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PHARMACOGNOSTICAL EVALUATION OF INGREDIENTS OF KANTAKA PANCHMOOLA- AN AYURVEDIC COMPOUND

Authors:

1. Neha Thakkar, Second year P.G. Scholar, Upgraded P.G. Department of *Dravyaguna*, Government Ayurved College, Vadodara, Gujarat, India
2. Dharmendra Jani, Associate Professor, Upgraded P.G. Department of *Dravyaguna*, Government Ayurved College, Vadodara, Gujarat, India

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Corresponding author: Dr. Neha Thakkar

Email: thakkarneha958@gmail.com

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Abstract

Background: Medicines prepared from plants are made using plant parts, i.e., Root, Stem, Flower, Fruit, Bark, Seed, Leaf, etc. When the root of five plants is taken together to prepare a formulation, it is called *Panchamoola*. Five types of *Panchamoola* are mentioned in Samhita. *Kantaka Panchamoola* is one such *Panchamoola*, *Kantaka* means thorns and *Moola* is root. The contents of *Kantaka Panchamoola* are *Karmarda* (*Carissa carandas* Linn.), *Gokshura* (*Tribulus terrestris* Linn.), *Saireyaka* (*Barleria prionitis* Linn.), *Shatavari* (*Asparagus racemosus* Willd.) and *Himsra* (*Capparis spinosa* Linn.). All five plants of *Kantaka Panchamoola* have thorns; therefore, roots of these five plants are collectively called as *Kantaka Panchamoola*. **Material & Method:** Freehand transverse sections of five roots were taken and using required reagents (Safranin, Sudan 3). Sections were observed under the microscope to assess their various microscopic features. **Observation & Result:** Pharmacognostical characters shows identification characters of plants included in *Kantaka Panchmoola* like Stone cells, Starch grains in *Karmarda* (*Carissa carandas* Linn.), Acicular crystals in *Shatavari* (*Asparagus racemosus* Willd.), cork cmbium in *Saireyaka* (*Barleria prionitis* Linn.) tracheids, rosset crystals in *Gokshura* (*Tribulus terrestris* Linn.), oil globules in *Himsra* (*Capparis spinosa* Linn.) were observed. **Discussion and Conclusion:** The microscopic structures which are observed in *Kantaka Panchmoola* helps in correct identification of roots of *Karmarda* (*Carissa carandas* Linn.), *Gokshura* (*Tribulus terrestris* Linn.), *Saireyaka* (*Barleria prionitis* Linn.), *Shatavari* (*Asparagus racemosus* Willd.) and *Himsra* (*Capparis spinosa* Linn.).

Key Words:

Kantaka Panchmoola, Mishrakavarga, Pharmacognosy

INTRODUCTION:

The word “*Mishraka Gana*” is derived from two words; “*Mishraka*” means mixture or combination and “*Gana*” means group. The word “*Mishraka*” refers to the *Samuha*, or group of drugs, in other words. Many drug groups are categorized by Ayurveda under the term *Mishrakagana*, our ancient Acharyas divided medicines into groupings known as *Ganas* based on comparable morphological characteristics (*Aakriti Sadharmya*), qualities (*Guna Sadharmya*), and medicinal applications (*Karma Sadharmya*). Some examples are, *Dashamoola*, *Triphala*, *Trikatu*, *Trimada*, *Panch Pallava*, *Panchakola* etc.

In Charak Samhita, Rasayan adhyaya of chikitsa sthana, five types of Panchamoola are mentioned¹. Acharya Charak described the word Panchamoola for the first time. Later on, In chapter 38th of Sutra Sthana, Kantaka Panchamoola is also defined by Acharya Charak. The contents of *Kantaka Panchamoola* are *Karmarda* (*Carissa carandas* Linn. - Apocynaceae), *Gokshura* (*Tribulus terrestris* Linn. - Zygophyllaceae), *Saireyaka* (*Barleria prionitis* Linn. - Acanthaceae), *Shatavari* (*Asparagus racemosus* Willd. - Liliaceae) and *Himsra* (*Capparis spinosa* Linn. - Capparidaceae). Acharya Charak also described the medicinal properties and uses of all the contents of *Kantaka Panchamoola*. *Kantaka* means thorns and *Moola* is root. All five plants of *Kantaka Panchamoola* have thorns; therefore, roots of these five plants are collectively called as *Kantaka Panchamoola*.

AIM:

To study the microscopic features of roots of plants included in *Kantaka Panchamoola*.

OBJECTIVE:

To study the identification features of transverse sections of root of plants included in *Kantaka Panchamoola*.

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 *Karmarda* (*Carissa carandas* Linn. - Apocynaceae), *Saireyaka* (*Barleria prionitis* Linn. - Acanthaceae) and *Shatavari* (*Asparagus racemosus* Willd. - Liliaceae) were collected from *Dhanvantri Udhyan*, Government Ayurveda College, Vadodara (**Latitude and Longitude:** 22.3072°N, 73.1815°E, **Altitude:** Approximately 39 meters (128 feet) above sea level.). Roots of *Gokshura* (*Tribulus terrestris* Linn. - Zygophyllaceae), were collected from Boriyavi, Anand (**Latitude and Longitude:** 22.6276°N, 72.9347°E, **Altitude:** Approximately 35 meters (115 feet) above sea level) and *Himsra* (*Capparis spinosa* Linn. - Capparaceae) roots were collected from por village, vadodara (**Latitude and Longitude:** 22.1405°N, 73.1843°E, **Altitude:** Approximately 35 meters (115 feet) above sea level) and taken for the study.

Methods

Microscopy study**Slide preparation:**

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

Staining agents: 1) Safranin

2) Iodine

3) Sudan 3

OBSERVATIONS & DISCUSSION:

Table No. 1: microscopic characters found in roots of *Kantaka Panchamoola*.

NO.	Microscopic characters	<i>Karmarda</i> (<i>Carissa</i> <i>carandas</i> Linn.)	<i>Saireyaka</i> (<i>Barleria</i> <i>prionitis</i> Linn.)	<i>Shatavari</i> (<i>Asparagus</i> <i>racemosus</i> Willd.)	<i>Gokshura</i> (<i>Tribulus</i> <i>terrestris</i> Linn.)	<i>Himsra</i> (<i>Capparis</i> <i>spinosa</i> Linn.)
1	Cork	+	-	-	+	+
2	Epidermis	-	-	+	-	+
3	Endodermis	-	-	+	-	-
4	Cortex	+	+	+	+	+
5	Xylem	+	+	+	+	+
6	Phloem	+	+	+	+	+
7	Medullary rays	+	+	+	+	+
8	Cambium	+	+	-	-	-
9	Acicular crystals	-	-	+	-	-
10	Stone cells	+	-	-	-	-
11	Starch grains	+	-	-	-	+
12	Rosette crystals	-	-	-	+	-
13	Collenchyma cell	-	-	-	-	-
14	Oil globule	-	-	-	-	+
15		-	-	-	-	+

- Absent, + Present

Table No. 2: Transverse section of *Karmarda* (*Carissa carandas* Linn.) root²

No.	Characteristics of <i>Karmarda</i> (<i>Carissa carandas</i> Linn.) root	Figure no.
	Cork	[Fig. 1.a]
1.	Cortex	[Fig. 1.c]
2.	Xylem	[Fig. 1.b]
3.	Phloem	[Fig. 1.b]
4.	Phellogene	[Fig. 1.c]
5.	Stone cells	[Fig. 1.d]
6.	Starch grains	[Fig. 1.a]

Table No. 3: Transverse section of *Saireyaka* (*Barleria prionitis* Linn.) root³

No.	Characteristics of <i>Saireyaka</i> (<i>Barleria prionitis</i> Linn.) root	Figure no.
1.	Cortex	[Fig. 2.a]
2.	Medullary rays	[Fig. 2.b]
3.	Cork cambium	[Fig. 2.c]
4.	Xylem	[Fig. 2.d]
5.	Phloem	[Fig. 2.d]
6.	Vascular bundle	[Fig. 2.b]

Table No. 4: Transverse section of *Shatavari* (*Asparagus racemosus* Willd.) root⁴

No.	Characteristics of <i>Shatavari</i> (<i>Asparagus racemosus</i> Willd.) root	Figure no.
1.	Epidermis	[Fig. 3.a]
2.	Cortex	[Fig. 3.b]
3.	Endodermis	[Fig. 3.c]
5.	Xylem	[Fig. 3.c]
6.	Phloem	[Fig. 3.c]
7.	Pith	[Fig. 3.d]
8.	Acicular crystals	[Fig. 3.e]

Table No. 5: Transverse section of *Gokshura* (*Tribulus terrestris* Linn.) root⁵

No.	Characteristics of <i>Gokshura</i> (<i>Tribulus terrestris</i> Linn.) root	Figure no.
1.	Vascular bundles	[Fig. 4.a]
2.	Medullary rays	[Fig. 4.a]
3.	Cork	[Fig. 4.b]
4.	Starch grains	[Fig. 4.c]
5.	Tracheids	[Fig. 4.d]
6.	Rosette crystals	[Fig. 4.d]
7.	Pith	[Fig. 4.e]

Table No. 6: Transverse section of *Himsra* (*Capparis spinosa* Linn.) root

No.	Characteristics of <i>Himsra</i> (<i>Capparis spinosa</i> Linn.) root	Figure no.
1.	Cork	[Fig. 5.a]
2.	Epidermal cells	[Fig. 5.a]
3.	Collenchyma cell	[Fig. 5.b]
4.	Pith	[Fig. 5.c]
5.	Medullary rays	[Fig. 5.e]
6.	Xylem	[Fig. 5.e]
8.	Phloem	[Fig. 5.e]

9.	Starch grains	[Fig. 5.d]
10.	Oil globule	[Fig. 5.d]

Fresh root of *Kantaka Panchmoola* were selected. The microscopic characters of *Kantaka Panchmoola* were observed which will be narrated further. Transverse section of *Karmarda* (*Carissa carandas* Linn.) root shows cork, cortex, xylem, phloem, phellogene, stone cells and starch grains. Transverse section of *Saireyaka* (*Barleria prionitis* Linn.) root shows cortex, medullary rays, cork cambium, xylem and phloem. Transverse section of *Shatavari* (*Asparagus racemosus* Willd.) root shows epidermis, cortex, endodermis, xylem, phloem, pith and acicular crystals. Transverse section of *Gokshura* (*Tribulus terrestris* Linn.) root shows, vascular bundle, medullary rays, cork, starch grains, tracheids and pith. Transverse section of *Himsra* (*Capparis spinosa* Linn.) root shows cork, epidermal cells, collenchyma cell, pith, medullary rays, xylem, phloem, starch grains and oil globules.

CONCLUSION:

Karmarda (*Carissa carandas* Linn.), *Saireyaka* (*Barleria prionitis* Linn.), *Shatavari* (*Asparagus racemosus* Willd.), *Gokshura* (*Tribulus terrestris* Linn.) and *Himsra* (*Capparis spinosa* Linn.) plants are included in *Kantaka Panchmoola* and all *Kantaka Panchmoola* are dicotyledonous plants. In taxonomy, these five plants belong to five different families, i.e., Apocynaceae, Acanthaceae, Liliaceae, Zygophyllaceae and Capparaceae

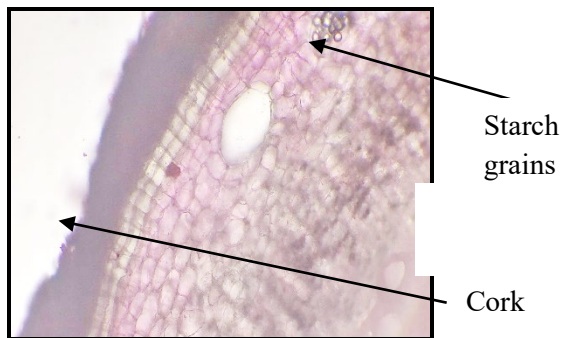
Key identifications of features of root included in *Kantaka Panchmoola* as follow:

No.	Plants	Key identification
1.	<i>Karmarda</i> (<i>Carissa carandas</i> Linn.)	Stone cells, Starch grains
2.	<i>Saireyaka</i> (<i>Barleria prionitis</i> Linn.)	Cork cambium
3.	<i>Shatavari</i> (<i>Asparagus racemosus</i> Willd.)	Acicular crystals
4.	<i>Gokshura</i> (<i>Tribulus terrestris</i> Linn.)	Starch grains, tracheids and rosset crystals
5.	<i>Himsra</i> (<i>Capparis spinosa</i> Linn.)	Oil globules

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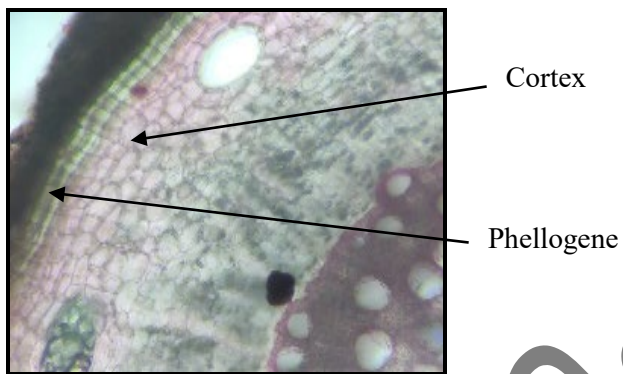
Plate No. 1: Photos of Transverse section of *Karmarda* (*Carissa carandas* Linn.) root



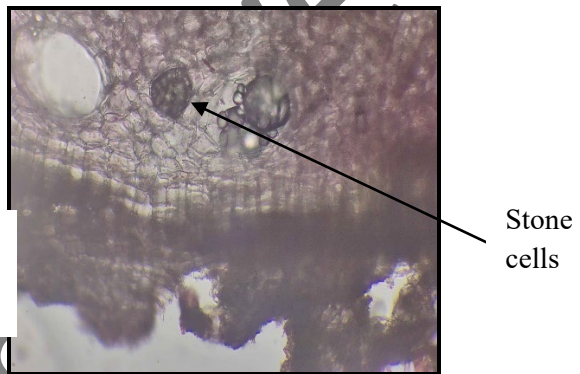
[Fig. 1.a]



[Fig. 1.b]

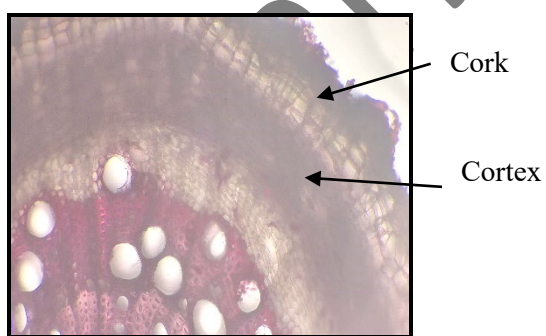


[Fig. 1.c]

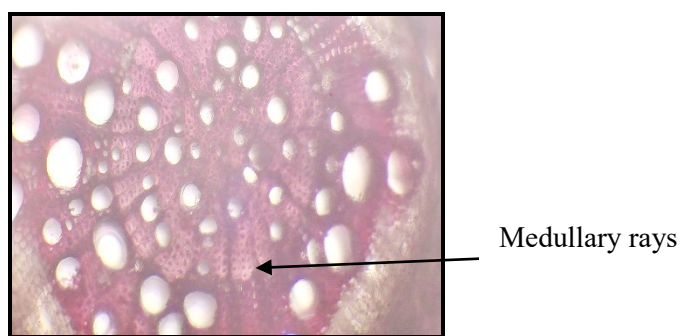


[Fig. 1.d]

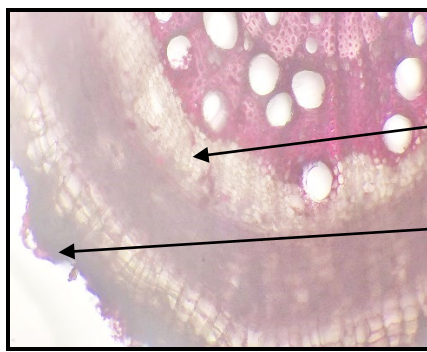
Plate No. 2: Photos of Transverse section of *Saireyaka* (*Barleria prionitis* Linn.) root



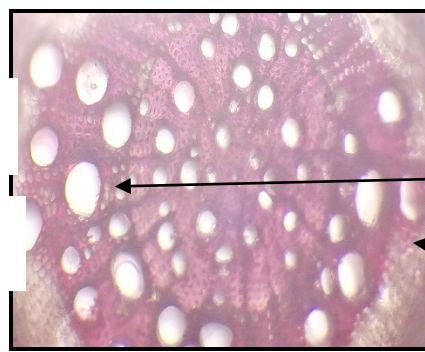
[Fig. 2.a]



[Fig. 2.b]

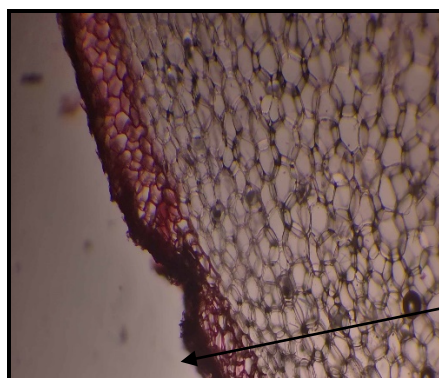


[Fig. 2.c]

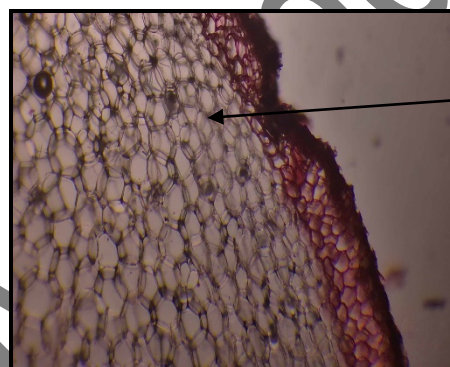


[Fig. 2.d]

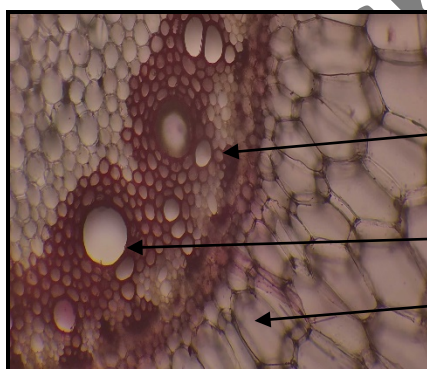
Plate No. 3: Photos of Transverse section of *Shatavari* (*Asparagus racemosus* Willd.) root



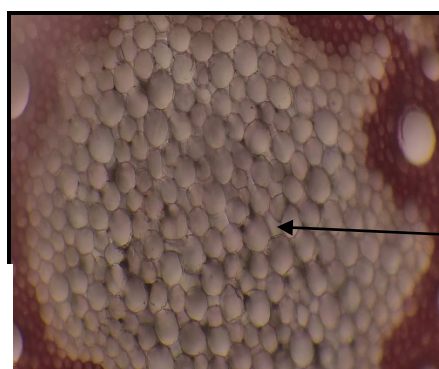
[Fig. 3.a]



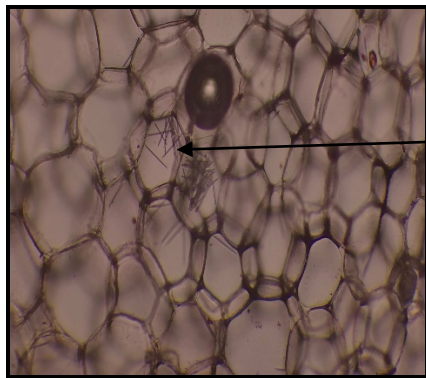
[Fig. 3.b]



[Fig. 3.c]



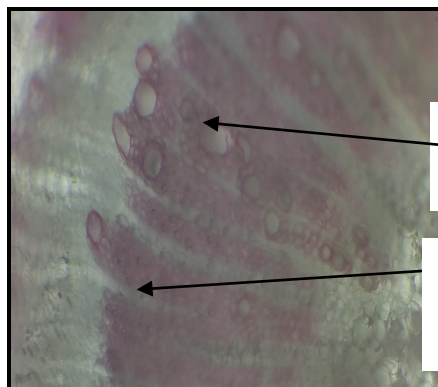
[Fig. 3.d]



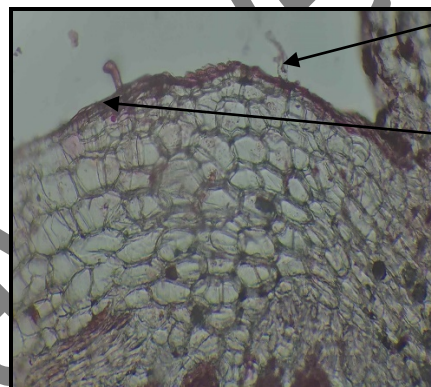
Acicular
crystals

[Fig. 3.e]

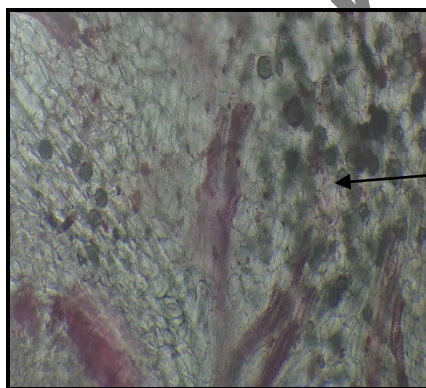
Plate No. 4: Photos of Transverse section of *Gokshura* (*Tribulus terrestris* Linn.) root



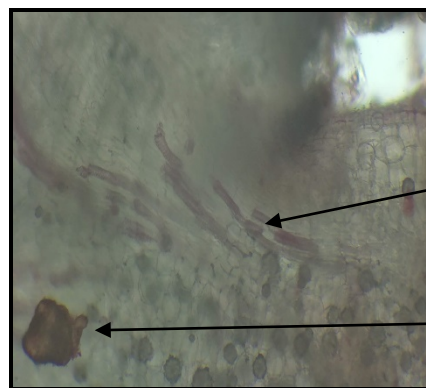
[Fig. 4.a]



[Fig. 4.b]



[Fig. 4.c]



[Fig. 4.d]

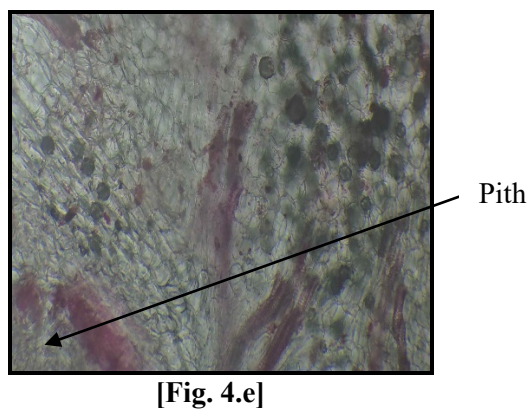
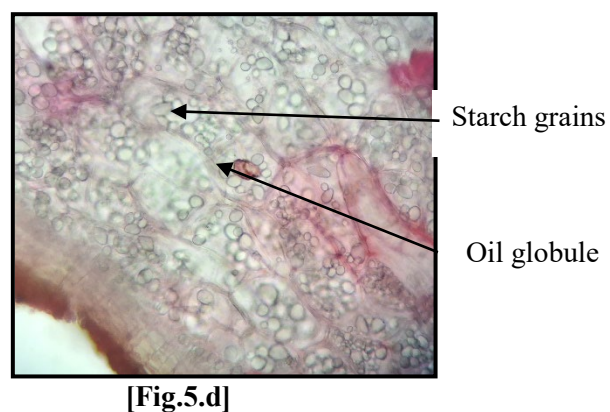
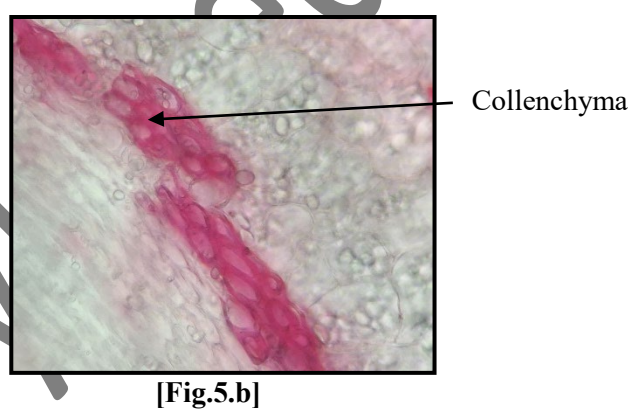
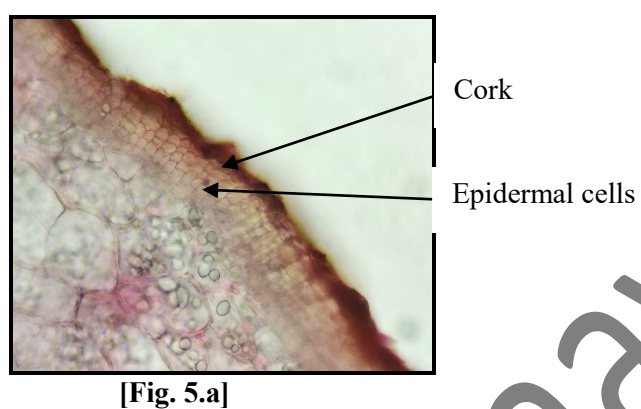
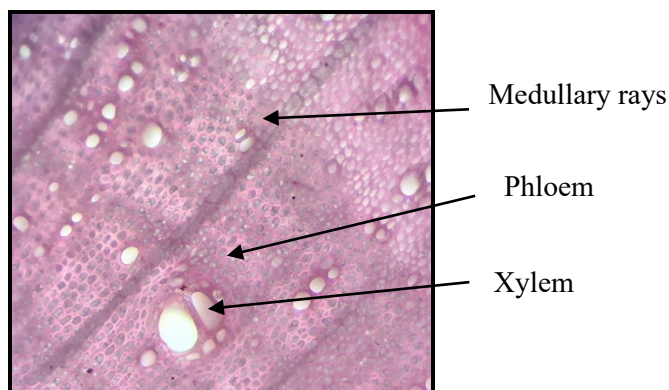


Plate No. 5: Photos of Transverse section of *Himsra* (*Capparis spinosa* Linn.) root





[Fig. 5.e]

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