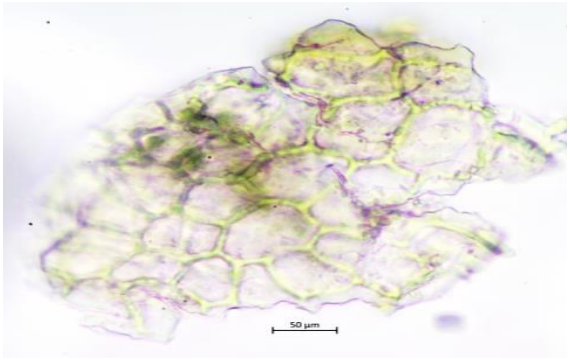
C. Vein islets **D. Vein terminations**

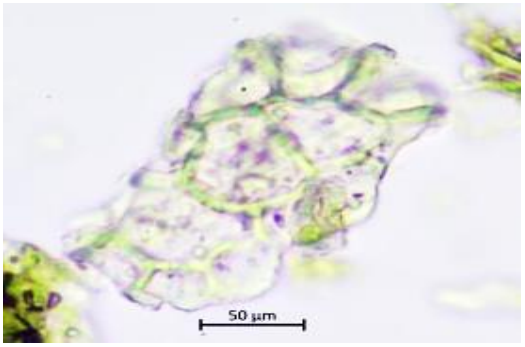
E - epidermis; **St -** stomata; **VI -** vein islet; **VT -** vein termination

Figure 1: Quantitative microscopy of *Polyscias scutellaria* leaf.

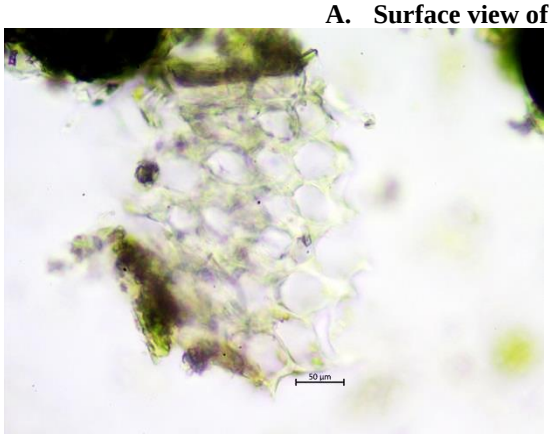
2. POWDER MICROSCOPY

The powder is light green coloured with characteristic odour and taste; it shows of fragments of upper epidermis in surface view, collenchyma cells from midrib, vessels with bordered pits, simple pits, spiral and reticulate thickenings, microsphenoidal and cluster crystals (Fig. 2).

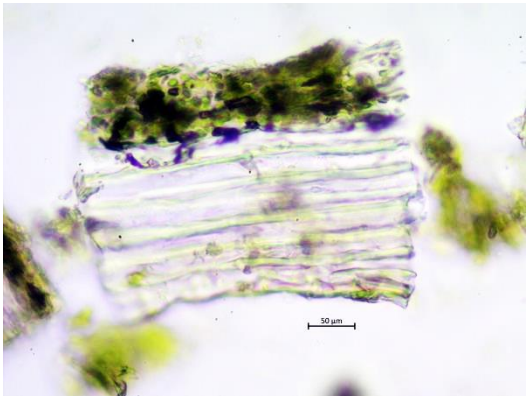




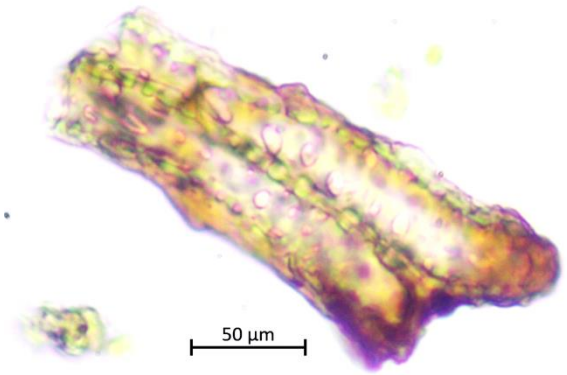
A. Surface view of upper epidermis



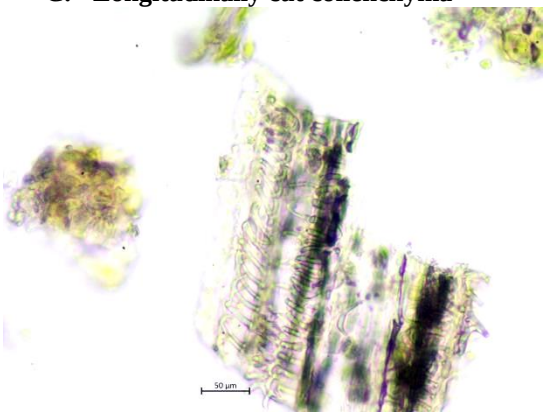
B. Sectional view of collenchyma



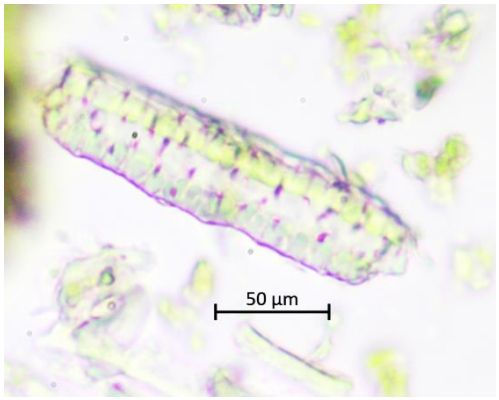
C. Longitudinally cut collenchyma



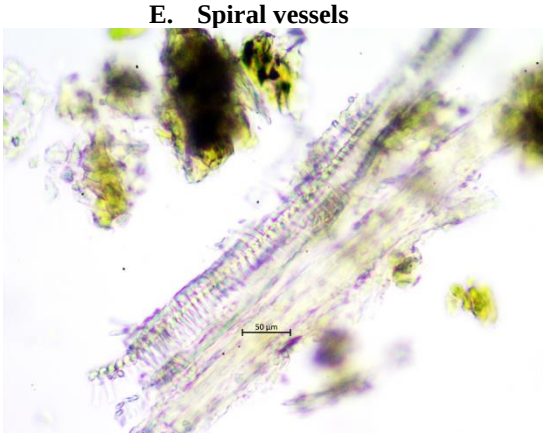
D. Bordered pitted vessels



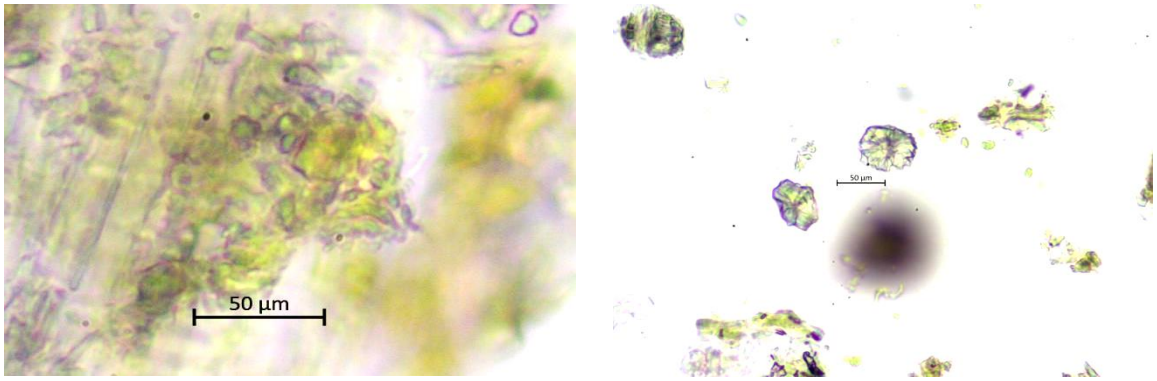
E. Spiral vessels



F. Pitted vessel



G. Reticulate vessel



H. Microsphenoidal crystals **I. Cluster crystals**

Figure 2: Powder microscopy of *Polyscias scutellaria* leaf.

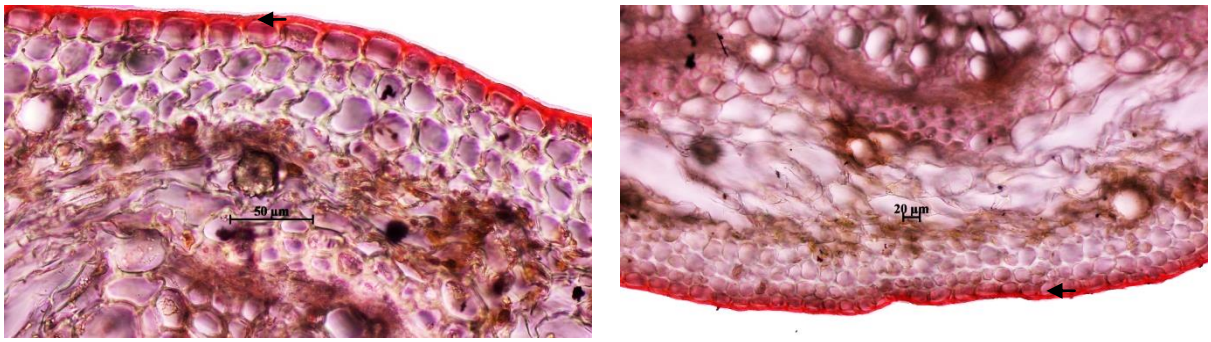
3. Histochemistry

Petiole

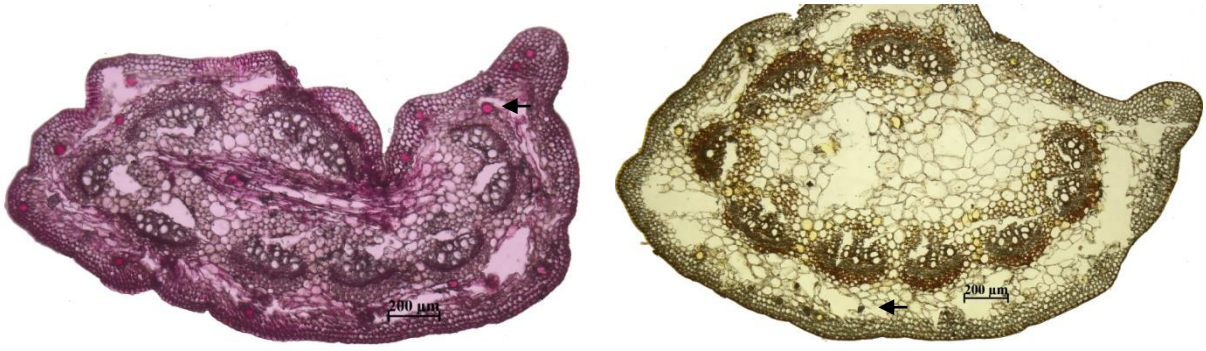
Cutin present on epidermis; mucilage observed in cortical region; alkaloids found in pericycle region; lignin present in the xylem and pericycle; starch and cluster crystals present in inner cortex; oil globules detected in parenchyma cells of pith; tannin deposition not observed (Fig. 3).

Leaf

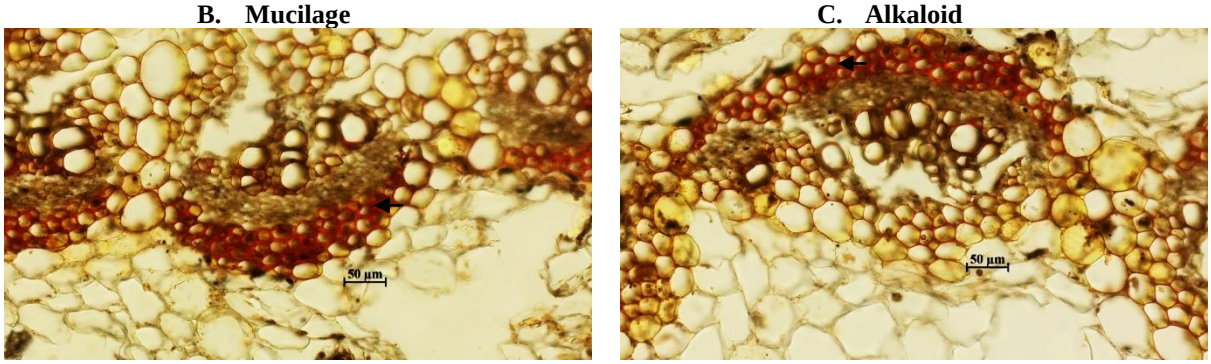
Cutin observed on epidermis; mucilage observed in cortical and ground tissue of midrib; alkaloids found in mesophyll cells and ground tissue; starch, cluster crystals and oil globules present in ground tissue; lignin present in the xylem of midrib; tannin deposition found in phloem cells (Fig. 4).



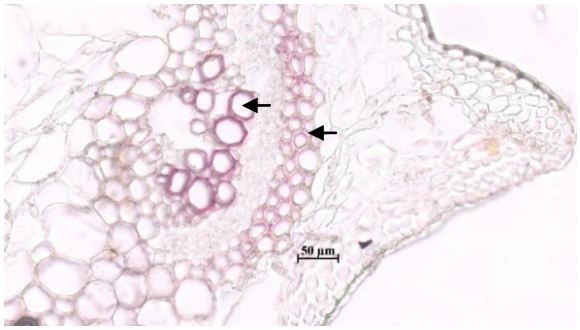
A. Cutin



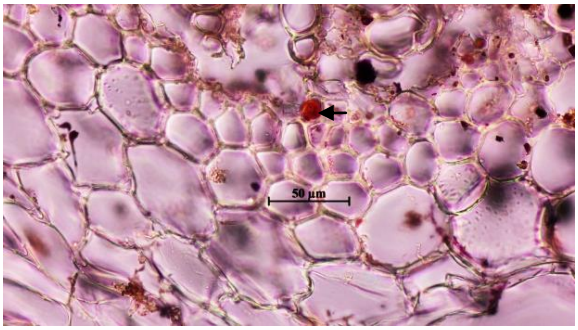
B. Mucilage **C. Alkaloid**



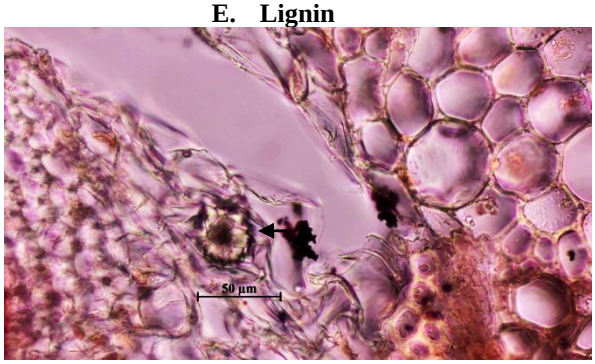
D. Alkaloid



E. Lignin



Oil



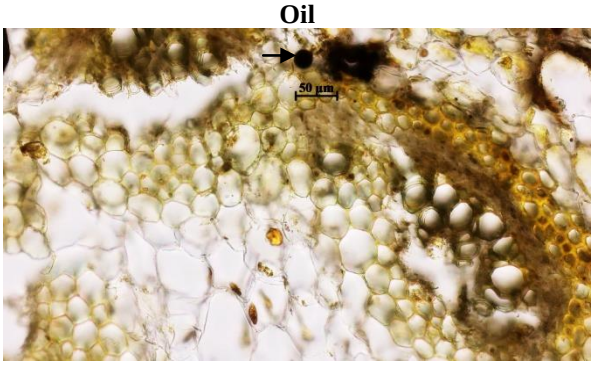
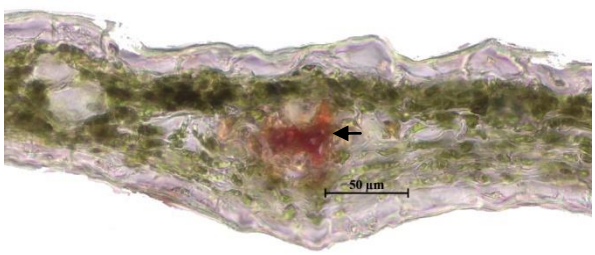
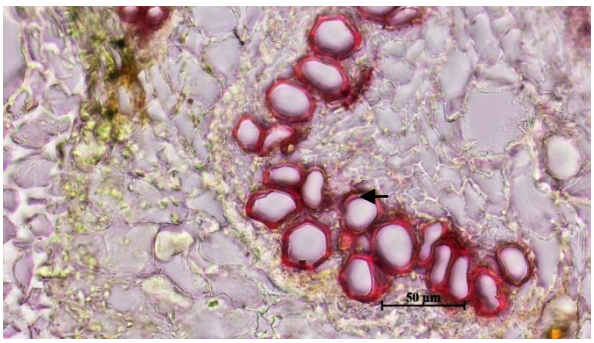
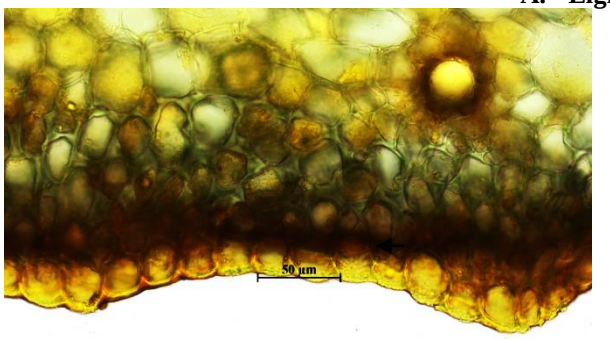


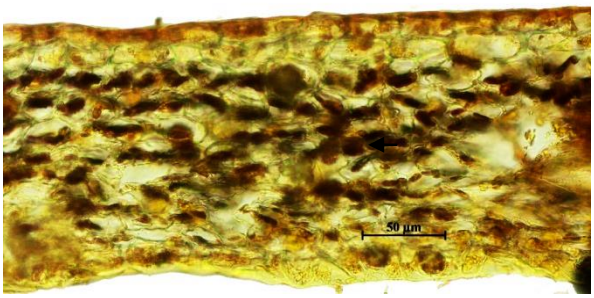
Figure 3: Histochemistry of *Polyscias scutellaria* petiole.



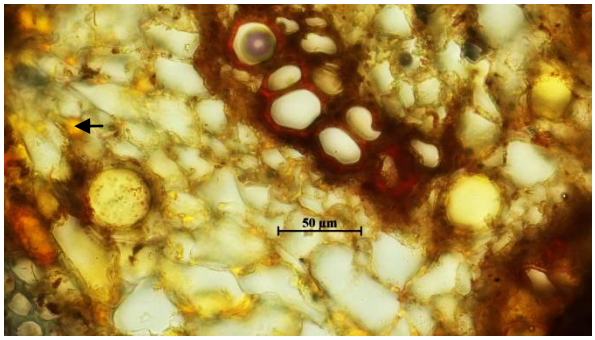


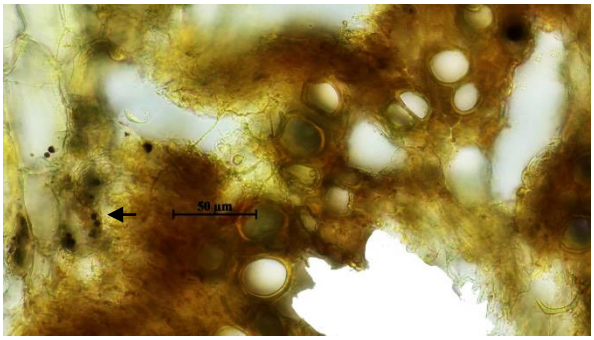
A. Lignin

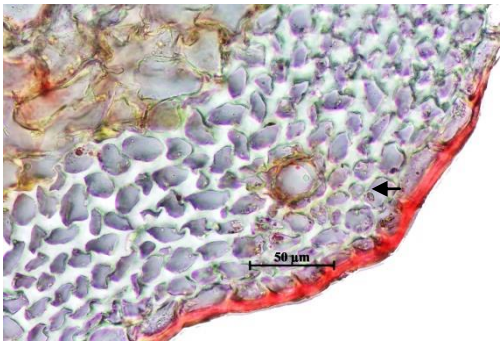




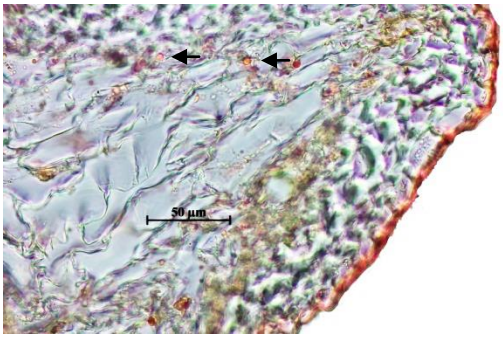
B. Alkaloid



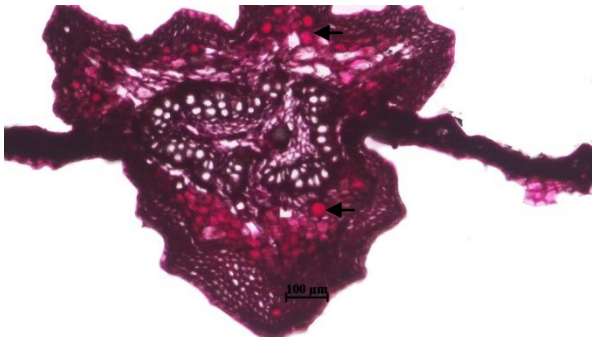


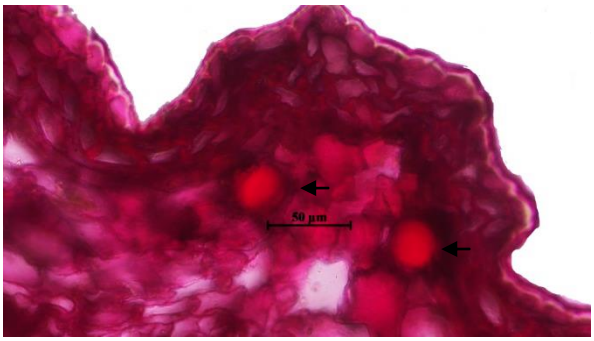


C. Cutin

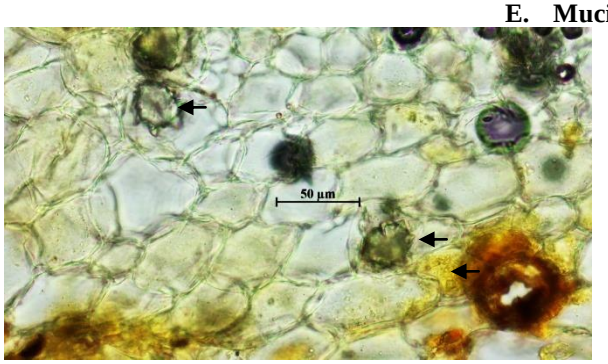


D. Oil

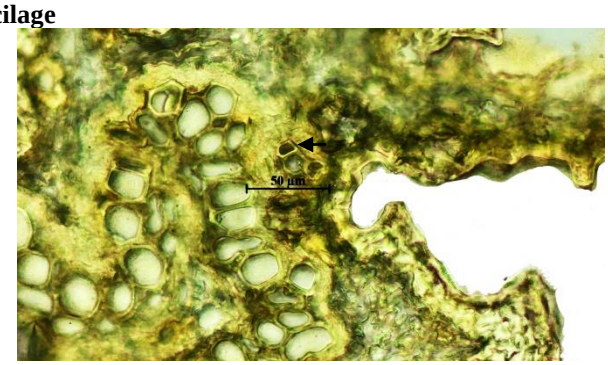




E. Mucilage



F. Crystal



G. Tannin

Figure 4: Histochemistry of *Polyscias scutellaria* Leaf.

3. PHYSICOCHEMICAL PARAMETERS

TABLE 2

S no	Parameters	Values (%w/w)
1	Ash values Total ash	10.31w/w ± 1.19
	water soluble ash Acid insoluble ash Sulphated ash	5.86 w/w ± 1.02 3.55w/w ± 0.50 6.52w/w ±0.85
2	Extractive value Water soluble extractive Alcohol soluble extractive	4.8 % w/w 12% w/w
3	Loss on drying	4.09%w/w
4	Foaming index	<100

Fluorescence Analysis

Table 3.

S No	Experiment	Visible light	Ultraviolet light	
			Short UV	Long UV
1	Powder	Pale brown	Dark green	Greenish brown
2	Powder + NaOH	Pale brown	Dark green	Greenish brown
3	Powder+ HCl	Pale brown	Dark green	Greenish brown
4	Powder+ 50% H_2SO_4	Pale brown	Dark green	Greenish brown

5	Powder+ 50%HNO_3	Pale brown	Dark green	Greenish brown
6	Powder+ Ethanol	Pale brown	Dark green	Pale green
7	Powder+ Iodine	Pale brown	Dark green	Greenish brown
8	Powder+ $FeCl_3$	Pale brown	Dark brown	Dark brown
9	Powder+ Acetic acid	Pale brown	Dark green	Greenish brown

DISCUSSION

Pharmacognostical investigations entail a thorough examination and comprehension of the biological, chemical, physical, and pharmacological characteristics of plant-based materials, such as medicinal herbs, botanical extracts, and other naturally occurring chemical compounds. A useful and comprehensive strategy for health and wellness is the usage of medicinal plants. But, especially when combining them with traditional medical treatments, it's crucial to use them sensibly and under the supervision of licensed medical professionals.

Standardization of medicinal plants is the process of creating uniform quality, safety, and efficacy standards for herbal and plant-based medications. This is essential because various elements, including plant species, growth environments, and processing techniques, can affect the makeup and efficacy of therapeutic herbs. Standardization contributes to ensuring the dependability and adherence to the quality standards of herbal products.

In the present study based on the Pharmacognostical standardisation of *Polyscias scutellaria* the information on the Quantitative microscopy were provided based upon on the vein islets, vein termination, stomatal number, epidermal number, stomatal index, and palisade ratio. The Powder microscopy were studied it shows fragments of upper epidermis in surface view, collenchyma cells from midrib, vessels with bordered pits, simple pits, spiral and reticulate thickenings, microsphenoidal and cluster crystals. Histochemical tests were taken in Petiole and leaf were found the crystals, fats, fatty oil, volatile oil and resins, starch, tannin, mucilage, lignified cell wall, suberized or cuticular cell walls and alkaloids were observed and reported. Physiochemical parameters includes the Ash values, extractive value, loss on drying ,foaming index and conventional approach for detecting fluorescent compounds was used to test all of the obtained *Polyscias scutellaria* powder in daylight, short and long UV. The findings have greater consequences for pharmacology, botany, and conventional medicine. Utilizing Polyscias scutellaria's therapeutic potential in traditional medicine to cure ailments like body odor, wound healing, urinary tract problems, and breast discomfort requires an understanding of the plant's composition and structure.

The results might also direct the creation of drugs or herbal therapies derived from this plant. Alkaloids and tannins, for example, are examples of certain chemicals whose existence may have therapeutic value and call for more research.

Furthermore, the study lays the groundwork for standardization and quality assurance in the herbal product sector, guaranteeing the efficacy and consistency of goods made from Polyscias scutellaria. pharmacological evaluation of plant extracts in order to achieve success phyto-pharmacological research.

REFERENCE

1. Sultana S, Khan MA, Ahmad M, Bano A, Zafar M, and Shinwari ZK. Authentication of herbal medicine neem (Azadirachta indica A. Juss.) by using taxonomic and pharmacognostic techniques. Pakistan Journal of Botany, 1, 2011; 43: 141-50.
2. Rasool Hassan BA. Medicinal plants (importance and uses). Pharmaceut Anal Act, 2012; 3(10): 2153-435.
3. Gurib-Fakim A. Medicinal plants: traditions of yesterday and drugs of tomorrow. Molecular aspects of Medicine, 1, 2006; 27(1): 1-93.
4. Budiono, Budiono, Sumirah Budi Pertami, Siti Nur Arifah, and Sri Rahayu Lestari. "Molecular docking analysis of *Polyscias scutellaria* active compounds as inhibitor of dopamine D2 receptors to increase prolactin secretion." In *AIP Conference Proceedings*, vol. 2353, no. 1. AIP Publishing, 2021.
5. Rojas Herrera V. Protocol for in-vitro multiplication and induction of mutations in Polyscias skullcap cv. "Fabian". Degree of Engineering Agronomics with Emphasis on Phytotechnics. thesis. Costa Rica University, 2015.
6. Kim K, Nguyen VB, Dong J, Wang Y, Park JY, Lee SC, and Yang TJ. Evolution of the Araliaceae family inferred from complete chloroplast genomes and 45S nrDNAs of 10 Panax-related species. Scientific reports, 2017; 7(1): 1-9.
7. Liu Z, Zeng X, Yang D, Chu G, Yuan Z, and Chen S. Applying DNA barcodes for identification of plant species in the family Araliaceae. Gene, 2012; 499(1): 76-80.
8. Ashmawy NS, Gad HA, Ashour ML, El-Ahmady SH, and Singab AN. The genus Polyscias (Araliaceae): A phytochemical and biological review. Journal of Herbal Medicine, 2020; 23: 100377.
9. Putri NM, Putri JR, Elya B, and Adawiyah R. Antifungal activity of *Polyscias scutellaria Fosberg* leaves against Candida albicans. Pharm Sci Res., 2020; 7(3): 7.
10. Sumiati T, Roswiem AP, and Wardhani AK. Potensi Ekstrak Daun Kacang Panjang (Vigna unguiculata (L.) Walp.) dan Daun Mangkokan *Polyscias scutellaria (Burm. f.) Fosberg*) Serta Kombinasinya terhadap Pertumbuhan Rambut Pada Tikus Jantan

Galur Sprague Dawley. Jurnal Katalisator, 2022; 7(2): 192-204.
11. Eden, Willy Tirza, Badahdah, and Nilam Kencana, Aktivitas Antioksidan Ekstrak Metanol Daun Mangkokan (*Polyscias scutellaria (Burn.f.)Fosberg*). Media Farmasi Indonesia, 2016; 11(2): 1126-1135.
12. Nurbaya S, Wiratma DY, and Sitorus E. Uji Aktivitas Antibakteri Ekstrak Etanol Daunmangkokan (Polyscias scutellaria) Terhadap Bakteri Propionibacterium acnes. Jurnal farmanesia, 2021; 8(2): 120-125.
13. Dr. Krishnan Marg KS, and Ambasta SP. The useful plants of India.1 st ed. New Delhi: National institute of science and communication and information resources, 1992.
14. Wallis TE. Analytical Microscopy - Its aims and methods in relation to foods, water, spices and drugs. Third Edition. Boston: Little, Brown and Company, 1965.
15. Khandelwal K.R, Practical pharmacognosy, 19th edition, Niraliprakashan, 2008.
16. Fahn A. Plant anatomy. Third Edition Pergamon Press, Oxford, 1980.
17. Malathi G Chouhan and A.P. G Pillai. Microscopic profile of drugs used in Indian systems of medicine, 2011; 137.