ISSN: 2249- 5746
International Journal of Ayurvedic and Herbal Medicine 15:6 (2025) 5194-5220
Journal homepage: http://www.interscience.org.uk
DOI: 10.47191/ijahm/v15i6.03
Impact Factor: 8.254

Pharmacognostic Evaluation of Various Market Samples of *Talishpatra*

Dr. Neha Thakkar[1], Dr. Dharmendra Jani[2]
[1]Third year P.G. Scholar, Upgraded P.G. Department of *Dravya*guna, Government Ayurved College, Vadodara, Gujarat, India
[2]Associate Professor, Upgraded P.G. Department of *Dravya*guna, Government Ayurved College, Vadodara, Gujarat, India

Corresponding Author: Dr. Neha Thakkar
Institute: Government Ayurveda College, Vadodara - 390019, Gujarat, India

ABSTRACT

Background: Pharmacognostic profiling is essential for the authentication and quality control of herbal drugs. This study investigates the macroscopic, organoleptic, and microscopic characteristics of *Talishpatra*, a medicinal conifer, collected from various regional markets across India. Ten market samples and one reference specimen from the natural habitat were analysed.

Material & Method: Leaf samples were procured from five geographic regions of India (two samples from each)-Northern, Southern, Eastern, Western, and Central-along with one from a natural habitat. Macroscopic analysis included observations of colour, shape, size, texture, apex, venation, and leaf arrangement. Organoleptic evaluation was conducted to assess sensory attributes such as colour, odour, taste, and texture. Microscopic examination involved transverse sectioning and staining with reagents to identify microscopic features. Powder microscopy was performed on dried leaf powder samples to study microscopic characteristics.

Observation & Result: Macroscopic analysis revealed that the reference sample exhibited a bright green adaxial surface, silvery white abaxial surface, and emarginate apex, while market samples were predominantly brown with variable lengths (2–7 cm), pointed apices, and a consistent spiral arrangement. Organoleptic evaluation showed the reference sample had a strong aroma with pungent and bitter taste; market samples shared similar taste profiles but varied in colour from dark brown to nut brown. Microscopic examination of the reference sample highlighted distinct epidermal layers, hypodermis, sunken stomata, and secretory cavities. Market samples displayed striated cuticles, papillose projections, brown inclusions, and uniform vascular bundle structures.

Discussion and Conclusion: Secretory cavities are key identification character of *Abies spectabilis* (D. Don) Mirb. which is absent in all market samples, Upper striated cuticle and lower Papillose cuticle is key identification character of *Taxus baccata* Linn. which is found in all market samples, while secretory cavities are absent in all market samples.

KEY WORDS: Pharmacognosy, *Talishpatra*, *Abies spectabilis* (D. Don) Mirb., herbal authentication, macroscopic analysis, microscopic study

INTRODUCTION

Pharmacognosy serves as a cornerstone in the identification and standardization of herbal drugs, ensuring their safety, efficacy, and authenticity. *Talishpatra*'s accepted botanical source is *Abies spectabilis* (D.Don) Mirb.,while *Abies pindrow, Rhododendron anthopogon* and *Taxus wallichiana* are adulterants or substitutes of *Talishpatra* as mentioned by API[1]. It is traditionally used in Ayurvedic medicine for its expectorant, anti-inflammatory, and antimicrobial properties. However, regional variations in harvesting, processing, and market handling can affect the quality of the raw material. This study aims to perform a detailed pharmacognostic evaluation of *Talishpatra* leaf samples collected from different regions of India, comparing them with a morphologically authenticated reference specimen.

AIM

To conduct a comparative pharmacognostic evaluation of *Talishpatra* leaf samples obtained from various regional markets in relation to a reference standard.

OBJECTIVE

1. To study the macroscopic features of *Talishpatra* leaves procured from various regional markets in relation to a morphologically reference standard.
2. To study the microscopic features of *Talishpatra* leaves procured from various regional markets in relation to a morphologically reference standard.
3. To study the powder microscopic feature of *Talishpatra* leaves powder procured from various regional markets in relation to a morphologically reference standard.

MATERIAL AND METHODS

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

Study protocol includes:

A. Sample collection
B. Macroscopic study
C. Organoleptic study
D. Microscopical study
E. Powder microscopical study

A. Sample Collection

Eleven samples of *Talishpatra* leaves were collected: two each from Northern (Delhi), Southern (Udupi, Hyderabad), Eastern (Kolkata), Western (Ahmedabad, Vadodara), and Central (Bhopal, Indore) regions, and one from the plant's natural habitat (Auli, Chamoli district, Uttarakhand- Latitude**:** 30.52892°N Altitude**:** 2,909 meters (9,544 feet) above sea level.) which is reference standard. Each sample was coded (e.g., N1, S2, E1) for identification.

Table No.1: Procurement Sites and Codes of Market Procured *Talishpatra* Samples

Sr.no.	Region	City	Code
1.	Northern region	Delhi	N1
2.	Northern region	Delhi	N2
3.	Southern region	Udupi	S1
4.	Southern region	Hyderabad	S2

5.	Eastern region	Kolkata	E1
6.	Eastern region	Kolkata	E2
7.	Western region	Ahmedabad	W1
8.	Western region	Vadodara	W2
9.	Central region	Bhopal	C1
10.	Central region	Indore	C2

B. Macroscopic study

Various market samples of *Talishpatra* leaves in relation to a Standard reference specimen were studied for macroscopic identification characters and observations were mentioned as below table.

Table No.2 Comparative Macroscopic characters of *Talishpatra* samples with standard reference specimen

Parameter	S.R.	N1	N2	S1	S2	E1	E2	W1	W2	C1	C2
Colour	Bright green (adaxial), silvery white (abaxial)	Brown	Brown	Dark brown	Light brown	Brown	Nut brown	Brown	Dark brown	Dark brown	Dark brown
Length (cm)	Approx. 5	7	5	2–3	3–4	3–5	3–4	2–3	2–3	2–3	2–3
Width (mm)	Approx. 2	2	1	1	2	2	1	1	1	2	1
Leaf Apex	Emarginate	Pointed	Pointed	Pointed	Pointed	Pointed	Pointed	Pointed	Pointed	Pointed	Pointed
Arrangement	Spiral	Spiral	Spiral	Spiral	Spiral	Spiral	Spiral	Spiral	Spiral	Spiral	Spiral

C. Organoleptic Evaluation

Sensory characteristics such as colour (leaf and powder), odour, taste, and texture were assessed using sensory methods and reference colour charts.

Table No.3 Comparative Organoleptic characters of *Talishpatra* samples with standard reference specimen

Sample Code	Leaf Colour	Powder Colour	Odour	Taste	Texture
S.R.	Green	Green	Strong aroma	Pungent & Bitter	Glabrous & brittle
N1	Dark brown	Brown	Aromatic	Bitter	Glabrous & brittle

N2	Brown	Dark brown	Strong aroma	Pungent & Bitter	Glabrous & brittle
S1	Dark brown	Brown	Aromatic	Bitter	Glabrous & brittle
S2	Light brown	Yellowish brown	Aromatic	Pungent & Bitter	Glabrous & brittle
E1	Brown	Dark brown	Strong pungent aroma	Pungent & Bitter	Glabrous & brittle
E2	Nut brown	Dark brown	Strong pungent aroma	Pungent & Bitter	Glabrous & brittle
W1	Brown	Dark brown	Strong aromatic	Pungent & Bitter	Glabrous & brittle
W2	Dark brown	Dark brown	Strong aromatic	Pungent & Bitter	Glabrous & brittle
C1	Dark brown	Dark brown	Faint aroma	Pungent & Bitter	Glabrous & brittle
C2	Dark brown	Dark brown	Faint aroma	Pungent & Bitter	Glabrous & brittle

D. Microscopic Examination

Transverse sections of leaves were stained with safranin, iodine, and Sudan III and microscopic features were observed.

Table No.4 Comparative Microscopic characters of *Talishpatra* samples with standard reference specimen

Feature	S.R.	N1	N2	S1	S2	E1	E2	W1	W2	C1	C2
Striated Cuticle	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Papillose Cuticle	✗	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Palisade Layer	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Spongy Mesophyll	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Secretory Cavities	✓	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗
Stomata (Sunken)	✓ (Both surfaces)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Brown Content	✗	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

E. Powder Microscopy Study

Powdered leaf samples were examined microscopically to identify diagnostic features

Table No.5 Comparative powder microscopic characters of *Talishpatra* samples with standard reference specimen

Structure	S.R.	N1	N2	S1	S2	E1	E2	W1	W2	C1	C2
Epidermal cells	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Hypodermal cells	✓	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗
Upper epidermis (surface view)	✓	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗

Lower epidermis with stomata	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Oil globules	✓	✓	✓	✗	✗	✓	✗	✗	✗	✓	✗
Vessel fragments	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Starch grains	✗	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Stomata (powder view)	✓	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗
Sclereids	✓	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗
Sclerenchyma	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Collenchyma	✗	✗	✓	✗	✗	✓	✓	✗	✗	✗	✓
Brown content	✗	✓	✓	✗	✓	✓	✓	✗	✓	✓	✓
Fibers	✓	✓	✓	✓	✓	✓	✗	✓	✗	✗	✗

DISCUSSION

Macroscopic study

- **Colour**: The reference sample exhibited bright green adaxial and silvery white abaxial surfaces, whereas market samples predominantly showed shades of brown, ranging from nut brown (E2) to dark brown with reddish undertones (S1, N1, C1, C2).
- **Size**: Leaf length varied significantly, from 2–3 cm (S1, W1, C1, C2) to 7 cm (N1), suggesting possible species admixture or post-harvest shrinkage.
- **Apex and Veins**: While the reference leaf was emarginate, all market samples showed pointed apices. Emarginated apex is key characteristic of *Abies spectabilis* (D. Don) Mirb[2], while pointed apex is character of *Abies Pindrow* and *Taxus Baccatal* Linn. Vein structure remained consistent, with a central vein and spiral phyllotaxy.

Organoleptic Evaluation

- **Odour and Taste**: Most samples retained the characteristic pungent and bitter taste, aligning with classical descriptions. However, odour intensity varied ranging from strong aromatic (W1, W2, E1, E2) to faint aroma (C1, C2), possibly indicating differences in freshness and storage conditions.
- **Powder Colour**: Reference powder was green, while market samples ranged from brown to dark brown and yellowish brown (S2), reflecting degradation or variation in drying techniques.

Microscopic Examination

- **Reference standard**: The authenticated leaf showed a well-defined structure single-layered epidermis, 2-layered palisade, 4–6-layered spongy parenchyma, centrally placed vascular bundle with xylem and phloem, and two secretory cavities.
- **Market Samples**: All regional samples consistently exhibited striated cuticle, papillose cuticle, lower epidermis, palisade and spongy mesophyll, and vascular tissues. However, presence of brown content and variation in sclerenchyma thickness suggest possible aging or adulteration.
- Secretory cavities are key identification character of *Abies spectabilis* (D. Don) Mirb. which is absent in all market samples, Upper cuticle striated and lower Papillose cuticle is key identification character of *Taxus baccata* Linn. which is found in all market samples, while secretory cavities are absent in all market samples.

Powder Microscopy Study

- Epidermal cells, lower epidermis with stomata, vessel fragments, and sclerenchyma were consistently present across all samples, including the standard.

- Oil globules were inconsistently present, found in only a few market samples (N1, N2, E1, C1). Oil globules are often considered a microscopic marker for genuine and potent herbal material. Their inconsistent presence raises concerns about standardization and therapeutic efficacy. Volatile oils can degrade over time due to exposure to light, heat, or air. Older or poorly stored samples may lose their oil content.
- Brown content was more prevalent in market samples, possibly due to oxidation or aging.
- Collenchyma appeared sporadically, suggesting anatomical variability or adulteration.
- Stomata are present on both the upper and lower surfaces of *Abies spectabilis* (D. Don) Mirb. while only on the lower surface of the leaves of *Taxus Baccata* Linn.

CONCLUSION

The comprehensive pharmacognostical evaluation of market-procured *Talishpatra* samples, in comparison with the authenticated reference standard of *Abies spectabilis* (D. Don) Mirb., revealed significant morphological, organoleptic, and microscopic deviations. While all market samples exhibited certain common features such as spiral phyllotaxy, glabrous and brittle texture, and pungent-bitter taste, key diagnostic markers of *Abies spectabilis* (D. Don) Mirb. notably the emarginate leaf apex and presence of secretory cavities were consistently absent.

Macroscopic observations indicated considerable variation in leaf size and colour, with most samples displaying brownish hues and pointed apices, suggestive of either post-harvest degradation or substitution with other species like *Abies pindrow* or *Taxus baccata*. Organoleptic assessments further supported this, with diminished aroma in some samples and altered powder coloration, indicating possible aging or improper storage.

Microscopic and powder microscopy studies corroborated these findings - The absence of secretory cavities, presence of papillose cuticle, and stomatal distribution patterns aligned more closely with *Taxus baccata* Linn. rather than with the reference standard. Additionally, the inconsistent presence of oil globules and increased brown content in market samples raise concerns about the authenticity, potency, and therapeutic reliability of the material being sold under the name of *Talishpatra*.

In conclusion, the study underscores the urgent need for rigorous quality control, standardization, and authentication protocols in the procurement and distribution of *Talishpatra* to ensure its safe and effective use in Ayurvedic formulations.

ACKNOWLEDGEMENT

The authors are thankful to Department of AYUSH, principal of Government Ayurveda College, Head of department, all faculty members, students and Co-workers of upgraded department of *Dravyaguna Vijnan*, Government ayurveda college, Vadodara for their cordial support.

Plate No. 1: Photos of Macroscopic features of various market samples of *Talishpatra* raw drug

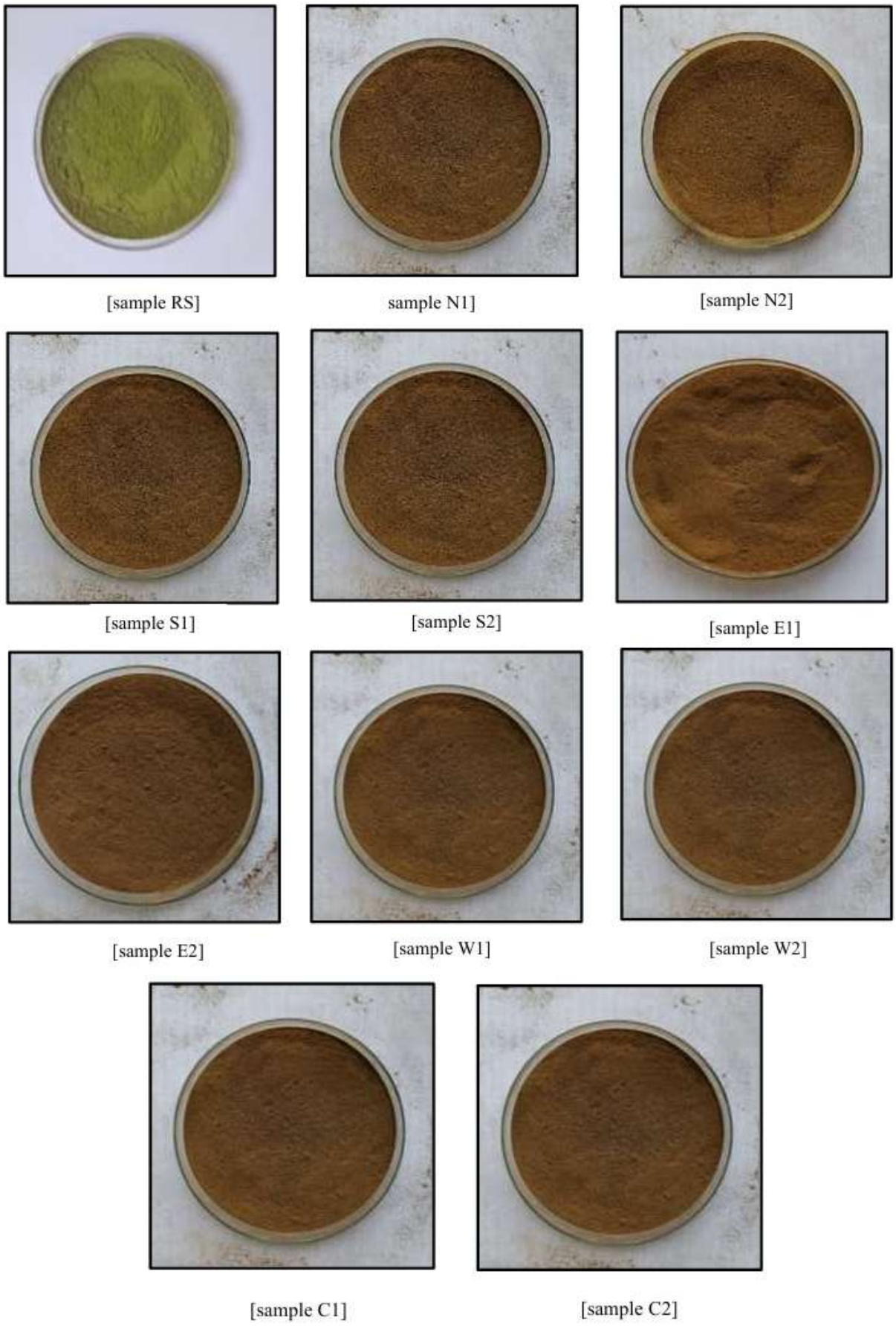
[sample RS*] [sample N1] [sample N2]

[sample S1] [sample S2] [sample E1]

[sample E2] [sample W1] [sample W2]

[sample. C1] [sample C2]

Plate No. 2: Photos of macroscopic features of various market samples of Talishpatra powder



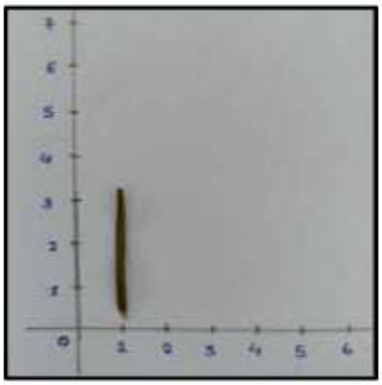
[sample RS] sample N1] [sample N2]

[sample S1] [sample S2] [sample E1]

[sample E2] [sample W1] [sample W2]

[sample C1] [sample C2]

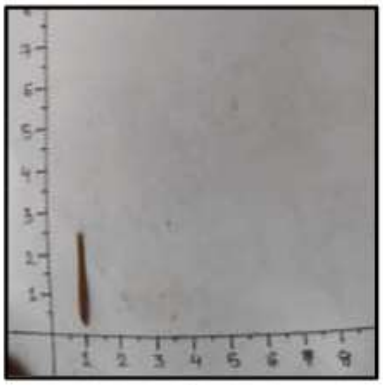
Plate No. 3: Photos of Macroscopic features of various samples of Talishpatra leaf



[sample RS]

[sample N1]

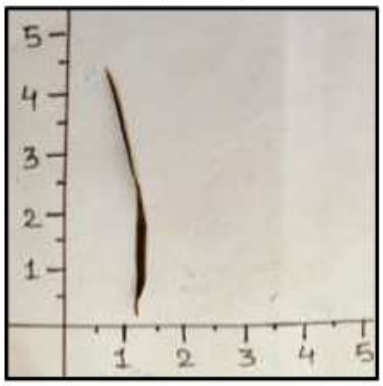
[sample N2]



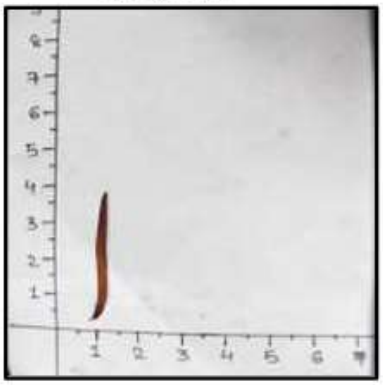
[sample S1]

[sample S2]

[sample E1]



[sample E2]



[sample W1]

[sample W2]

[sample C1]

[sample C2]

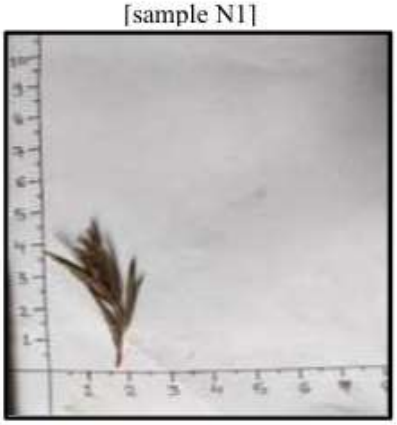
Plate No. 4: Photos of Macroscopic features of various market samples of Talishpatra branchlets

[sample RS]

[sample N1]

[sample N2]

[sample S1]



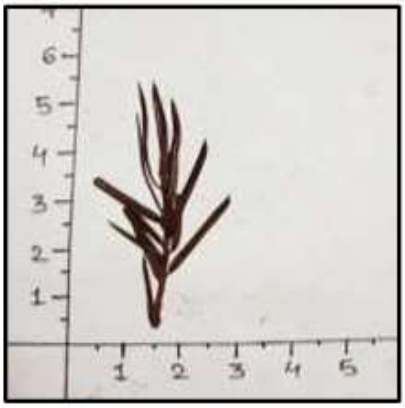
[sample S2]

[sample E1]

[sample E2]

[sample W1]

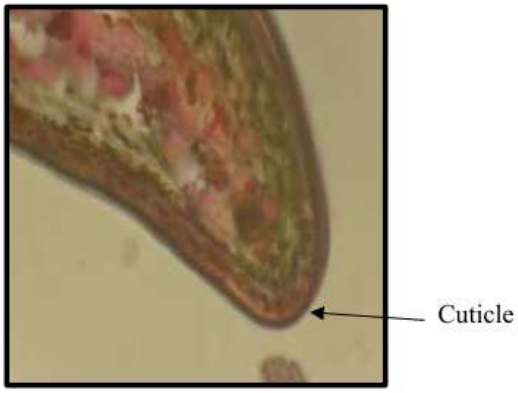
[sample W2]



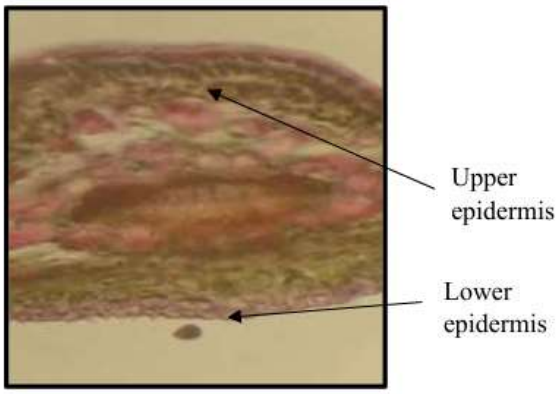
[sample C1]

[sample C2]

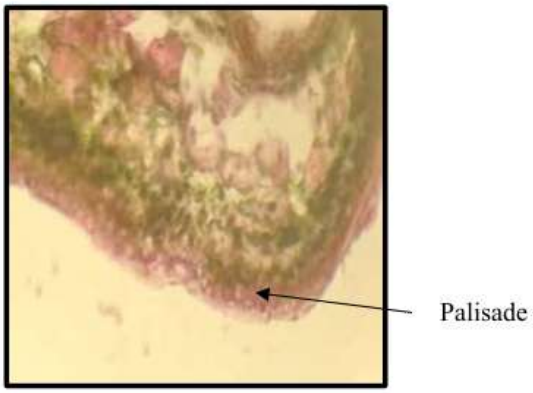
Plate No. 5: Images of Transverse Section of Talishpatra Leaf (Abies Spectabilis (D.Don) Mirb.)



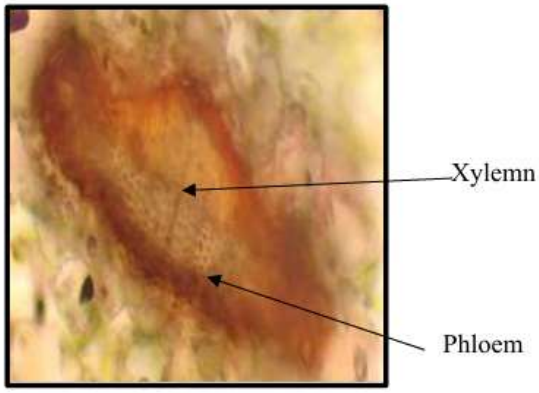
[Fig. 5 a]



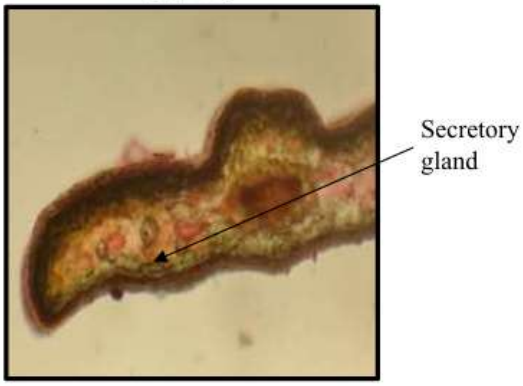
[Fig. 5 b]



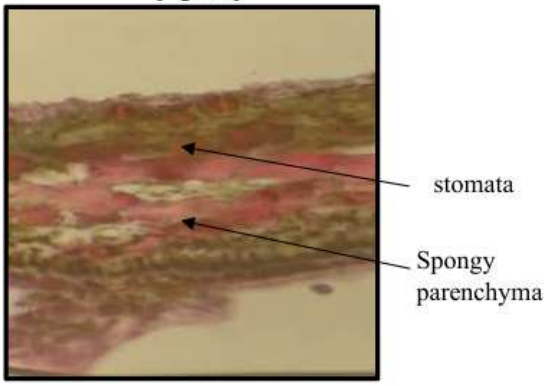
[Fig. 5 c]



[Fig. 5 d]

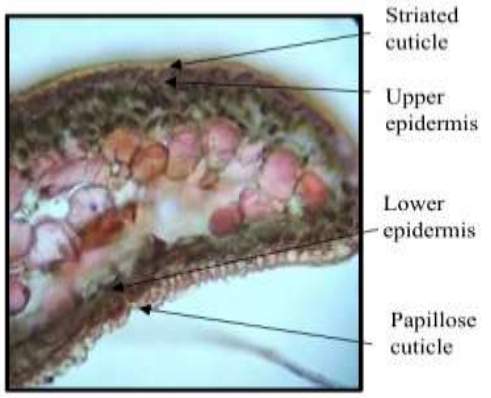


[Fig. 5 e]

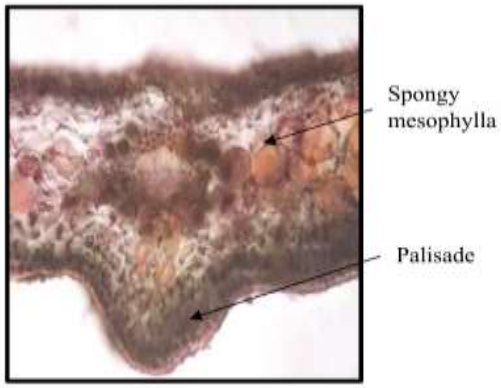


[Fig.5 f]

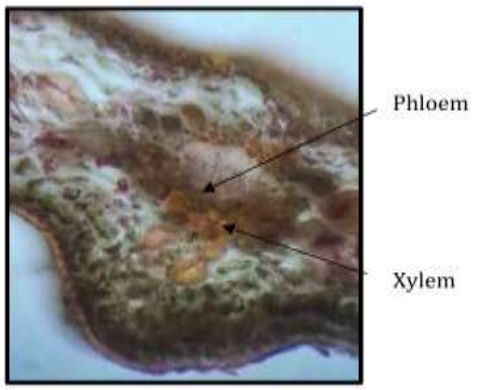
Plate No. 6: Images of Transverse section of Talishpatra Leaf N1 market sample



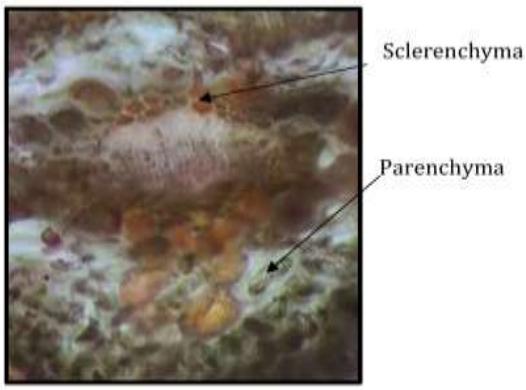
[Fig. 6 a]



[Fig. 6 b]

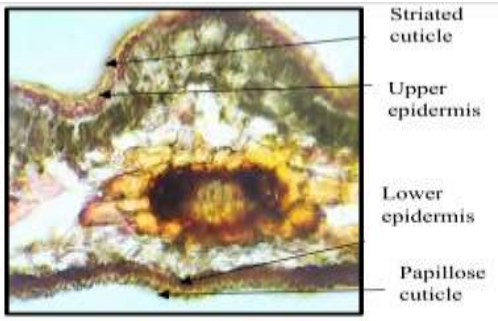


[Fig. 6 c]

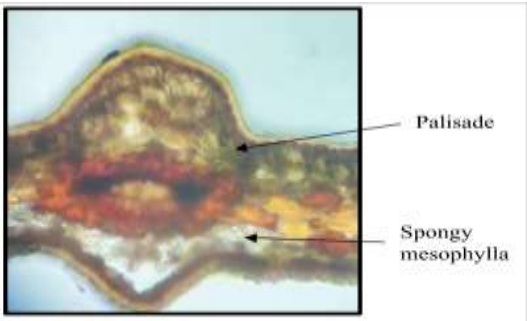


[Fig. 6 d]

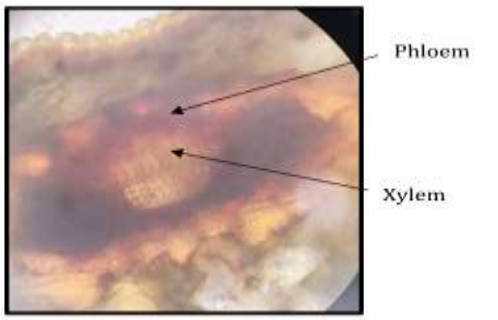
Plate No. 7: Images of Transverse Section of Talishpatra Leaf N2 market sample



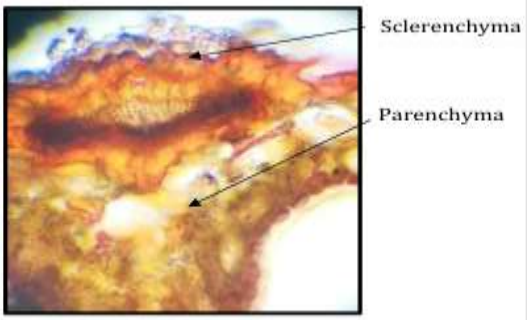
[Fig. 7 a]



[Fig. 7 b]

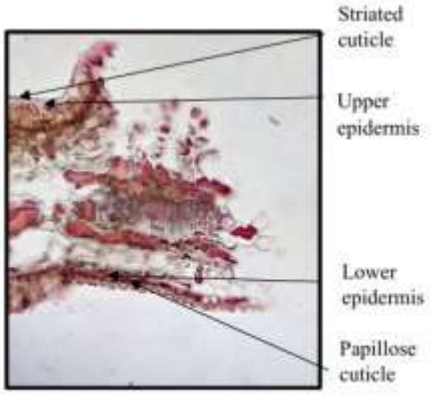


[Fig. 7 c]

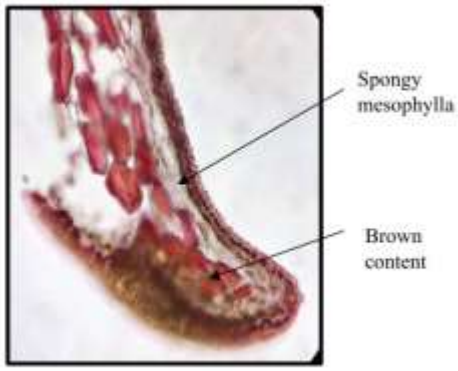


[Fig. 7 d]

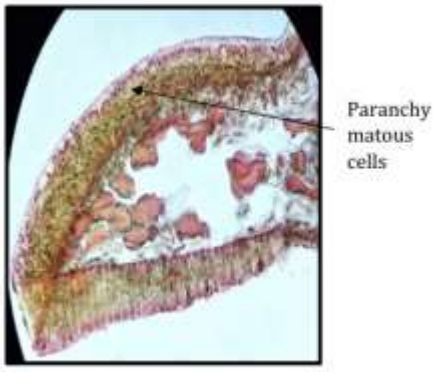
Plate No. 8: Images of Transverse Section of Talishpatra Leaf S1 market sample



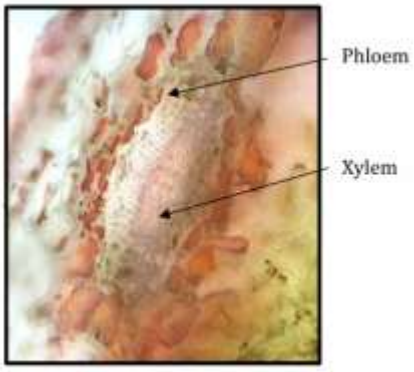
[Fig. 8 a]



[Fig. 8 b]

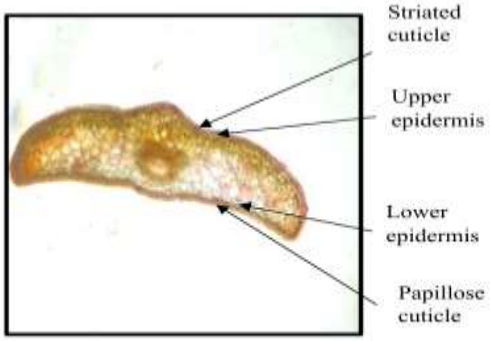


[Fig. 8 c]

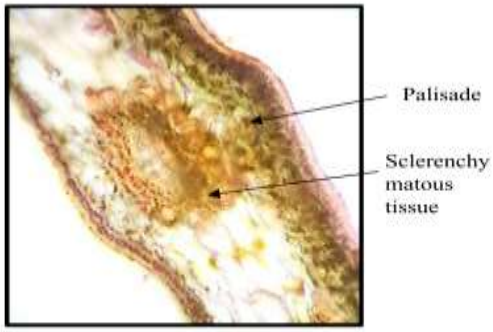


[Fig. 8 d]

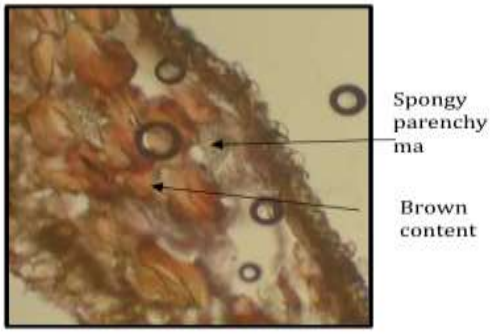
Plate No. 9: Images Transverse Section of Talishpatra Leaf S2 market sample



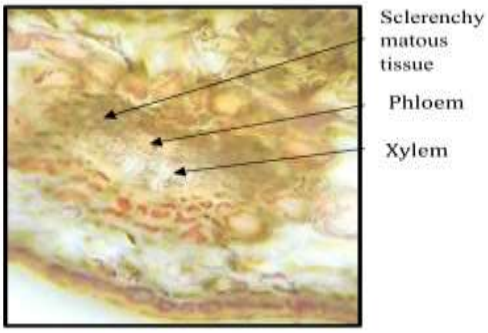
[Fig. 9 a]



[Fig. 9 b]

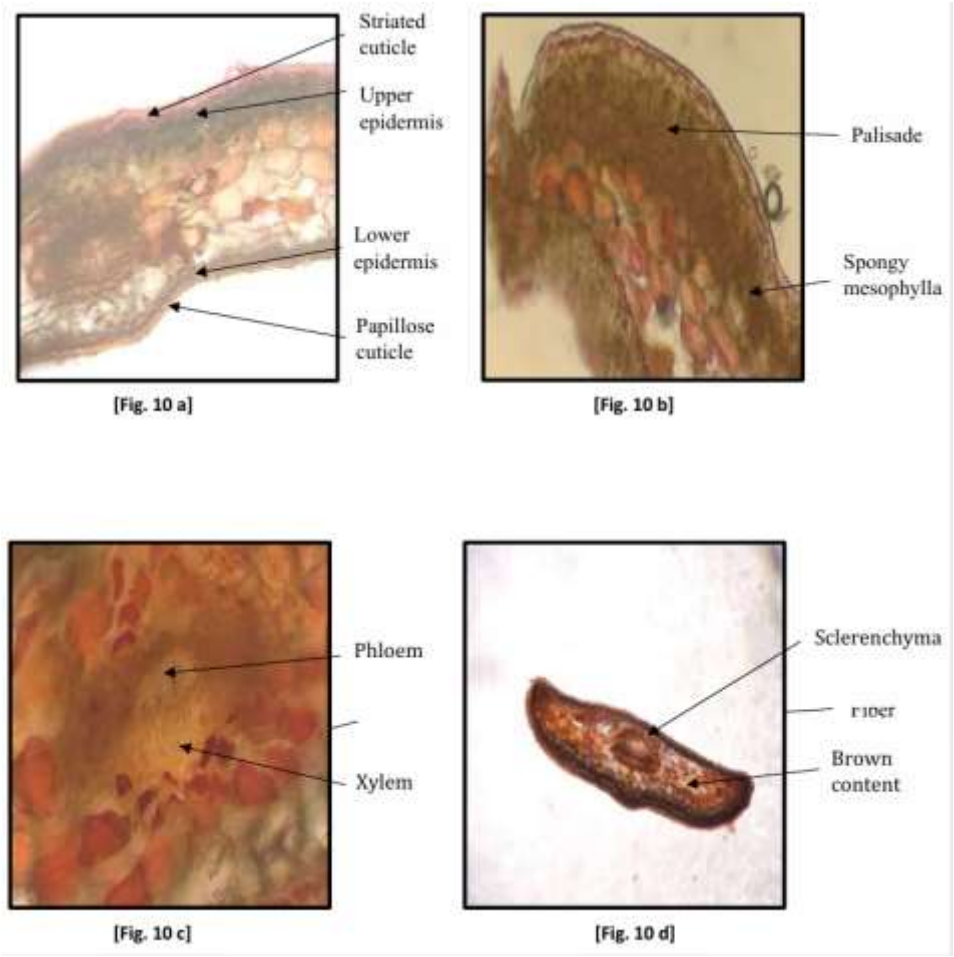


[Fig. 9 c]



[Fig. 9 d]

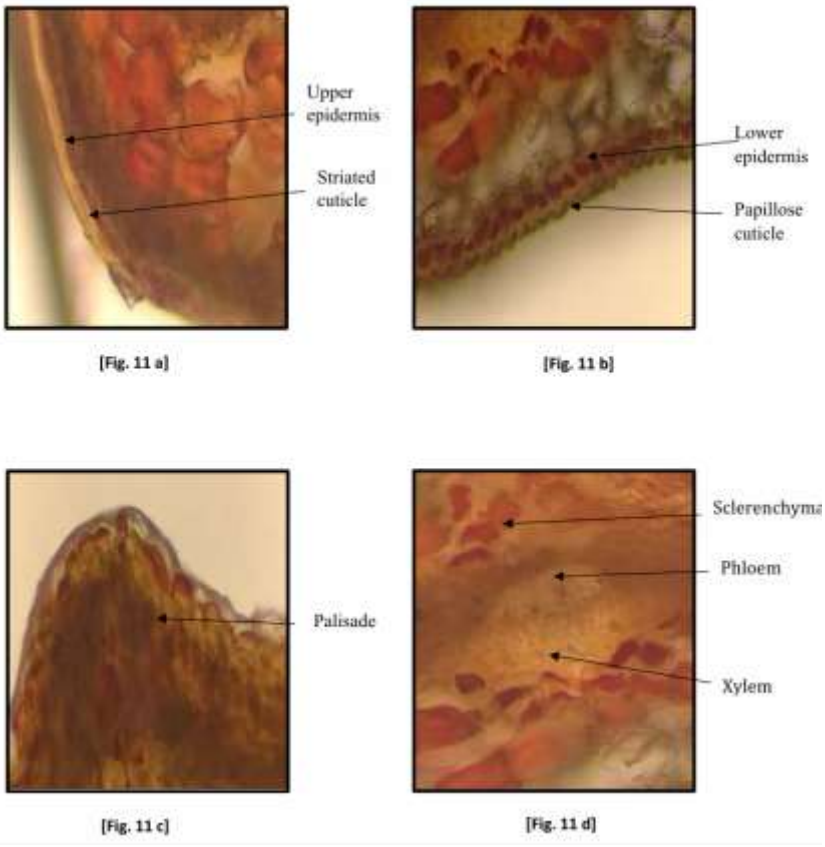
Plate No. 10: Images of Transverse Section of Talishpatra Leaf E1 market sample



[Fig. 10 a] [Fig. 10 b]

[Fig. 10 c] [Fig. 10 d]

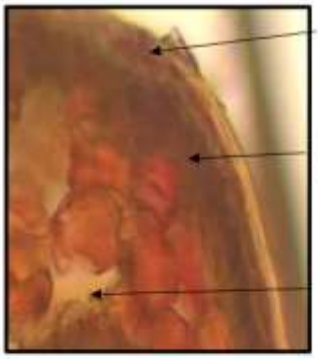
Plate No. 11: Images Transverse Section of Talishpatra Leaf E2 market sample



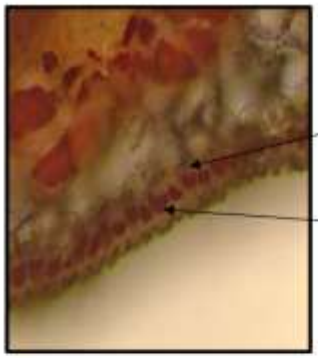
[Fig. 11 a] [Fig. 11 b]

[Fig. 11 c] [Fig. 11 d]

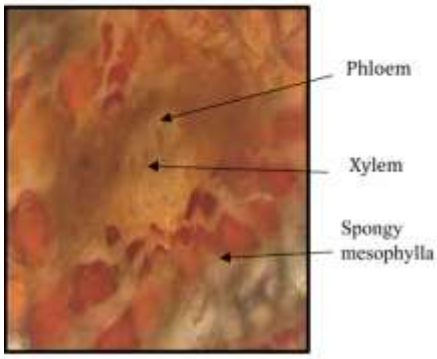
Plate No. 12: Images of Transverse Section of Talishpatra Leaf W1 market sample



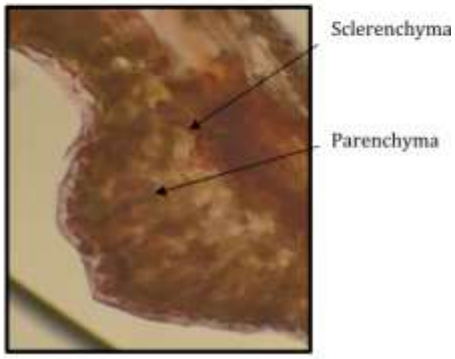
[Fig. 12 a]



[Fig. 12 b]

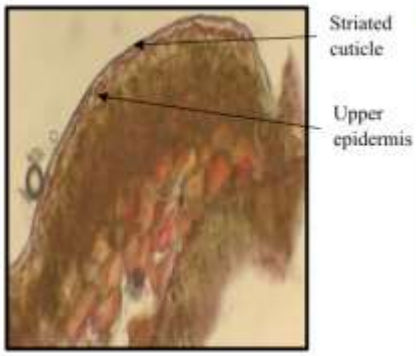


[Fig. 12 c]

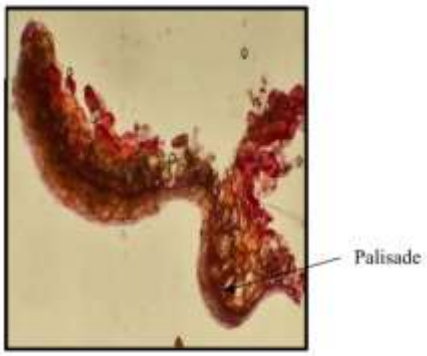


[Fig. 12 d]

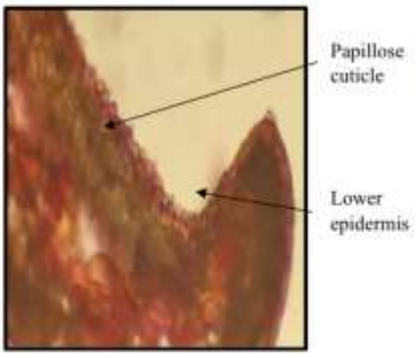
Plate No. 13: Images of Transverse Section of Talishpatra Leaf W2 market sample



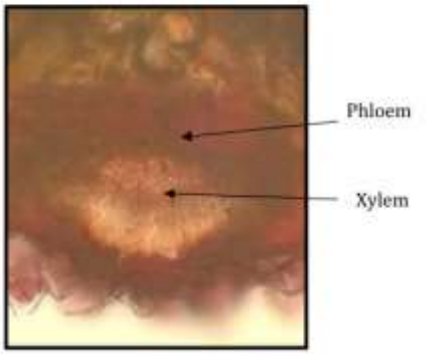
[Fig. 13 a]



[Fig. 13 b]

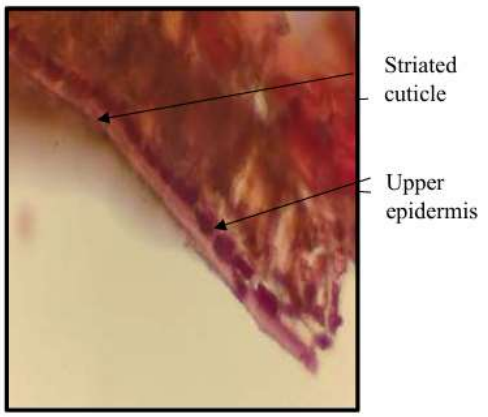


[Fig. 13 c]

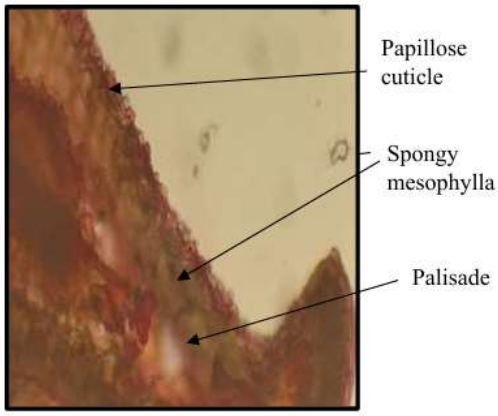


[Fig. 13 d]

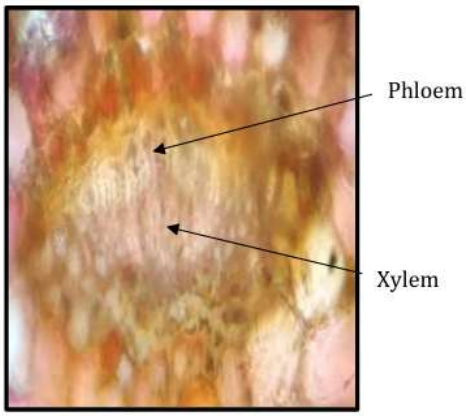
Plate No. 14: Images of Transverse Section of Talishpatra Leaf C1 market sample



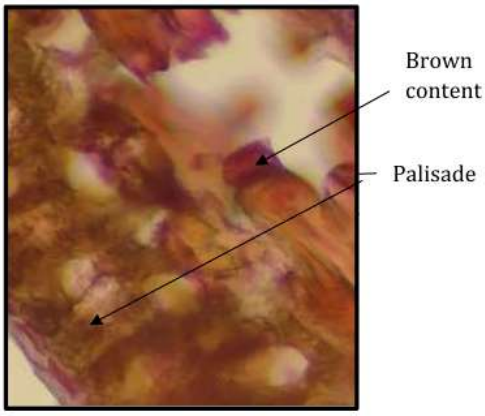
[Fig. 14 a]



[Fig. 14 b]

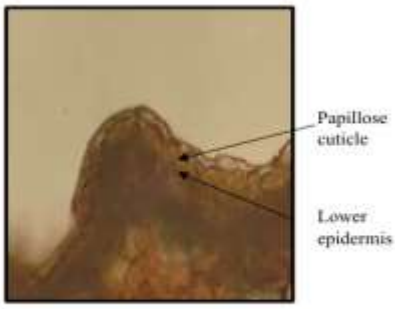


[Fig. 14 c]

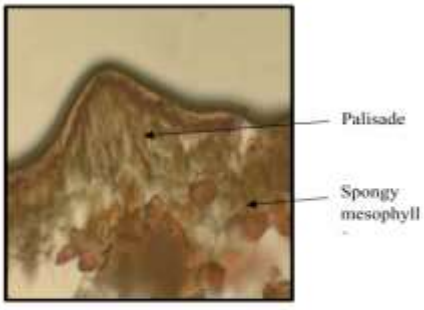


[Fig. 14 d]

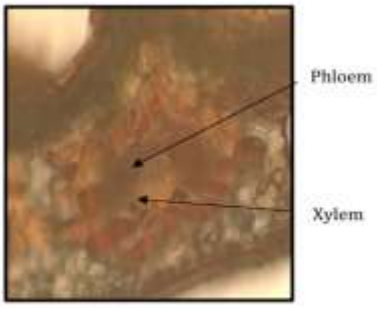
Plate No. 15: Images of Transverse Section of Talishpatra Leaf C2 market sample



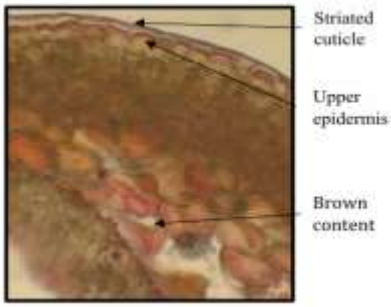
[Fig. 15 a]



[Fig. 15 b]

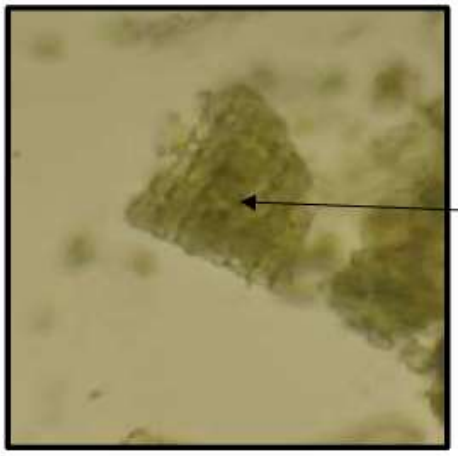


[Fig. 15 c]

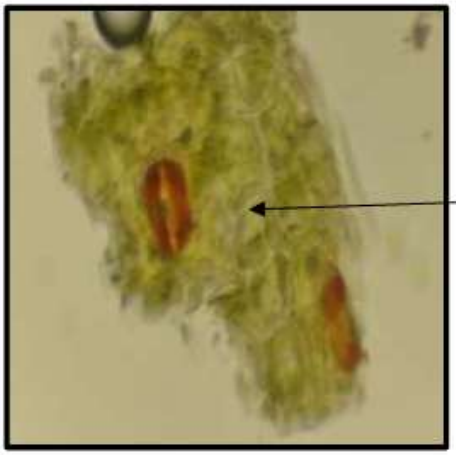


[Fig. 15 d]

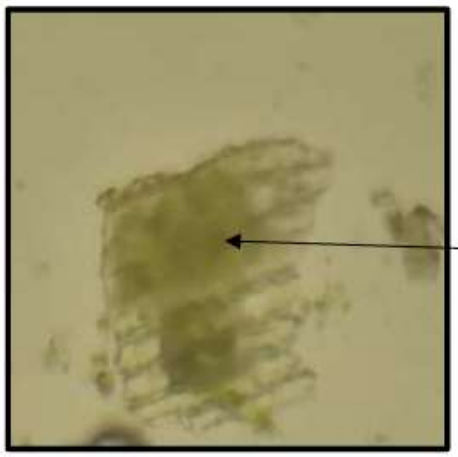
Plate No. 16: Images of powder microscopy of Talishpatra Leaf (Abies Spectabilis (D.Don) Mirb.)



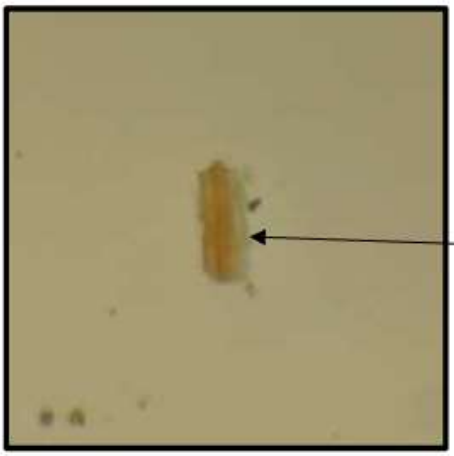
[Fig. 16 a]



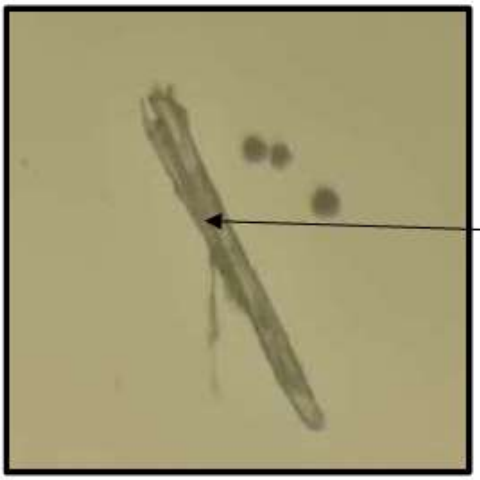
[Fig. 16 b]



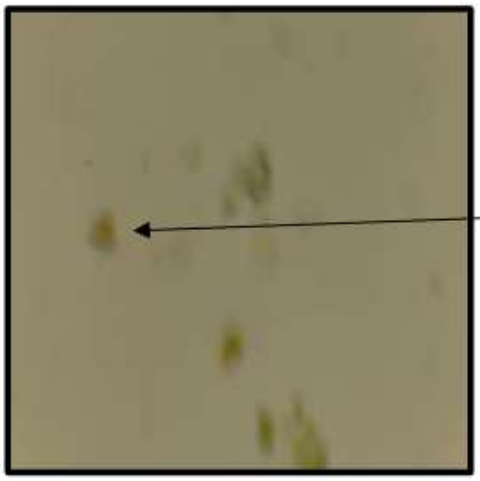
[Fig. 16 c]



[Fig. 16 d]

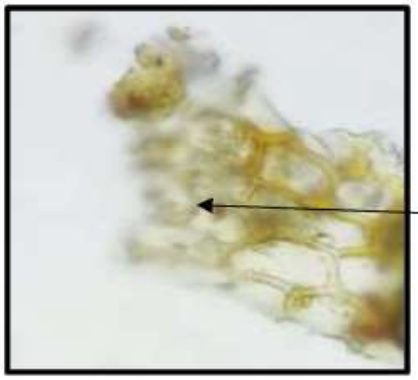


[Fig. 16 e]

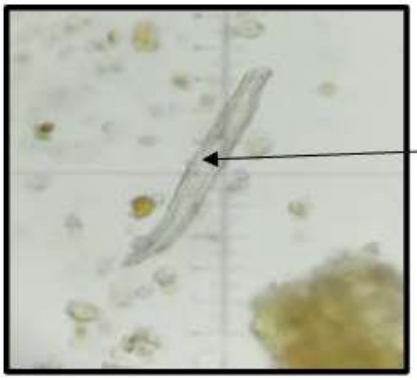


[Fig. 16 f]

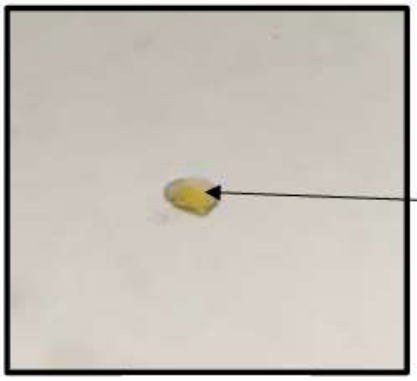
Plate No.17: Images of powder microscopy of Talishpatra Leaf N1 market sample



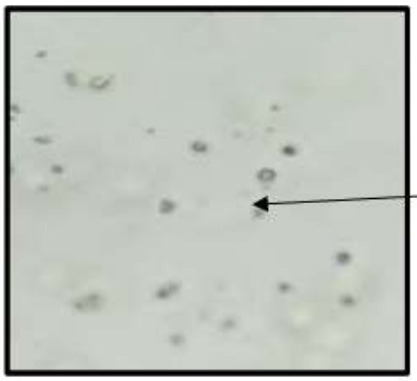
[Fig. 17 a]



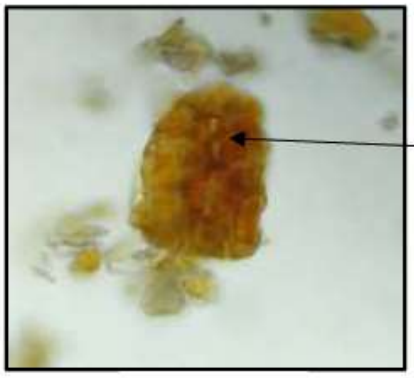
[Fig. 17 b]



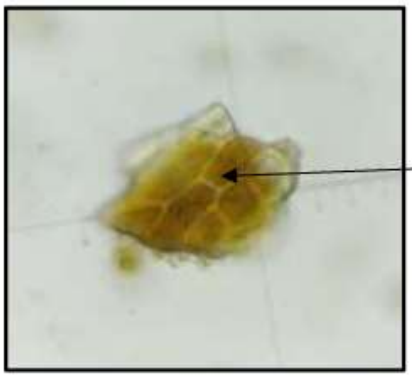
[Fig. 17 c]



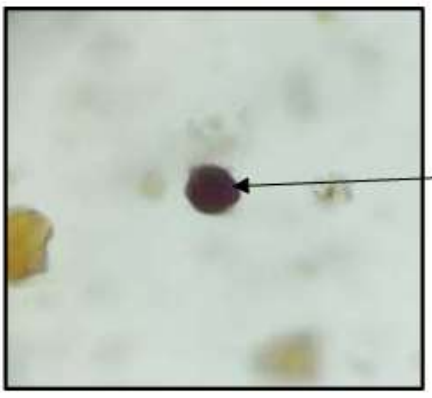
[Fig. 17 d]



[Fig. 17 e]



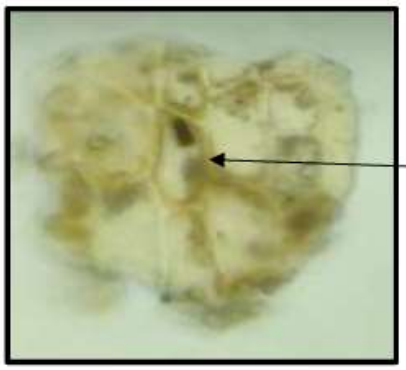
[Fig. 17 f]



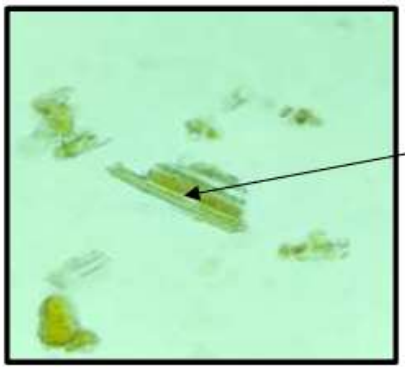
[Fig. 17 g]

[Fig. 17 h]

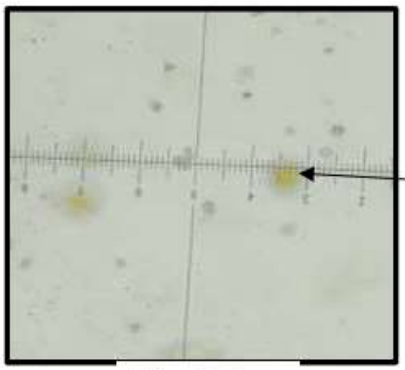
Plate No.18: Photos of powder microscopy of Talishpatra Leaf N2 market sample



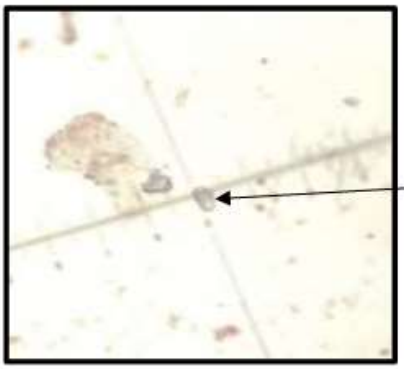
[Fig. 18 a]



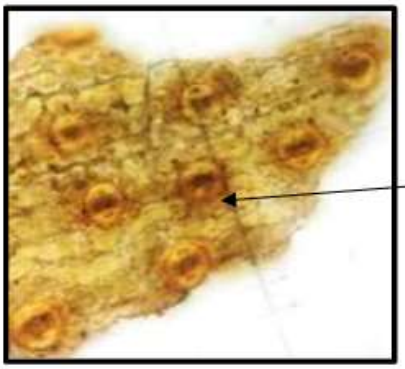
[Fig. 18 b]



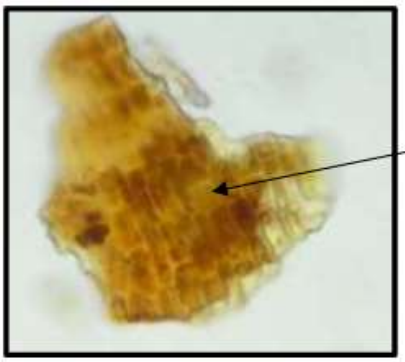
[Fig. 18 c]



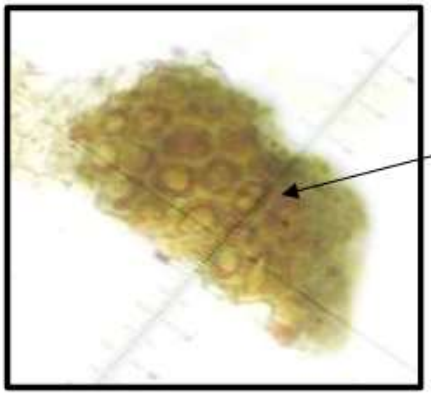
[Fig. 18 d]



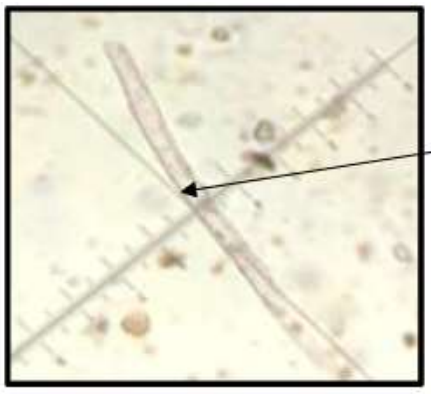
[Fig. 18 e]



[Fig. 18 f]

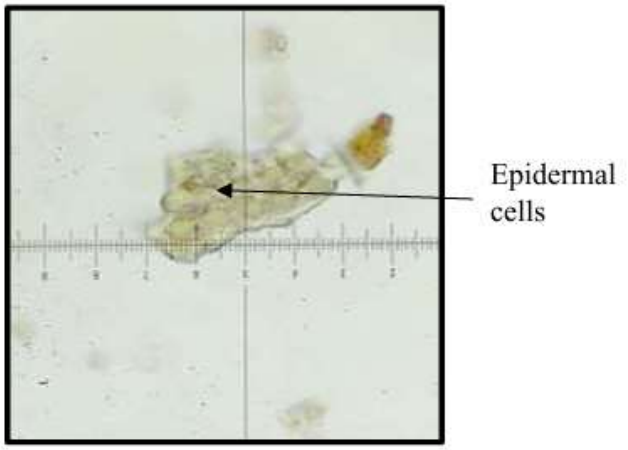


[Fig. 18 g]

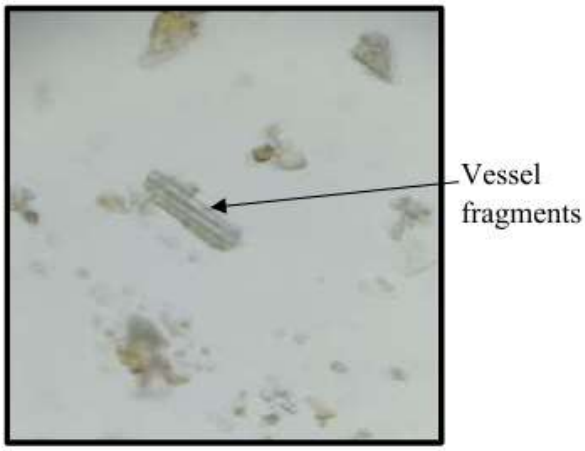


[Fig. 18 h]

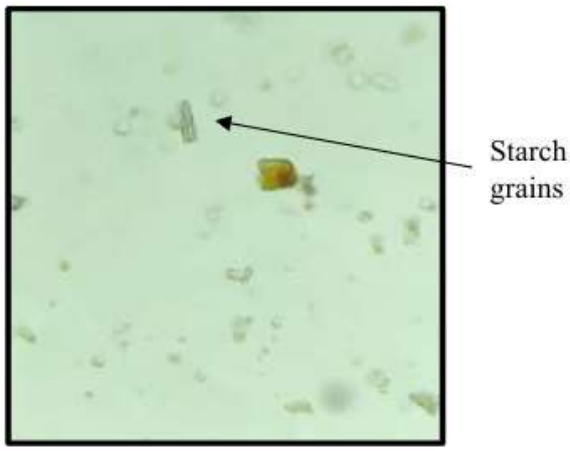
Plate No.19: Images of powder microscopy of Talishpatra Leaf S1 market sample



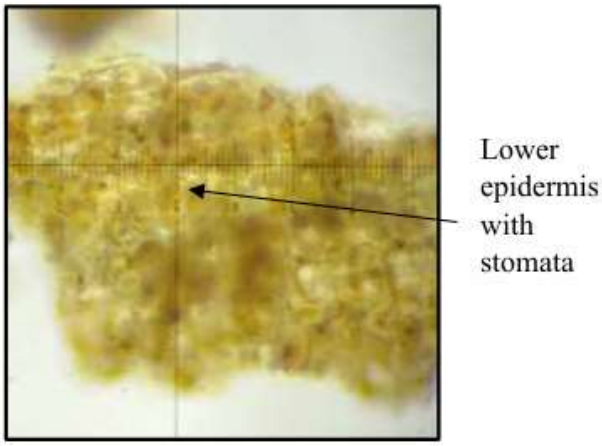
[Fig. 19 a]



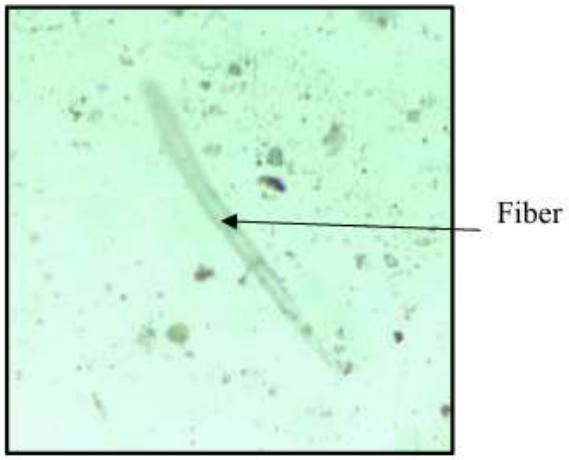
[Fig. 19 b]



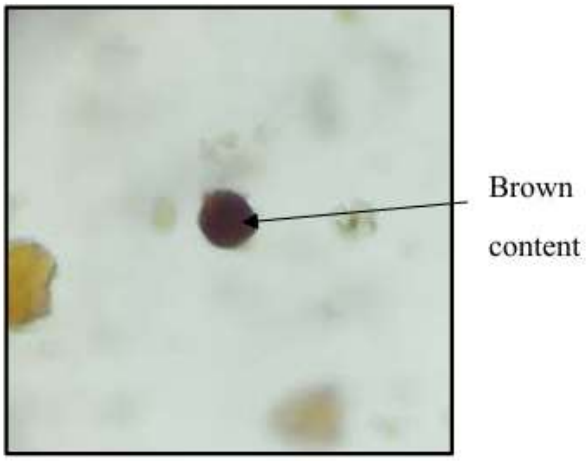
[Fig. 19 c]



[Fig. 19 d]

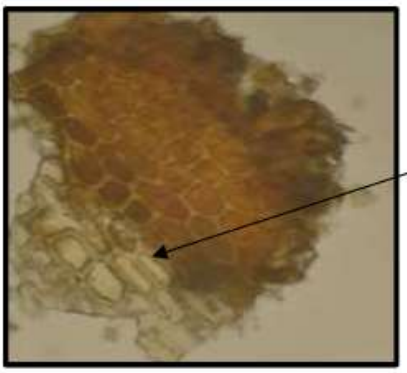


[Fig. 19 e]

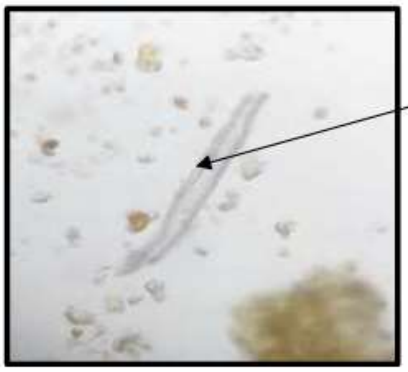


[Fig. 19 f]

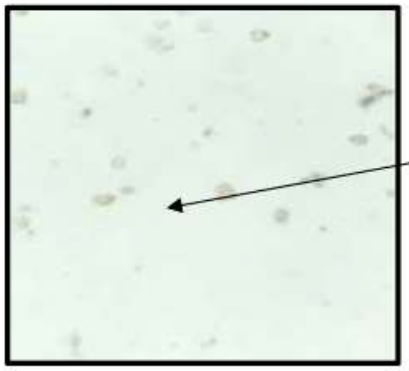
Plate No.20: Images of powder microscopy of Talishpatra S2 market sample



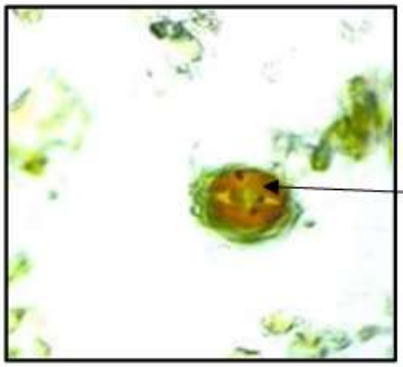
[Fig. 20 a]



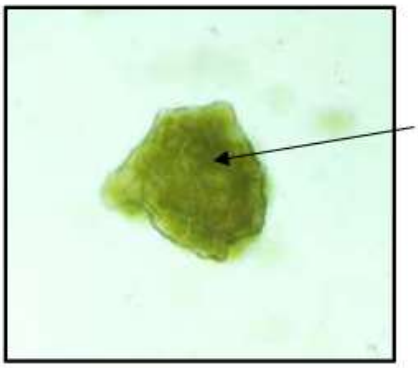
[Fig. 20 b]



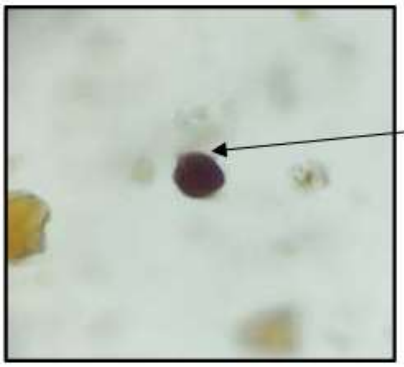
[Fig. 20 c]



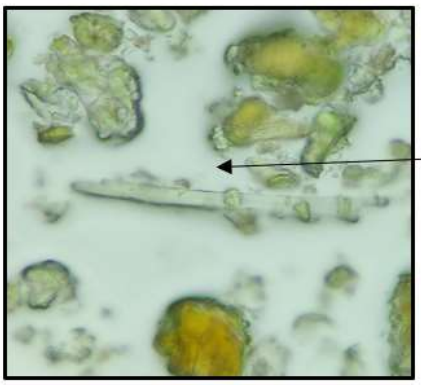
[Fig. 20 d]



[Fig. 20 e]

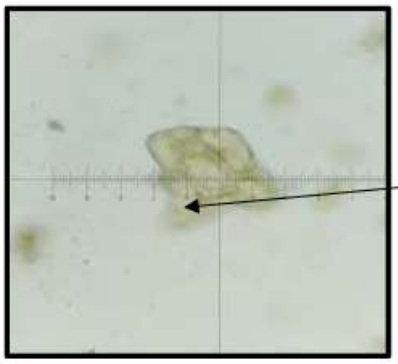


[Fig. 20 f]

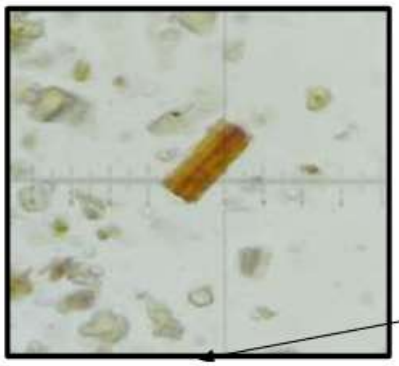


[Fig. 20 g]

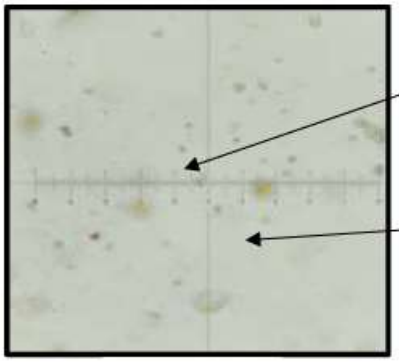
Plate No.21: Images of powder microscopy of Talishpatra Leaf E1 market sample



[Fig. 21 a]

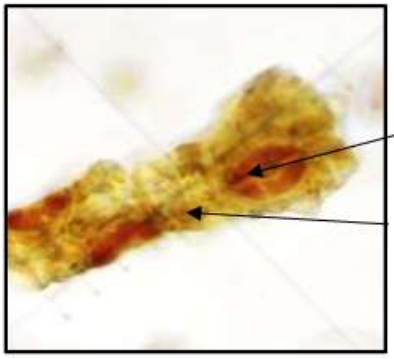


[Fig. 21 b]

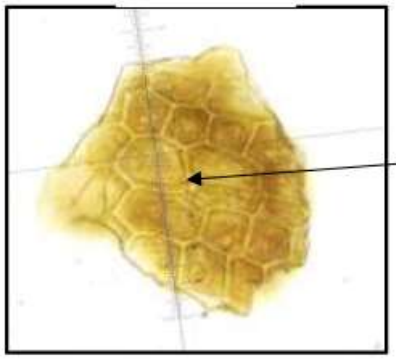


[Fig. 21 c]

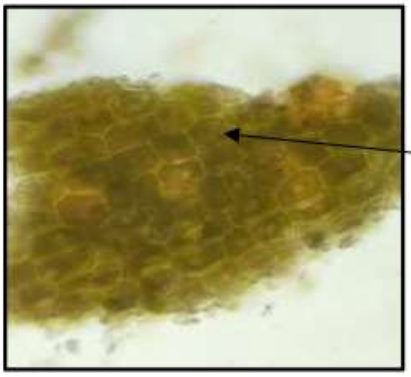
[Fig. 21 d]



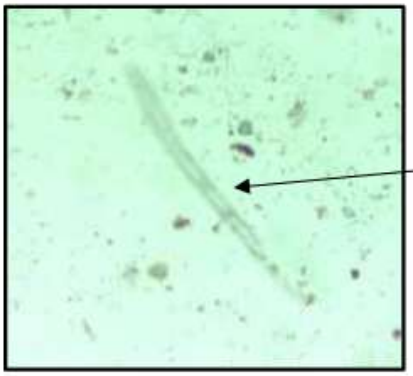
[Fig. 21 e]



[Fig. 21 f]

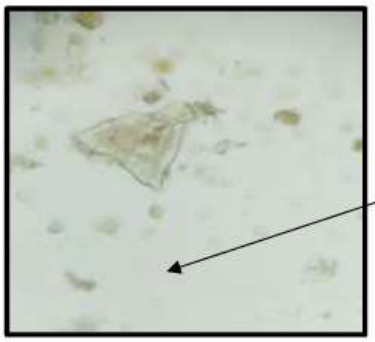


[Fig. 21 g]

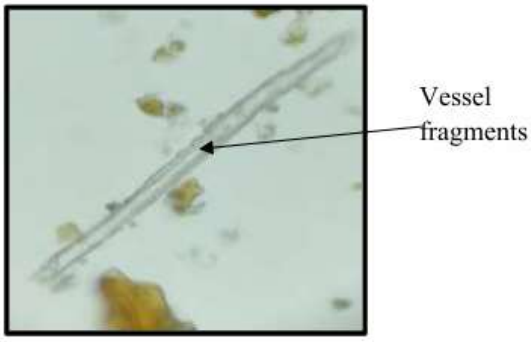


[Fig. 21 h]

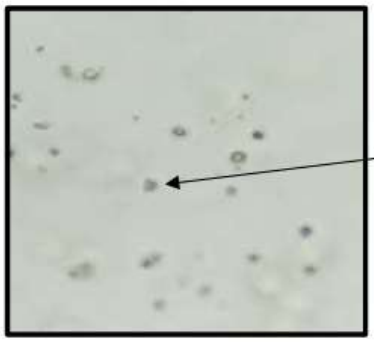
Plate No.22: Images of powder microscopy of Talishpatra Leaf E2 market sample



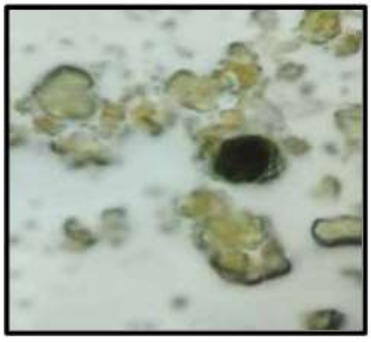
[Fig. 22 a]



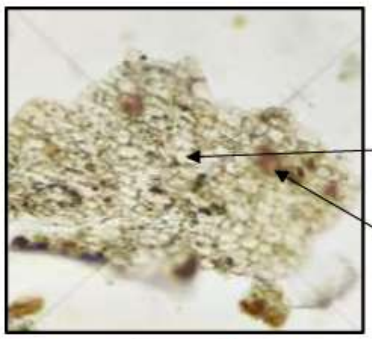
[Fig. 22 b]



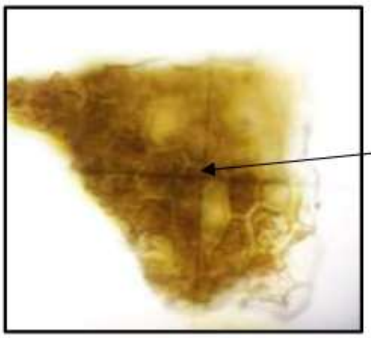
[Fig. 22 c]



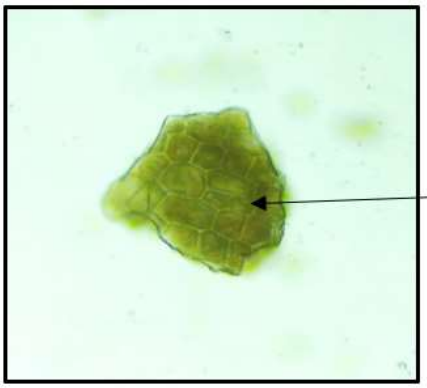
[Fig. 22 d]



[Fig. 22 e]



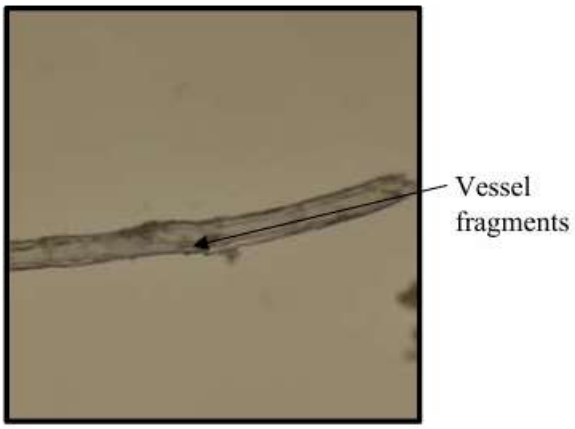
[Fig. 22 f]



[Fig. 22 h]

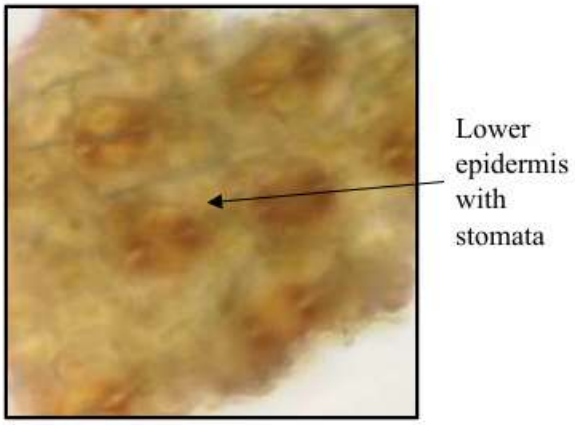
Plate No.23: Images of powder microscopy of Talishpatra W1 market sample

[Fig.23 a]

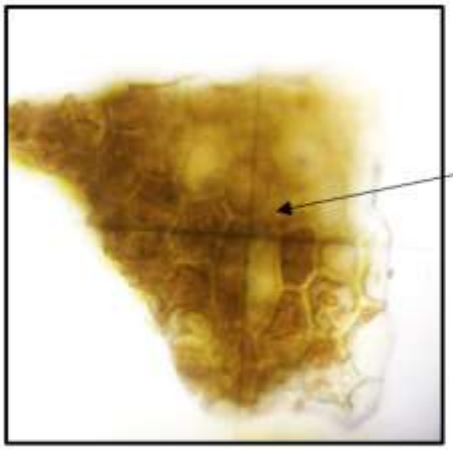


[Fig. 23 b]

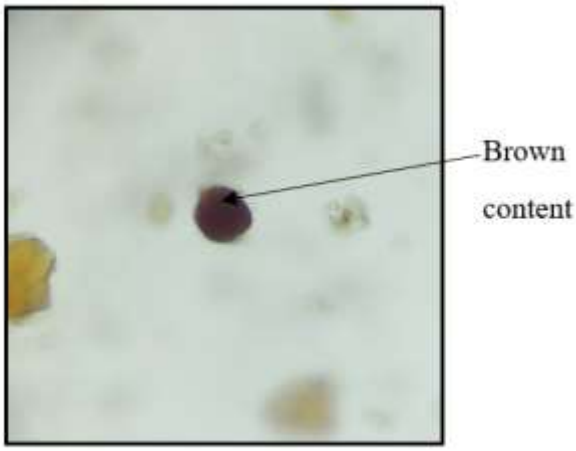
[Fig. 23 c]



[Fig.23 d]

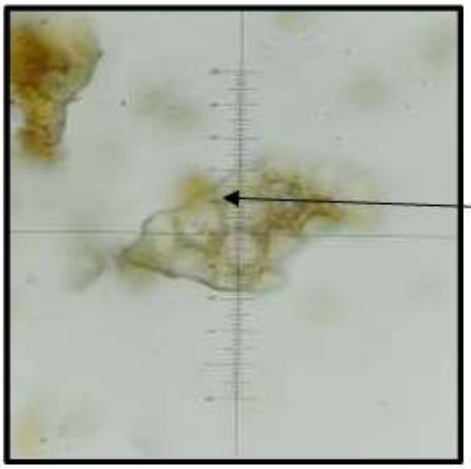


[Fig. 23 e]



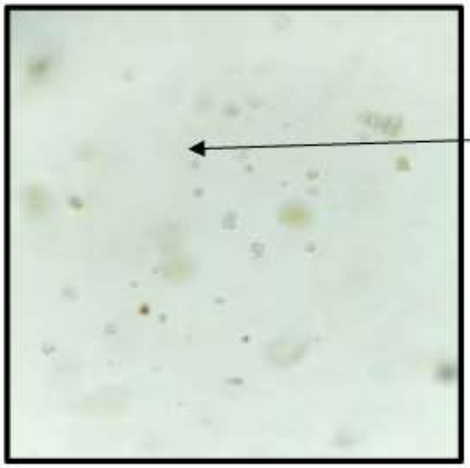
[Fig. 23 f]

Plate No.24: Images of powder microscopy of Talishpatra W2 market sample



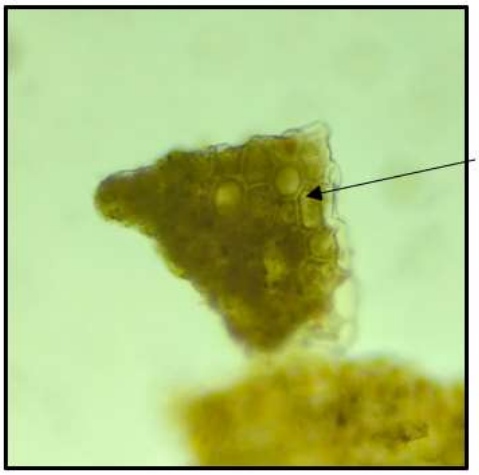
[Fig. 24 a]

[Fig. 24 b]



[Fig. 24 c]

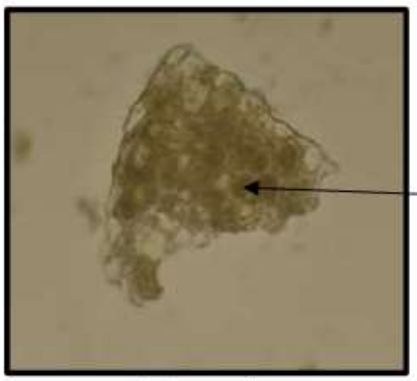
[Fig. 24 d]



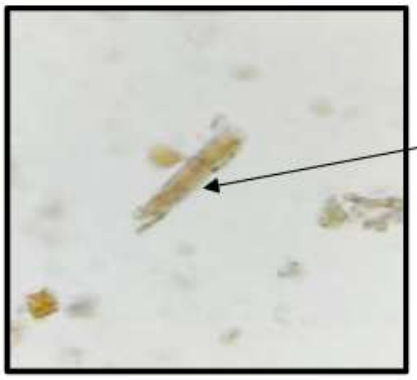
[Fig. 24 e]

[Fig. 24 f]

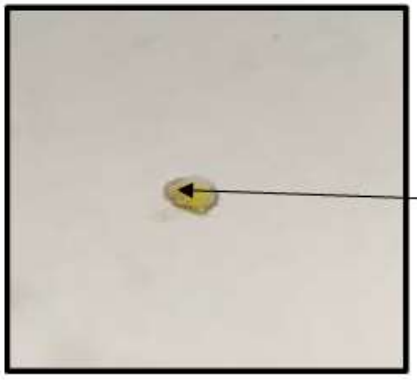
Plate No.25: Images of powder microscopy of Talishpatra Leaf C1 market sample



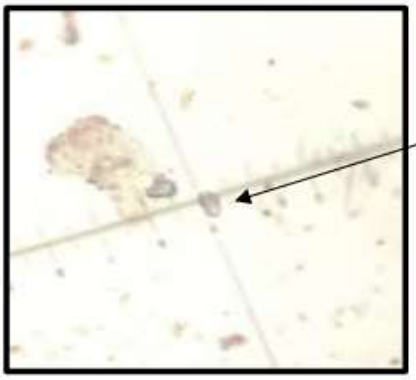
[Fig. 25 a]



[Fig. 25 b]

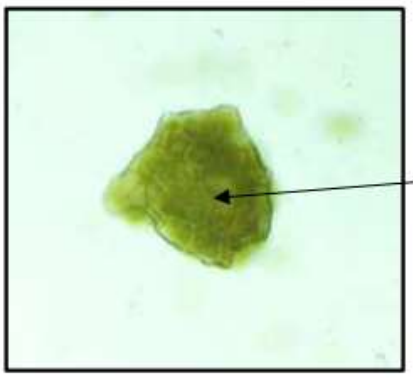


[Fig. 25 c]

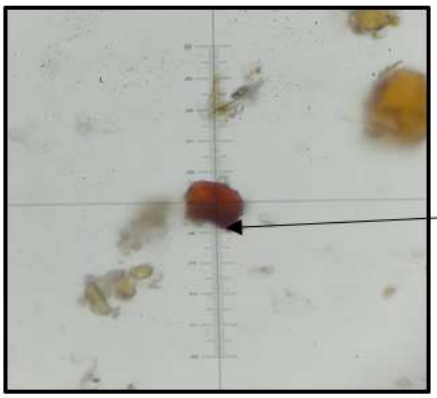


[Fig. 25 d]

[Fig. 25 e]



[Fig. 25 f]



[Fig. 25 g]

REFERENCES

1. Anonymous**,** The Ayurvedic Pharmacopoeia of India, part 1, Vol. 4 1st Edition, 2008, GOI, Ministry of health and family welfare, Dept. of AYUSH, New Delhi, p. 126.
2. Anonymous**,** The Ayurvedic Pharmacopoeia of India, part 1, Vol. 4 1st Edition, 2008, GOI, Ministry of health and family welfare, Dept. of AYUSH, New Delhi, p. 126.