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PHARMACOGNOSTICAL EVALUATION OF INGREDIENTS OF LAGHU PANCHAMULA - AN AYURVEDIC COMPOUND

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Abstract

Background: Ayurveda classifies some medications for therapeutic purposes under the *Mishrakavarga* (group of medications) title. *Laghu Panchamula* is part of *Pancha-panchamula*. All these plants are having habit of small *Kshupa*, so it is called as *Laghu Panchamula*. It contains the roots of five herbs like, *Shalaparni* (*Desmodium gangeticum*), *Prishnaparni* (*Uraria picta*), *Brihati* (*Solanum indicum*), *Kantakari* (*Solanum xanthocarpum*) and *Gokshura* (*Tribulus terrestris*). **Material & Method:** Freehand transverse sections of five roots were taken and using required reagents. Sections were observed under the microscope to assess their various microscopic features. **Observation & Result:** Pharmacognostical characters shows identification characters of plants included in *Laghu Panchamula* like Crystal of Calcium oxalate like Rosette, Sandy and Prismatic, Starch grains and Tracheids were observed in different roots. **Discussion and Conclusion:** The microscopic structures which are observed in *Laghu Panchamula* helps in correct identification of roots of *Shalaparni* (*Desmodium gangeticum*), *Prishnaparni* (*Uraria picta*), *Brihati* (*Solanum indicum*), *Kantakari* (*Solanum xanthocarpum*) and *Gokshura* (*Tribulus terrestris*).

Key Words:

Ayurveda, *Panchamula*, *Laghu Panchamula*, Pharmacognosy

INTRODUCTION:

In India nearly 7500 plant species are being used in the formulation of medicinal plant-based health care products. The quality and efficacy of these preparation depend on the quality of raw material used. The increase in the reported incidence of toxicity, in appropriate use and easy availability of herbal preparation and food supplements necessitates the establishment of standards which could ensure their quality, safety and efficacy. Our herbal medicine industry requires quality parameters of medicinal plants to produce high quality standard herbal medicines. The methods that are developed for determining and establishing quality control parameters for herbal medicines require a planned approach to establish standards, this can be achieved only through systematic evaluation of the plant material using modern analytical techniques.

Laghu Panchamula is part of *Panchapanchamula*¹. It is an integral part of the *Dashamula* formulation. *Laghu Panchamula* contains the roots of five herbs like, *Shalaparni* (*Desmodium gangeticum*), *Prishnaparni* (*Uraria picta*), *Brihati* (*Solanum indicum*), *Kantakari* (*Solanum xanthocarpum*) and *Gokshura* (*Tribulus terrestris*)². In Bhavprakash Nighantu, it is mentioned in the name of *Kanistha Panchamula*. All these plants are having habit of small *Kshupa*, so it is called as *Laghu Panchamula*. It is having *Madhura Rasa*, *Laghu Guna*, *Anushna Virya* and *Pitta-anilhara* properties³. In taxonomy, these five plants belong to three families, i.e., Fabaceae, Solanaceae, and Zygophyllaceae.

AIM:

To study the microscopic features of roots of plants included in *Laghu Panchamula*.

OBJECTIVE:

To study the identification features of transverse section of the plants included in *Laghu Panchamula*.

MATERIAL AND METHODS

The study was performed at pharmacognosy laboratory of Upgraded Department of *Dravyaguna Vijnana*, Government Ayurved College, Vadodara, Gujarat.

Materials

Fresh roots of *Shalaparni* (*Desmodium gangeticum*), *Prishnaparni* (*Uraria picta*), *Brihati* (*Solanum indicum*), *Kantakari* (*Solanum xanthocarpum*) and *Gokshura* (*Tribulus terrestris*) were collected from *Dhanvantri Udhyana*, Government Ayurveda College, Vadodara in the month of August, 2024.

Methods

Macroscopy study: Fresh roots of *Laghu Panchamula* were collected and observed thoroughly. Following features were observed:

Table No. 1: Macroscopic Characters of roots of *Laghu Panchmula*.

No.	Plant name	Macroscopic Characteristic features	Figure no.
1.	<i>Shalaparni</i> (<i>Desmodium gangeticum</i>) mula	10 to 15 cm in length, 4 to 7 mm in diameter, surface is somewhat smooth, whitish in colour, Taste is sweet and mucilaginous, odour not characteristic.	[Fig. 1.a]
2.	<i>Prishnaparni</i> (<i>Uraria picta</i>) mula	Mature roots are straight, woody pieces varying in length, about 0.75 to 1 cm in diameter, surface rough, yellowish brown in colour.	[Fig. 1.b]
3.	<i>Brihati</i> (<i>Solanum indicum</i>) mula	Branched tap root with well developed lateral secondary roots, 20 to 25 cm in length, 0.5 to 1 cm in diameter pale	[Fig. 1.c]

		brown in colour.	
4.	<i>Kantakari (Solanum xanthocarpum) mula</i>	Cylindrical, branched tap root with secondary root, variable in length, 0.5 to 1 cm in diameter, pale brown in colour, order nil.	[Fig. 1.d]
5.	<i>Gokshura (Tribulus terrestris) mula</i>	7 to 10 cm in length, 0.3 to 0.8 cm in diameter, surface is smooth, colour pale yellowish brown, order slightly aromatic, sweet in test.	[Fig. 1.e]

Microscopy study:**Slide preparation:**

Freehand transverse sections of five Roots were taken and slides were prepared with using required reagents. Sections were observed under the microscope to assess their various microscopic features.

Staining agents: Safranin and iodine

OBSERVATIONS & DISCUSSION:**Table No. 2: Microscopic characters found in Roots of *Laghu Panchmula*.**

NO.	Microscopic characters	<i>Shalaparni (Desmodium gangeticum)</i>	<i>Prishnaparni (Uraria picta)</i>	<i>Brihati (Solanum indicum)</i>	<i>Kantakari (Solanum xanthocarpum)</i>	<i>Gokshura (Tribulus terrestris)</i>
1.	Cork	+	+	+	+	+
2.	Cortex	+	+	+	+	+
3.	Secondary phloem	-	+	-	-	-
4.	Medullary rays	+	+	+	+	+
5.	Xylem Vessel	+	+	+	+	+
6.	Ceratenchyma	+	-	-	-	-
7.	Cambium	+	-	+	-	-
9.	Phloem	+	-	+	-	-
10.	Starch grains	+	+	+	-	+
11.	Prismatic crystal	-	+	-	-	-
12.	Sandy crystals	-	-	-	+	-
13.	Micro-sphenoidal crystals	-	-	+	-	-
14.	Rosette crystal	-	-	-	-	+
15.	Tracheids	-	-	-	-	+
16.	Stone cell	-	-	+	+	-
17.	Trichome	-	-	-	-	+

- Absent, + Present

Table No. 3: Transverse section of *Shalaparni (Desmodium gangeticum) Mula*

No.	Characteristics of <i>Shalaparni (Desmodium gangeticum) Mula</i>	NO.
1.	Cork	[Fig. 2.a]
2.	Cortex	[Fig. 2.a]
3.	Ceratenchyma	[Fig. 2.a]
4.	Cambium	[Fig. 2.b]

5.	Phloem	[Fig. 2.b]
6.	Medullary rays	[Fig. 2.c]
7.	Xylem Vessel	[Fig. 2.c]
8.	Starch grains	[Fig. 2.d]

Table No. 4: Transverse section of *Prishnaparni (Uraria picta)* Mula

No.	Characteristics of <i>Prishnaparni (Uraria picta)</i> Mula	Figure no.
1.	Cork	[Fig. 3.a]
2.	Cortex	[Fig. 3.a]
3.	Secondary phloem	[Fig. 3.b]
4.	Medullary rays	[Fig. 3.c]
5.	Xylem Vessel	[Fig. 3.d]
6.	Prismatic crystal of calcium oxalate	[Fig. 3.e]
7.	Starch grain	[Fig. 3.f]

Table No. 5: Transverse section of *Brihati (Solanum indicum)* Mula

No.	Characteristics of <i>Brihati (Solanum indicum)</i> Mula	Figure no.
1.	Cork	[Fig. 4.a]
2.	Cortex	[Fig. 4.a]
3.	Cambium	[Fig. 4.a]
4.	Phloem	[Fig. 4.b]
5.	Medullary rays	[Fig. 4.b]
6.	Xylem Vessel	[Fig. 4.b]
7.	Microsphenoidal crystals of calcium	[Fig. 4.c]
8.	Stone cell	[Fig. 4.c]
9.	Starch grains	[Fig. 4. d]

Table No. 6: Transverse section of *Kantakari (Solanum xanthocarpum)* Mula

No.	Characteristics of <i>Kantakari (Solanum xanthocarpum)</i> Mula	Figure no.
1.	Cork	[Fig. 5.a]
2.	Cortex	[Fig. 5.a]
3.	Sandy crystals of calcium oxalate	[Fig. 5.b]
4.	Medullary rays	[Fig. 5.c]
5.	Xylem Vessel	[Fig. 5.c]
6.	Stone cell	[Fig. 5.d]

Table No. 7: Transverse section of *Gokshura (Tribulus terrestris)* Mula

No.	Characteristics of <i>Gokshura (Tribulus terrestris)</i> Mula	Figure no.
1.	Trichome	[Fig. 6.a]
2.	Cork	[Fig. 6.a]

3.	Cortex	[Fig. 6.a]
4.	Rosette crystal of calcium oxalate	[Fig. 6.b]
5.	Medullary rays	[Fig. 6.c]
6.	Xylem Vessel	[Fig. 6.c]
7.	Tracheids	[Fig. 6.d]
8.	Starch grains	[Fig. 6.e]

Through this present study information regarding the microscopic characters of the herbal drug can be known. For this microscopic study, root of *Laghu Panchamula* was selected. The microscopic characters of *Laghu Panchamula* were observed which will be narrated further. Transverse section of *Shalaparni* (*Desmodium gangeticum*) root shows, Cork, Cortex, Ceratenchyma, Cambium, Phloem, Medullary rays, Xylem Vessel, Starch grains. Transverse section of *Prishnaparni* (*Uraria picta*) root shows, Cork, Cortex, Secondary phloem, Medullary rays, Xylem vessel, Prismatic crystal of calcium oxalate, Starch grain. Transverse section of *Brihati* (*Solanum indicum*) root shows Cork, Cortex, Cambium, Phloem, Medullary rays, Xylem Vessel, Starch grains, Stone cell, Microsphenoidal crystals of calcium. Transverse section of *Kantakari* (*Solanum xanthocarpum*) root shows, Cork, Cortex, Sandy crystals of calcium oxalate, Medullary rays, Xylem Vessel, Stone cell. Transverse section of *Gokshura* (*Tribulus terrestris*) root shows, Trichomes, Cork, Cortex, Rosette crystal of calcium oxalate, Tracheids, Medullary rays, Xylem Vessel, Starch grain.

CONCLUSION:

Shalaparni (*Desmodium gangeticum*), *Prishnaparni* (*Uraria picta*), *Brihati* (*Solanum indicum*), *Kantakari* (*Solanum xanthocarpum*) and *Gokshura* (*Tribulus terrestris*) plants are included in *Laghu Panchamula*. In taxonomy, these five plants belong to three families, i.e., Fabaceae, Solanaceae, and Zygophyllaceae.

Table No. 8: Key identifications feature of Roots include in *Laghu Panchamula*

No.	Plants	Key identification
1.	<i>Shalaparni</i> (<i>Desmodium gangeticum</i>)	Ceratenchyma, Starch grains
2.	<i>Prishnaparni</i> (<i>Uraria picta</i>)	Secondary phloem, Prismatic crystal of calcium oxalate
3.	<i>Brihati</i> (<i>Solanum indicum</i>)	Microsphenoidal crystals of calcium, Stone cell, Starch grains
4.	<i>Kantakari</i> (<i>Solanum xanthocarpum</i>)	Sandy crystals of calcium oxalate, Stone cell
5.	<i>Gokshura</i> (<i>Tribulus terrestris</i>)	Rosette crystal of calcium oxalate, Tracheids

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Plate No.1: Photos of Fresha roots of *Laghu Panchamula*



[Fig. 1. a]



[Fig. 1. b]



[Fig. 1. c]

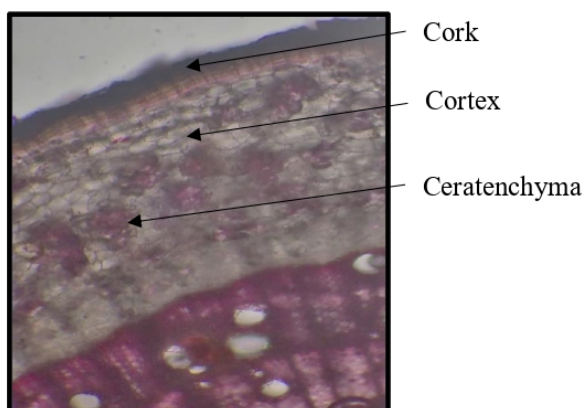


[Fig. 1. d]

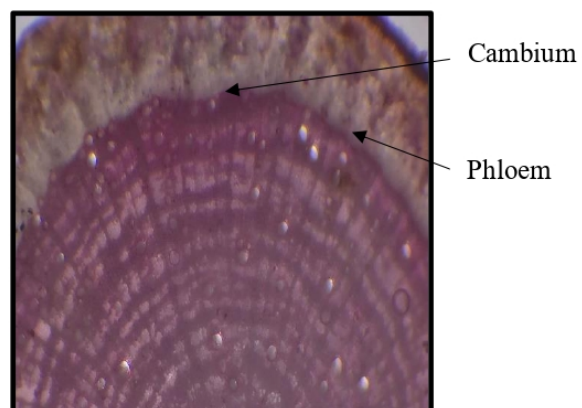


[Fig. 1. e]

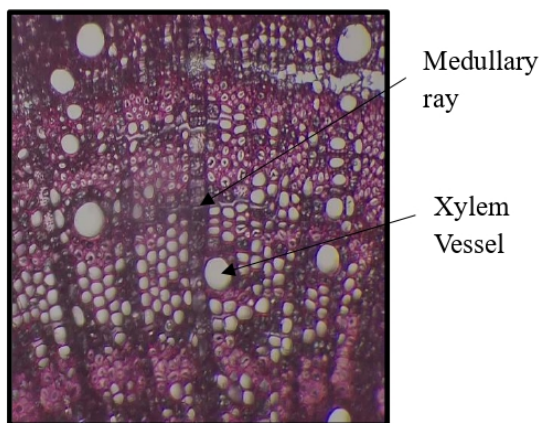
Plate No. 2: Photos of Pharmacognosy of *Shalaparni* (*Desmodium gangeticum*) Root



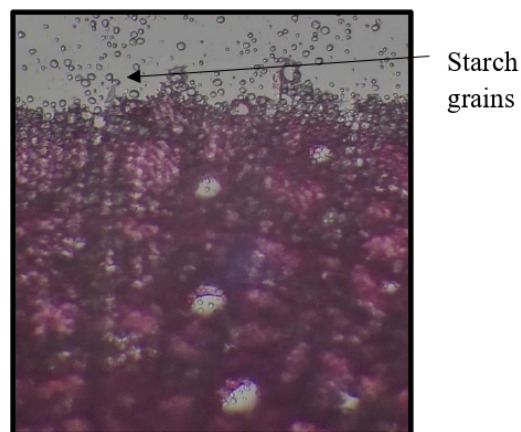
[Fig. 2. a]



[Fig. 2. b]

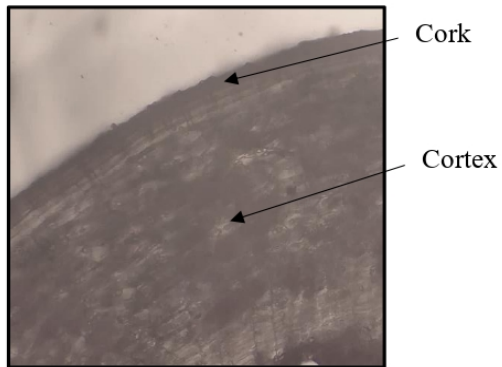


[Fig. 2. c]

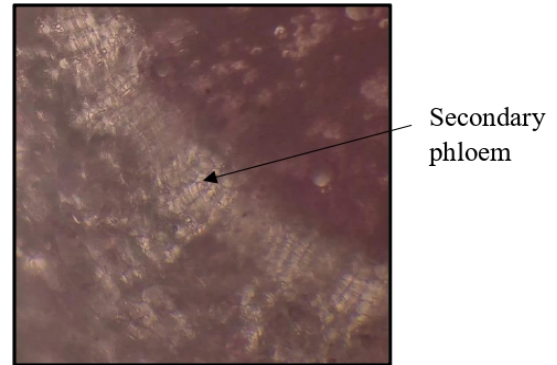


[Fig. 2. d]

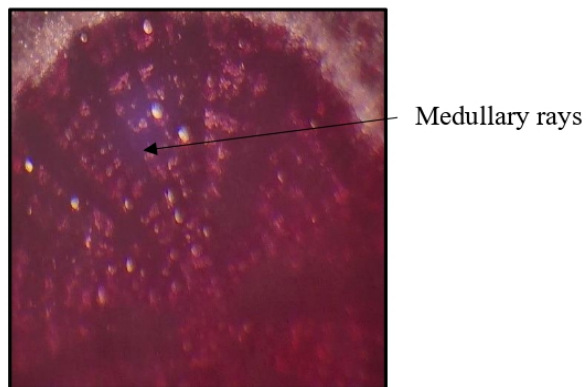
Plate No.3: Photos of microscopy of *Prishnaparni (Uraria picta)* Root



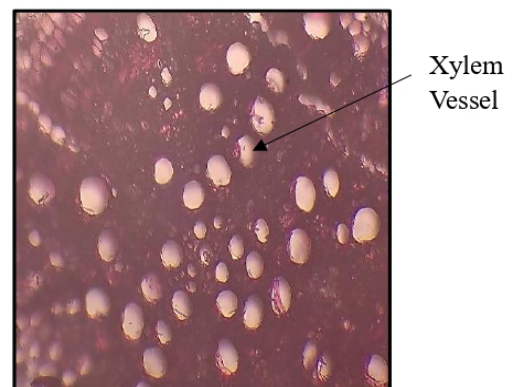
[Fig. 3.a]



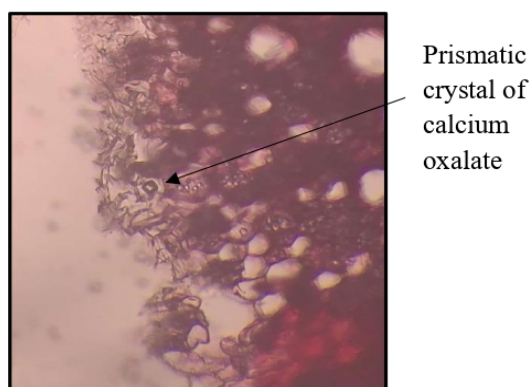
[Fig. 3.b]



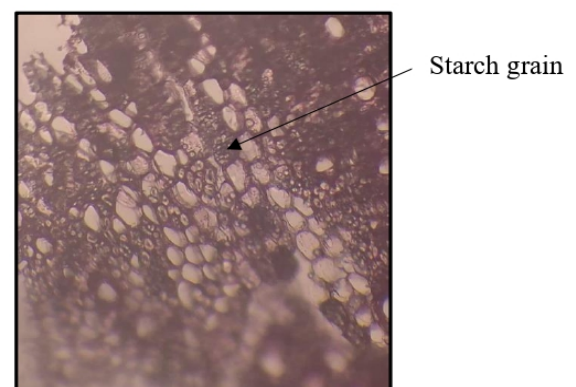
[Fig. 3. c]



[Fig. 3. d]

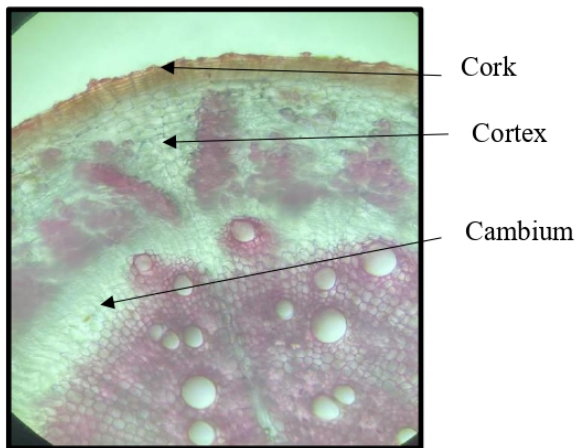


[Fig. 3. e]

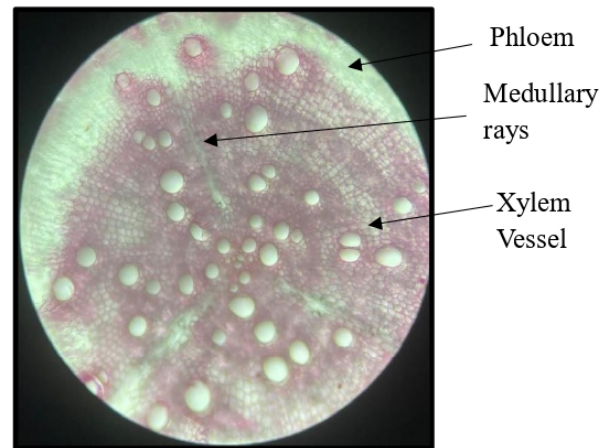


[Fig.3. f]

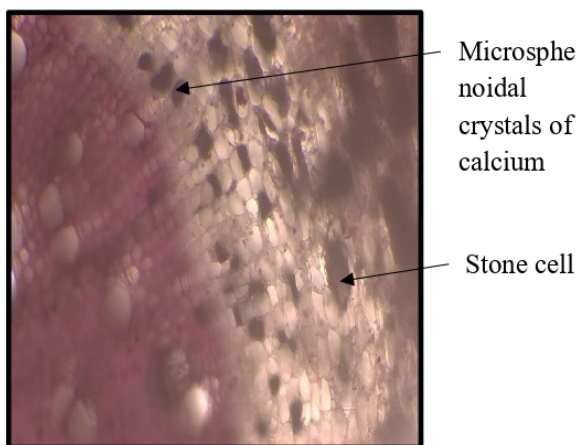
Plate No.4: Photos of microscopy of *Brihati (Solanum indicum)* Root



[Fig. 4. a]



[Fig. 4. b]

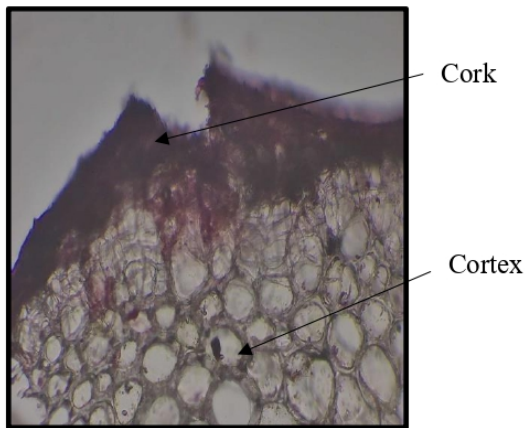


[Fig. 4. c]

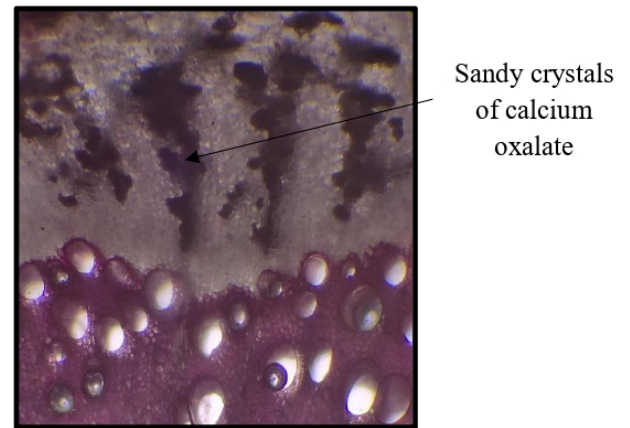


[Fig. 4. d]

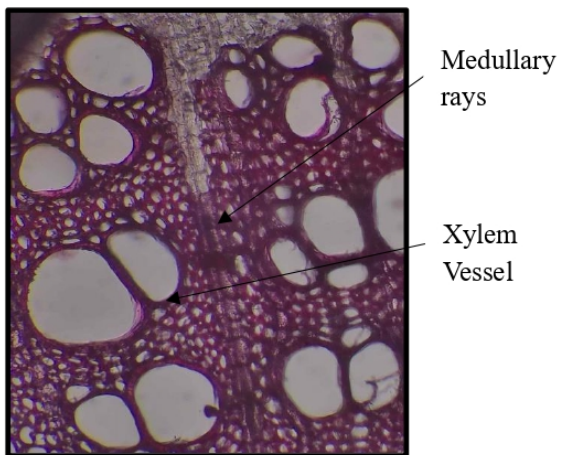
Plate No.5: Photos of microscopy of *Kantakari* (*Solanum xanthocarpum*) Root



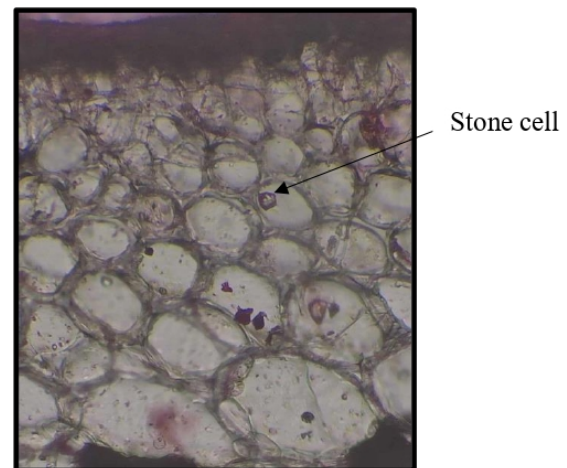
[Fig. 5. a]



[Fig. 5. b]

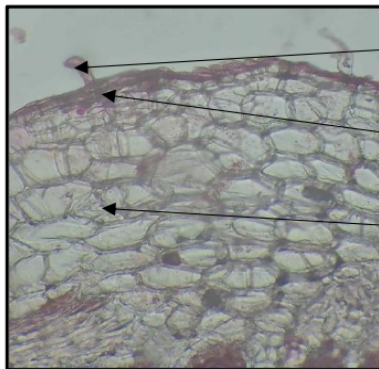


[Fig. 5. c]



[Fig. 5. d]

Plate No.6: Photos of microscopy of *Gokshura (Tribulus terrestris)* Root

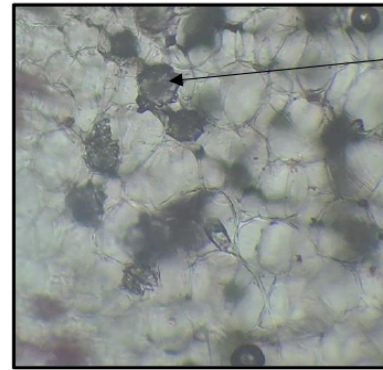


Trichome

Cork

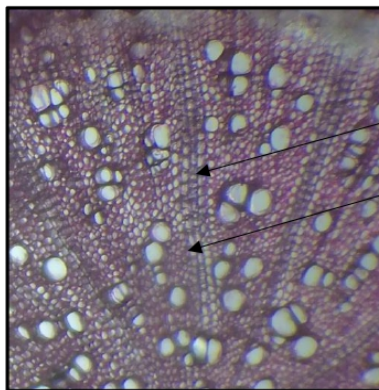
Cortex

[Fig. 6. a]



Rosette crystal
of calcium
oxalate

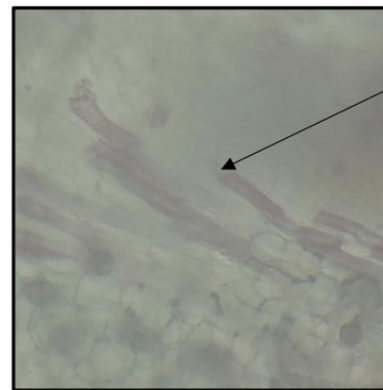
[Fig. 6. b]



Medullary rays

Xylem Vessel

[Fig. 6. c]



Tracheids

[Fig. 6. d]



Starch grains

[Fig. 6. e]

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