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COMPARATIVE PHARMACOGNOSTIC EVALUATION OF MARKET SAMPLES OF *PRSNIPARNI* WITH GENUINE SOURCE OF *URARIA PICTA* (JACQ) DESV EX DC

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ABSTRACT

The medicinal plants and its active principles are playing a dominant role in the maintenance of human health since ancient times. The degree of threat to natural population of medicinal plants has increased, because more than 90% of medicinal plant raw material for herbal industries in India draw from natural habitat In ayurvedic medicine Dasamula plants are top traded group and their annual demand is more than1000 Metric tons, Prsniparni moola is one among the Dasamula, The degree of threat to natural population of medicinal plants has increased, because more than 90% of medicinal plant raw material for herbal industries in India draws from natural habitat, this demand is not often met with supply of original raw drugs alone and is topped up with other species of plants that are substitutes or adulterants. This directly affects the quality and efficacy of the herbal products and the same has reflected in case of Uraria picta. Over usage, destructive harvesting and lack of cultivation have reduced the availability of Uraria picta. Inorder to characterize and compare the raw drugs used as prsniparni in market, the candidate species traded under the name Prsniparni were subjected to macroscopic and organoleptic evaluation, microscopic study, Physical and Phytochemical evaluation.

INTRODUCTION

The medicinal plants and its active principles are playing a dominant role in the maintenance of human health since ancient timesThe annual demand of botanical raw drugs in India was estimated to be 3,19,500 Metric tons during the year 2005-2006 amounting trade value of Rs. 1,069 crores.[1] The degree of threat to natural population of medicinal plants has increased, because more than 90% of medicinal plant raw material for herbal industries in India draw from natural habitat. This demand is not often met with supply of original raw drugs alone and is topped up with other species of plants that are substitutes or adulterants. As a result, the quality of herbal products becomes compromised. Natural sources of medicinal plants are often unable to meet demand for herbal products. Because of the exceptional growth in demand of herbal drugs, the required medicinal plants are randomly over exploited leading to scarcity or shortage of many valuable plant species. In India more than 90% plant species used by industry are collected from wild and over 60% of the collection involve destructive harvesting. According to an estimate over half a million tonnes of raw materials are indiscriminately collected from wild, mostly following destructive harvesting procedure and thus about 165,700 hectares forest being clear-felled each year. Hence alarming situations have resulted into short supply, high prices, forced import, or substitution and adulteration in crude drugs[2] The reference of *pratinidhi dravya* is not seen in *Brihatrayi* except *Vagbhata* in *Shodhanadi gana sangraha* and other references are in *Bhavaprakasha Nighantu*, *Yogaratnakara* and *Bhaishajyaratnavali* but for scientists in contemporary times the substitution seems non-scientific and inappropriate, raising questions about validity of their use in treatment[3]. In ayurvedic

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medicine *Dasamula* plants are top traded group and their annual demand is more than1000 Metric tons, *Prsniparni moola* is one among the *Dasamula, Uraria picta* is the original *Prsniparni* source while in trade or use *Uraria lagopodioides* (L.) DC, *Desmodium gangeticum* (L) DC, *Pseudarthria viscida* (L) Wight & Arn are observed. *Prsniparni* is one of the most widely used herbs in Ayurvedic pharmaceutical industry where roots are mentioned in various formulations which results in destructive form of harvesting, so inorder to meet the high demand the drug is overexploited and also adultered and substituted with other drugs. Inorder to characterize and compare the raw drugs used as *prsniparni* in market, the candidate species traded under the name *Prsniparni* were subjected to macroscopic and organoleptic evaluation, microscopic study, Physical and phytochemical evaluation and High-performance thin layer chromatography (HPTLC)

MATERIALS AND METHOD

The present study was carried out under- the following headings:

- Collection of drugs
- Macroscopic study and organoleptic study
- Microscopic study (powder microscopy)
- Physico-chemical evaluation
- Phytochemical evaluation

Collection of drugs: Samples were collected from market and pharmacies of different parts of the country and were coded as:

Table: 1 Collection of Sample

Sample	States
1.	Himachal Pradesh
2.	Maharashtra
3.	Karnataka
4.	Tamil Nadu
5.	Kerala

Place of study**:** Physico-Chemical and Phyto chemical were carried out in department of *Dravyaguna*, Sri Dharmasthala Manjunatheshwara College of Ayurveda and Hospital Hassan. Microscopy was carried out at Foundation for Revitalisation of Local health Traditions (FRLHT) Bangalore and High-performance thin layer chromatography (HPTLC) was done from Sri Dharmasthala Manjunatheshwara Research Centre for Ayurveda and Allied Science, Udupi.

Table: 2 Macroscopic study of Market Samples

Features	Sample 1	Sample 2	Sample 3	Sample 4	Sample 5
Texture	Smooth	Smooth	Smooth	Smooth	Smooth
Shape	Cylindrical	Cylindrical and twisted	Cylindrical and tortuous	Cylindrical and elongated	Cylindrical and elongated
Surface	Rough with longitudinal striations	Rough	Smooth	Rough	Rough
Shape	Elongated	Cylindric	Cylindrical elongated	Cylindrical	Cylindrical
Colour	Light yellow	Light brown	Dark brown	Dark brown,	Dark brown
Odour	Characteristic herbaceous	Characteristic	Saw dust odour	Agreeable	Agreeable
Fracture	Fibrous	Flexible	Brittle	Fibrous	Fibrous
Fracture surface	Pale yellowish	Creamish	Creamish	Light brown	Light brown
Taste	Slight acrid	Slight sweetness	Bitter	Slight sweet	Slight sweet

S 1-Himachal, S 2-Maharashtra, S 3-Karnataka, S 4-TamilNadu, S 5-Kerala

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Table: 3 Microscopic findings of Market samples

Features	Sample 1	Sample 2	Sample 3	Sample 4	Sample 5
Cork cells	Present	Present	Present	Present	Present
Sclereids	Columnar	Columnar and rounded	Columnar, small, Thin walled	Thick walled	Thick walled
Starch grains	Simple	Simple rounded	Simple rounded	Simple rounded	Simple rounded
Scalariform vessels		Long, broad and pitted	Pitted and spiral	Spiral	Spiral

S 1-Himachal, S 2-Maharashtra, S 3-Karnataka, S 4-TamilNadu, S 5-Kerala

Table: 4 Powder Microscopy

Features	Sample 1	Sample 2	Sample 3	Sample 4	Sample 5
Cork	Stratified		Filled with tannin content		Thin walled Stratified
Cortex	Uniform	Thin walled	Thin walled	Thin-walled rectangular shape	Thin walled tangentially arranged
Pericycle		Present, discontinuous fibres	Present with narrow lumen	Present as discontinuous rings	Present with narrow lumen
Secondary phloem	Secondary phloem outside secondary xylem	Thin walled Compactly arranged	Thin walled compactly arranged		Thick walled
Secondary xylem	Ring porous	Simple pitted scalariform	Simple and compound pitted, scalariform	Simple, pitted, round to oval shape	Simple pits
Xylem fibres	Concentric bands	Thick walled with narrow lumen, blunt tips	Thick walled with narrow lumen	Narrow lumen	
Xylem rays	1-3 cell thick with phenols	1-3 cells wide	1-2 cells with abundant starch grains	1-4 cells with calcium oxalate crystals	Isodiametric showing simple pits
Pith	Absent	Present Thin walled	Present thin walled	Present Parenchymatous cells	Present Parenchymatous cells

S 1-Himachal, S 2-Maharashtra, S 3-Karnataka, S 4-TamilNadu, S 5-Kerala

Table: 5 Physicochemical evaluations

SI NO	Physicochemical study	API	S 1	S 2	S 3	S 4	S 5
1.	**Foreign Matter**	**Not more than 2%**	**1.5%**	**1%**	**1.8%**	**2%**	**2.5%**
2.	**Loss on drying**		**8.4%**	**15%**	**6.24%**	**8.9%**	**7.7%**
3.	**Total ash value**	**Not more than 11%**	**6%**	**2.8%**	**19.6%**	**9%**	**6.94%**
4.	**Acid insoluble ash**	**Not more than 4%**	**2%**	**.90%**	**4.5%**	**3.94%**	**2.33%**
5.	**Water extractive value**	**Not less than 8%**	**18.83%**	**22.90%**	**7.94%**	**7.4%**	**16.42%**
6.	**Alcohol extractive value**	**Not less than 7%**	**7%**	**4%**	**3.89%**	**3.37%**	**2.93%**

S 1- Himachal, S 2- Maharashtra, S 3- Karnataka, S 4- Tamil Nadu, S 5- Kerala

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Table: 6 Phytochemical evaluation:

SI NO	Test For	Test	Extract used	S 1	S 2	S 3	S 4	S 5
1.	Carbohydrates	Fehling's test	Water	+	+	+	+	+
			Alcohol	+	+	-	+	-
		Benedict Test	Water	+	+	-	+	+
			Alcohol	+	+	-	-	-
2.	Alkaloids	Dragendroff's Test	Water	-	-	-	-	-
			Alcohol	+	-	-	-	+
		Wagner's Test	Water	-	-	-	-	-
			Alcohol	+	-	-	+	+
		Mayer's Test	Water	-	-	-	-	-
			Alcohol	+	-	-	+	+
3.	Tannins	Ferric chloride Test	Water	-	+	-	-	+
			Alcohol	+	+	-	+	+
		Lead acetate	Water	-	-	-	-	+
			Alcohol	+	-	-	+	+
4.	Flavonoid	Lead acetate	Water	+	+	-	+	+
			Alcohol	+	+	+	+	+
5.	Glycosides	Cardiac glycosides	Water	+	+	-	+	+
			Alcohol	+	-	+	+	+
6.	Steroids	Salkawski reaction	Water	+	+	-	+	+
			Alcohol	+	+	-	+	+
7.	Phenols		Water	+	-	-	-	-
			Alcohol	+	-	-	-	-
8.	Coumarins		Water	-	-	-	-	-
			Alcohol	-	-	-	-	-
9.	Triterpenoids		Water	+	+	-	-	-
			Alcohol	+	+	-	-	-
10.	Carboxylic acid		Water	-	-	-	-	-
			Alcohol	-	-	-	-	-
11.	Saponins		Water	+	+	-	+	+
			Alcohol	+	+	+	+	+
12.	Quinones		Water	-	+	-	-	-
			Alcohol	-	+	-	-	-

S 1-Himachal, S 2-Maharashtra, S 3-Karnataka, S 4-TamilNadu, S 5-Kerala

OBSERVATION

As per section 9 A of the drug and cosmetic act, 1940 defines an adultered drug as the one containing any harmful or toxic substance which may be injurious to health; or if any substance has been mixed with it so as to reduce its quality or strength[4]. The results of organoleptic evaluation, Microscopic evaluation ,powder microscopy, Physico-phytochemical evaluation of the market samples to that of genuine sample and also the standards mentioned in API evidenced that the majority of market samples were unintentionally adultered and also some samples were substitutes as per database .As per the microscopic evaluation; sample 3 which was *Pseudarthria viscida* and also sample 4 and 5 was identified as *Uraria lagopodiodes* which was mentioned by database as substitutes, but sample 2 was entirely a different drug which was not a substitute but can be taken as adulterant and was identified as *Vigna mungo.* All the market sample were showing almost similar properties in Physico-chemical evaluation .

DISCUSSION

Through the present study its evident that what is received from the market by the name of *Prsniparni* are not the original one its either substitute or adulterant. Almost all the substitute is dissimilar taxonomically as they belong to different families or species, but majority of the species which was received for the study was substitute which was a better option than adulterants. By using substitutes the pressure over a single drug can be reduced. The most important criteria for the selection of pratinidhi seem to be similarity in indications &

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Pharmaco-therapeutic uses. Finally, the study reveals that the status of the commercially available crude drug which was received as *prsniparni* was having less quality and purity and the materials received from markets were either substitute or adulterant, also care should be taken during the time of harvest

Being an unavoidable drug among Dasamoola with wide spectrum of uses, the substitution of *Prsniparni* should be judicial and authorised after conducting detailed scientific evaluation studies. Substitution with other useful plant or part is one of the early signs of upcoming extinction. Therefore, judicious usage and cultivation should be initiated for common medicinal species having huge consumption

CONCLUSION

The present study was Comparative Pharmacognostic evaluation of market samples of *Prsniparni* with genuine source of *Uraria picta* (jacq.) Desv. ex DC

- The objective of the study was pharmacognostic evaluation of market samples of *Prsniparni* and compare with natural habitat sample of *Uraria picta*
- Since the genuine root samples were not available, the Pharmacies were overcoming the situation mainly by substituting the drug with available substitutes.[5]
- Four samples were collected from different market across the country and compared with the sample collected from natural habitat, Sirmour district of Himachal Pradesh.
- The present study showed that the four market samples are not the original source drug they are either substituted or adulterated and possess less quality and purity.

As per the study conducted the samples received to be concluded as

Table: 7 Identification of Market samples

Sample No	Place of collection	Source Plant
1.	**Himachal Pradesh**	***Uraria picta* (jacq.) Desv. ex DC**
2.	**Pune**	***Vigna mungo* (L.) Hepper**
3.	**Karnataka**	***Pseudarthria viscida* (L.) Wight & Arn.**
4.	**Tamilnadu**	***Uraria lagopodioides* (L.) DC**
5.	**Kerala**	***Uraria lagopodioides* (L.) DC**

LIMITATIONS

The study was carried out in finest possible manner by managing the time. But still there were limitations. The limitation faced during the study was:

- HPTLC should have been done by comparing with marker compound.

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Volume: 6 | Issue: 10 | October 2021 - Peer Reviewed Journal

ANNEXURES

Figure: 1 Macroscopy of market samples

Sample 1

Sample 2

Sample 3

Sample 4

Sample 5

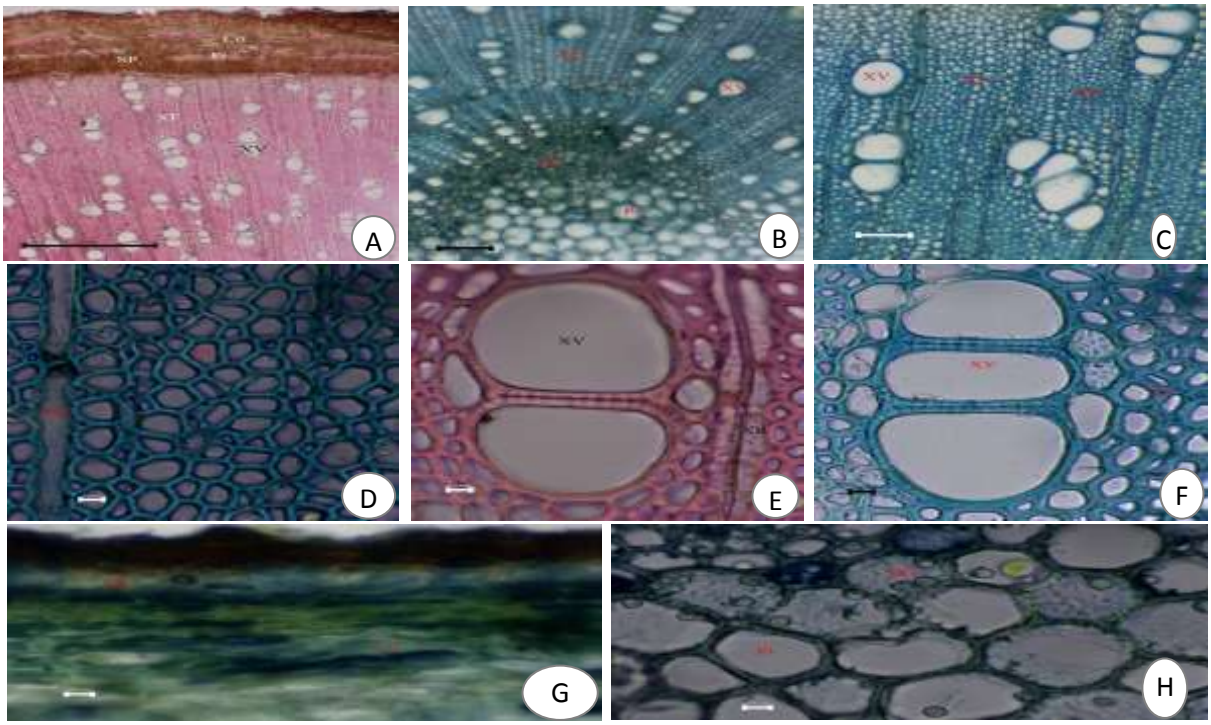
SJIF Impact Factor 2021: 8.013| ISI I.F.Value:1.241| Journal DOI: 10.36713/epra2016 ISSN: 2455-7838(Online)
EPRA International Journal of Research and Development (IJRD)
Volume: 6 | Issue: 10 | October 2021 - Peer Reviewed Journal

Figure: 2 Powder microscopy

	
Sample 1	**Sample 2**
	
Sample 3	**Sample 4**
	
Sample 5	

SJIF Impact Factor 2021: 8.013| ISI I.F.Value:1.241| Journal DOI: 10.36713/epra2016 ISSN: 2455-7838(Online)
EPRA International Journal of Research and Development (IJRD)
Volume: 6 | Issue: 10 | October 2021 - Peer Reviewed Journal

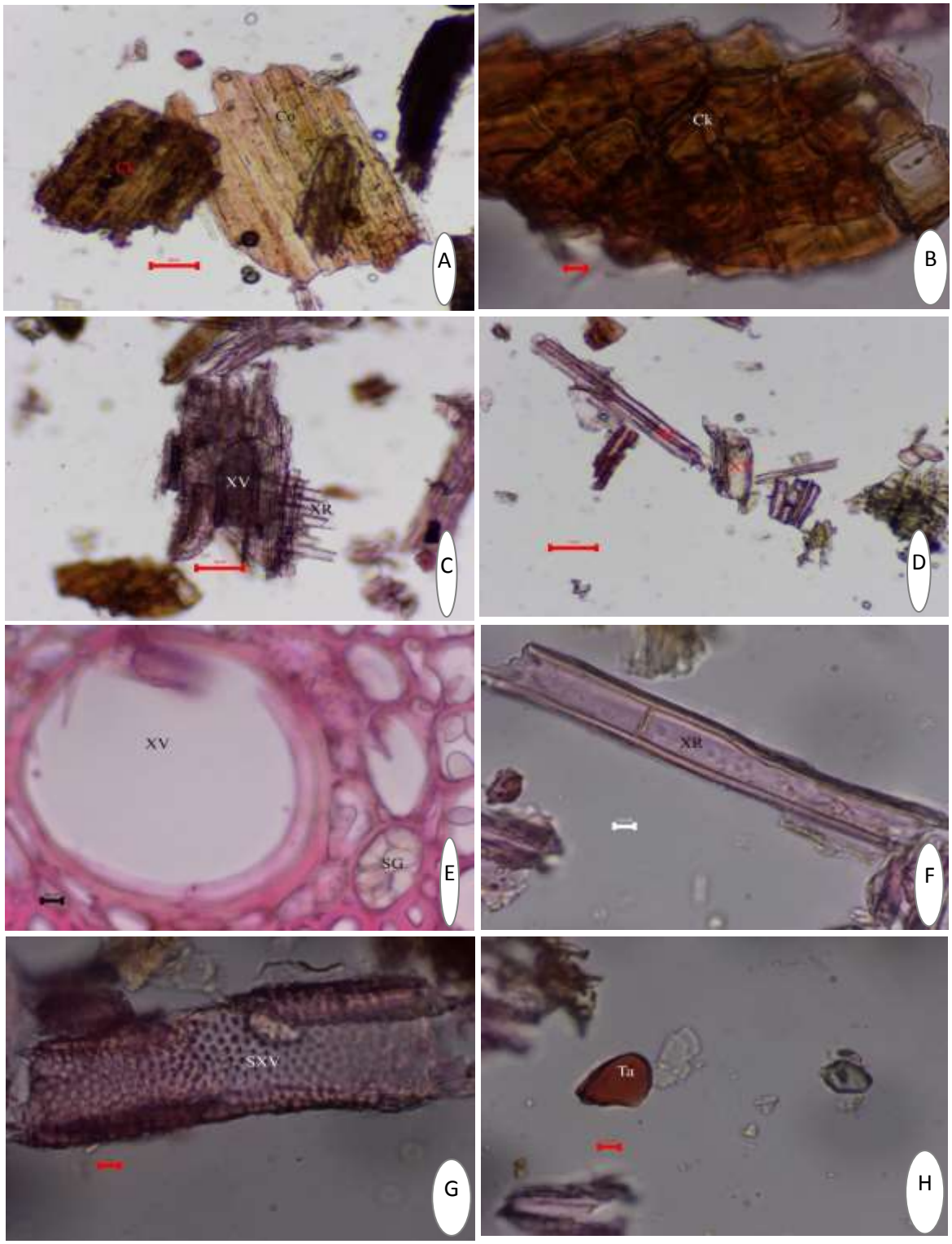
Figure: 3 Microscopy Sample 1



Co – Cortex; Ck – Cork; Fi -Fibres; Pi – Pith; SG – Starch Grains; SP – Secondary Phloem; SXV – Scalariform Xylem vessels; Ta – Tannin; XF – Xylem Fibre; XR – Xylem Rays; XV – Xylem Vessels

SJIF Impact Factor 2021: 8.013| ISI I.F.Value:1.241| Journal DOI: 10.36713/epra2016 ISSN: 2455-7838(Online)
EPRA International Journal of Research and Development (IJRD)
Volume: 6 | Issue: 10 | October 2021 - Peer Reviewed Journal

Figure:4 Powder Microscopy Sample 1



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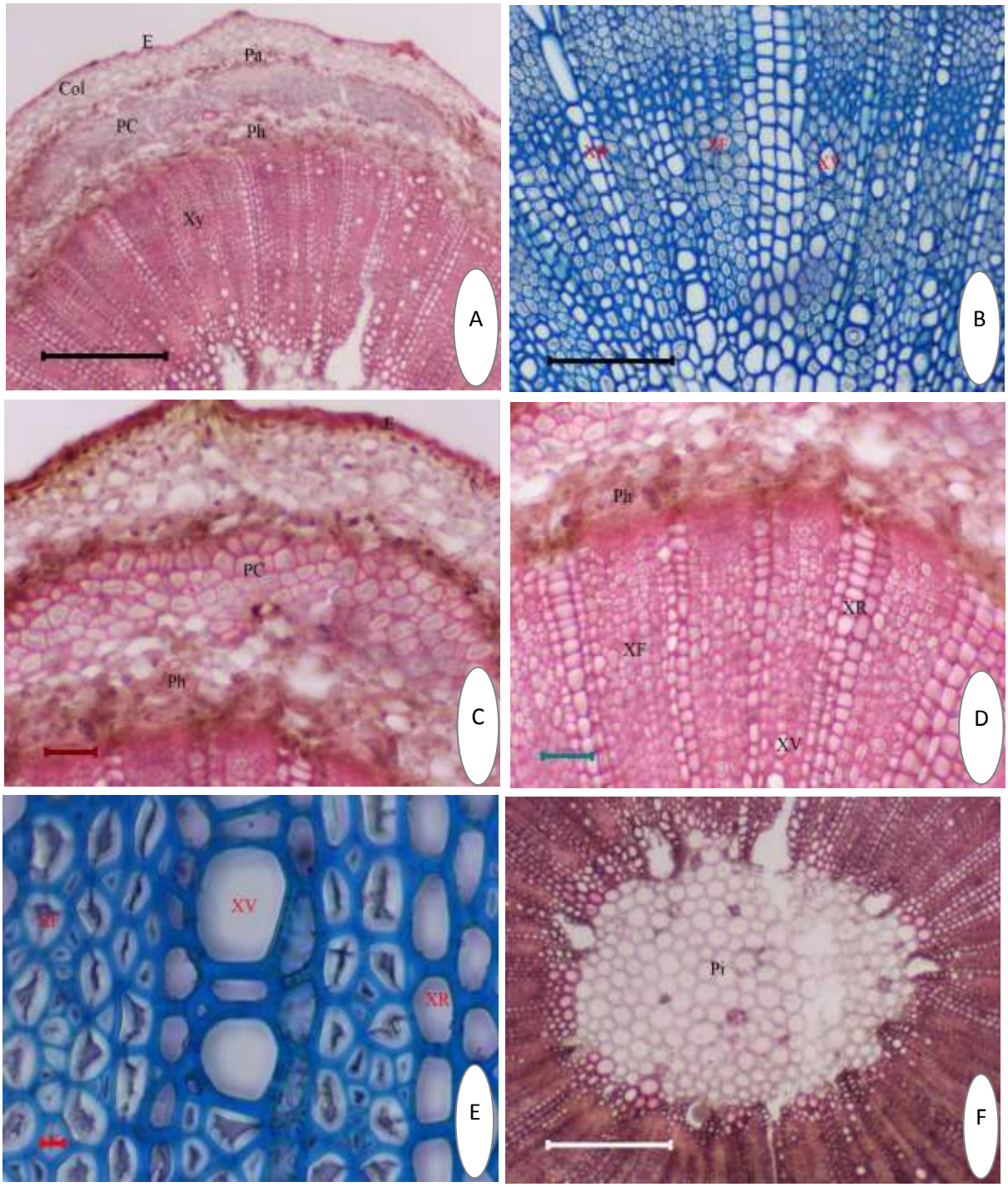
EPRA International Journal of Research and Development (IJRD)
Volume: 6 | Issue: 10 | October 2021 - Peer Reviewed Journal

Figure: 5 Microscopy Sample 2



Co – Cortex; Col – Collenchyma; E – Epidermis; Pa – Parenchyma; PC – Pericycle; Ph – Phloem; Pi – Pith; SG – Starch Grains; ST – Stone cells; SXV – Scalariform Xylem vessels; Ta – Tannin; XF – Xylem Fibre; XR – Xylem Rays; XV – Xylem Vessels; Xy – Xylem

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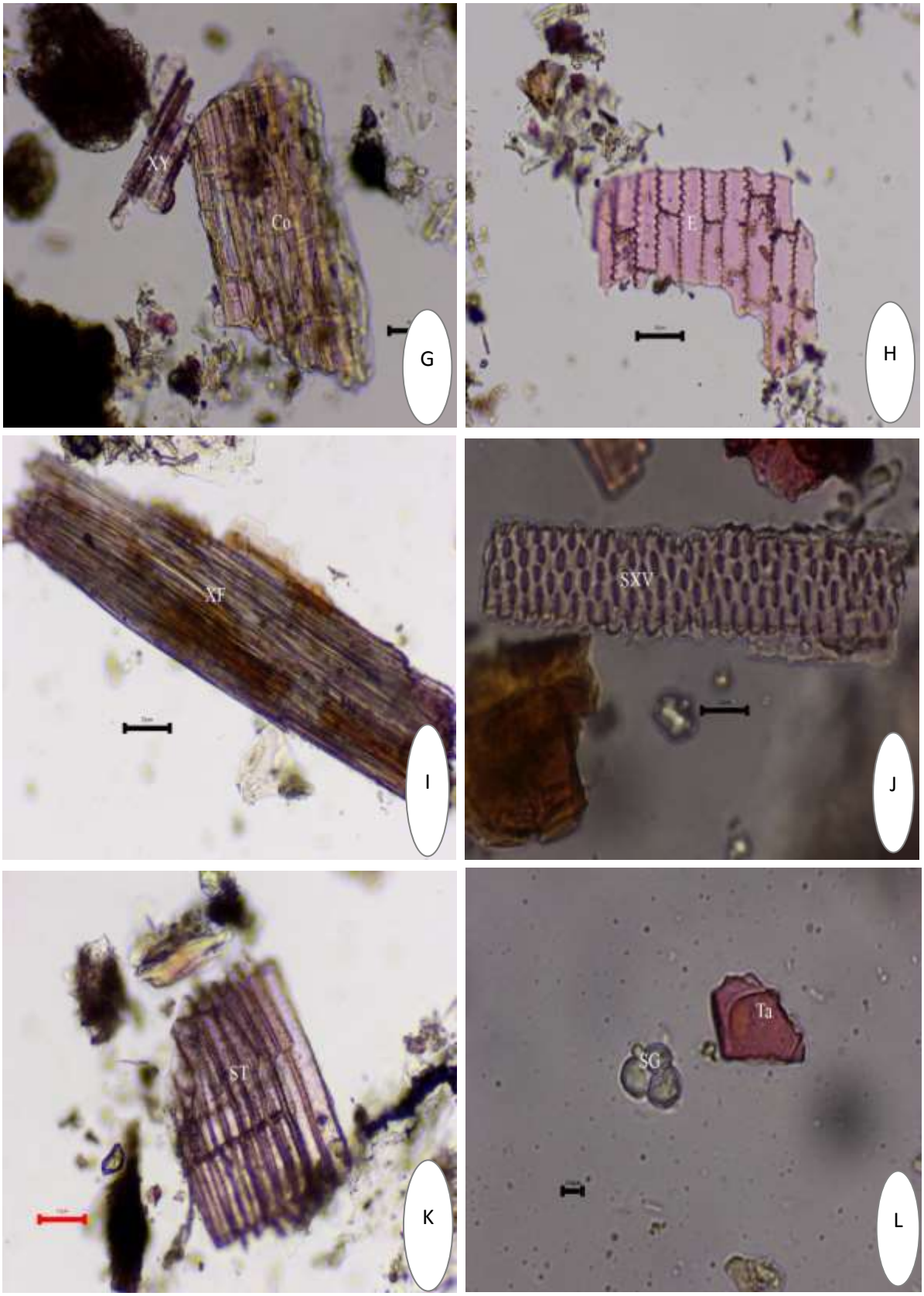
Volume: 6 | Issue: 10 | October 2021 - Peer Reviewed Journal

Figure: 6 Powder microscopy Sample 2



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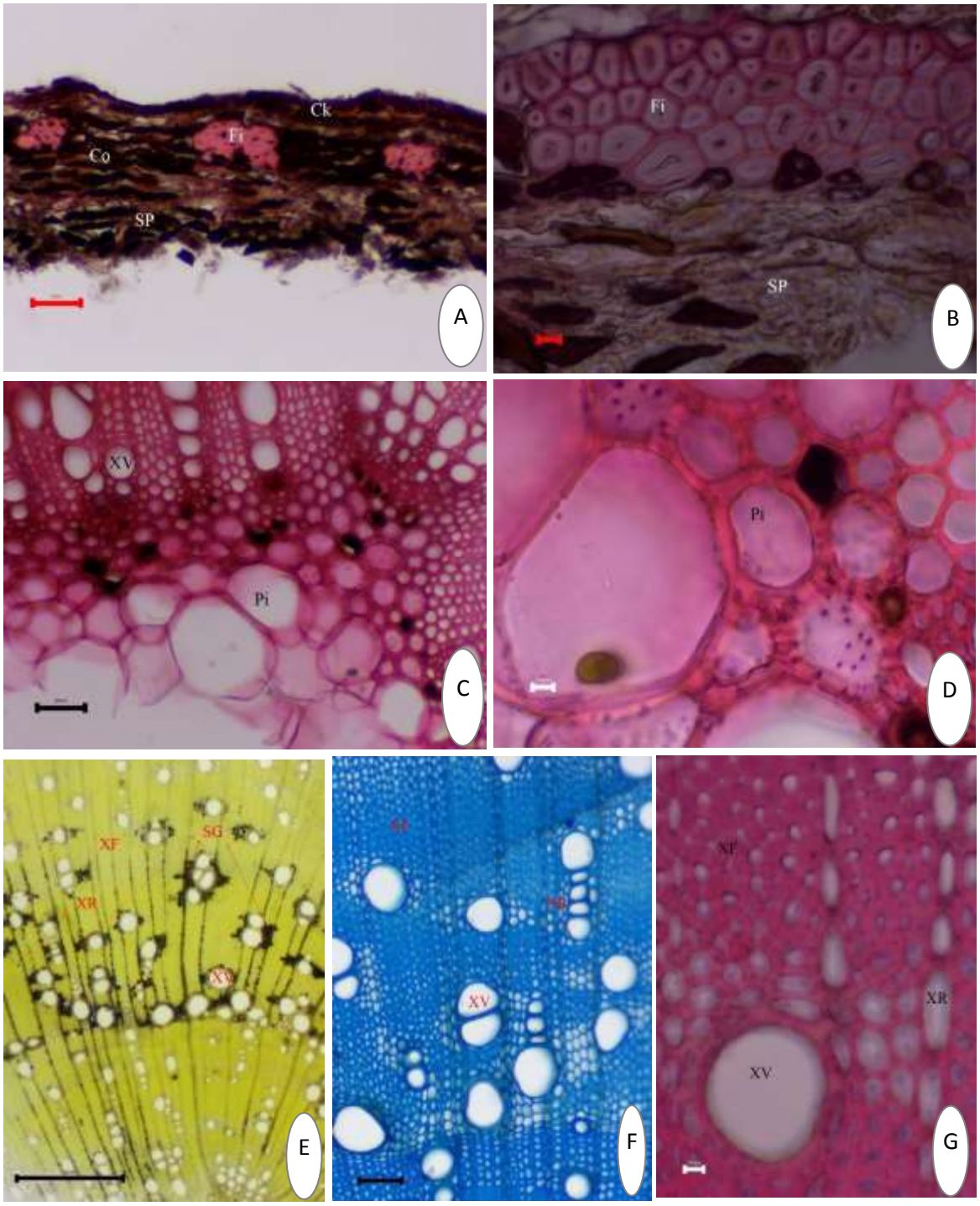
EPRA International Journal of Research and Development (IJRD)
Volume: 6 | Issue: 10 | October 2021 - Peer Reviewed Journal

Figure:7 Microscopy Sample 3



Co – Cortex; Ck – Cork; Fi - Fibres; Ph C – Phenolic Compound; Pi – Pith; SG – Starch Grains; SP – Secondary Phloem; SXV – Spiral Xylem Vessels; SXV – Scalariform Xylem vessels; Ta – Tannin; XF – Xylem Fibre; XR – Xylem Rays; XV – Xylem Vessels

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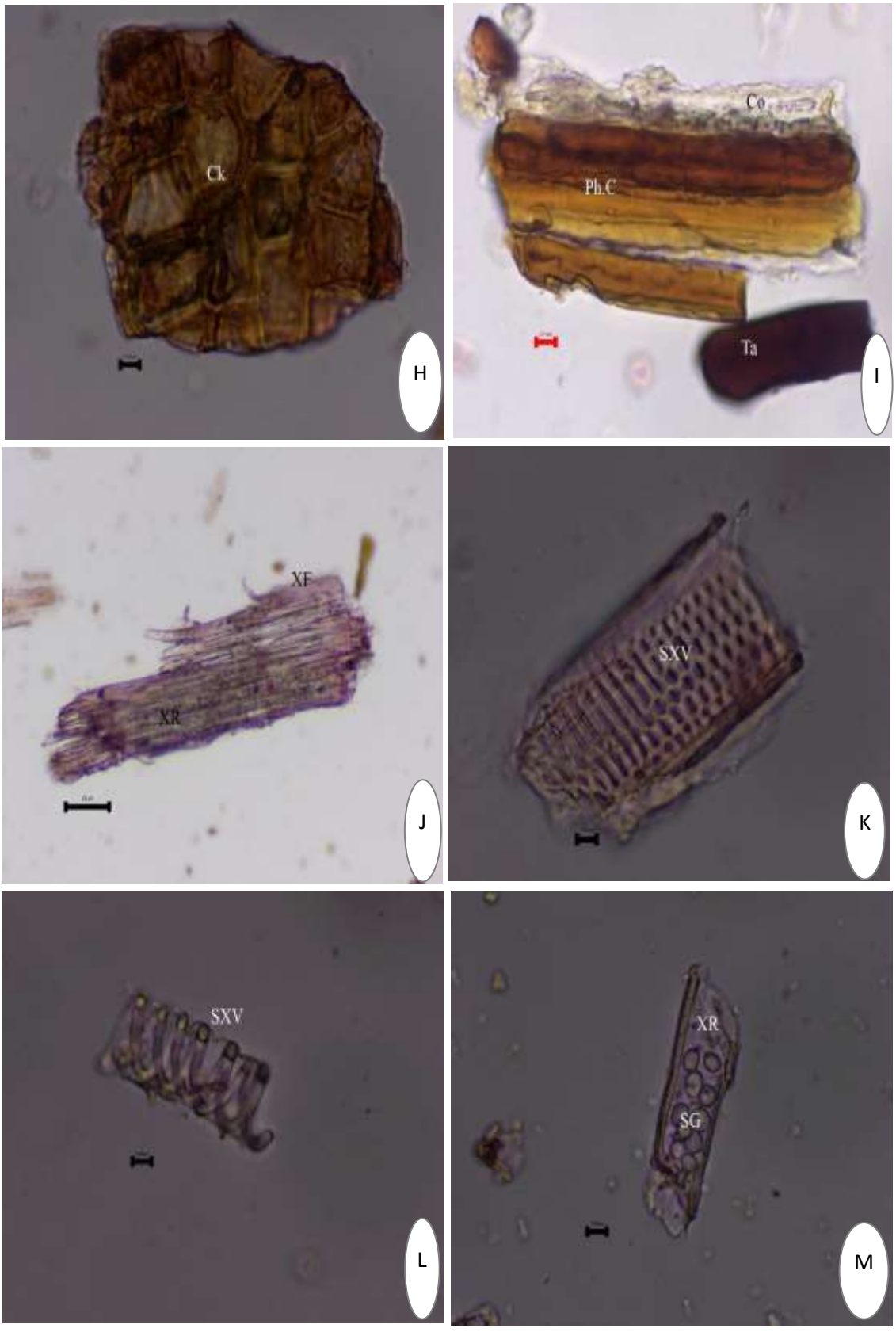
EPRA International Journal of Research and Development (IJRD)
Volume: 6 | Issue: 10 | October 2021 - Peer Reviewed Journal

Figure: 8 Powder microscopy Sample 3



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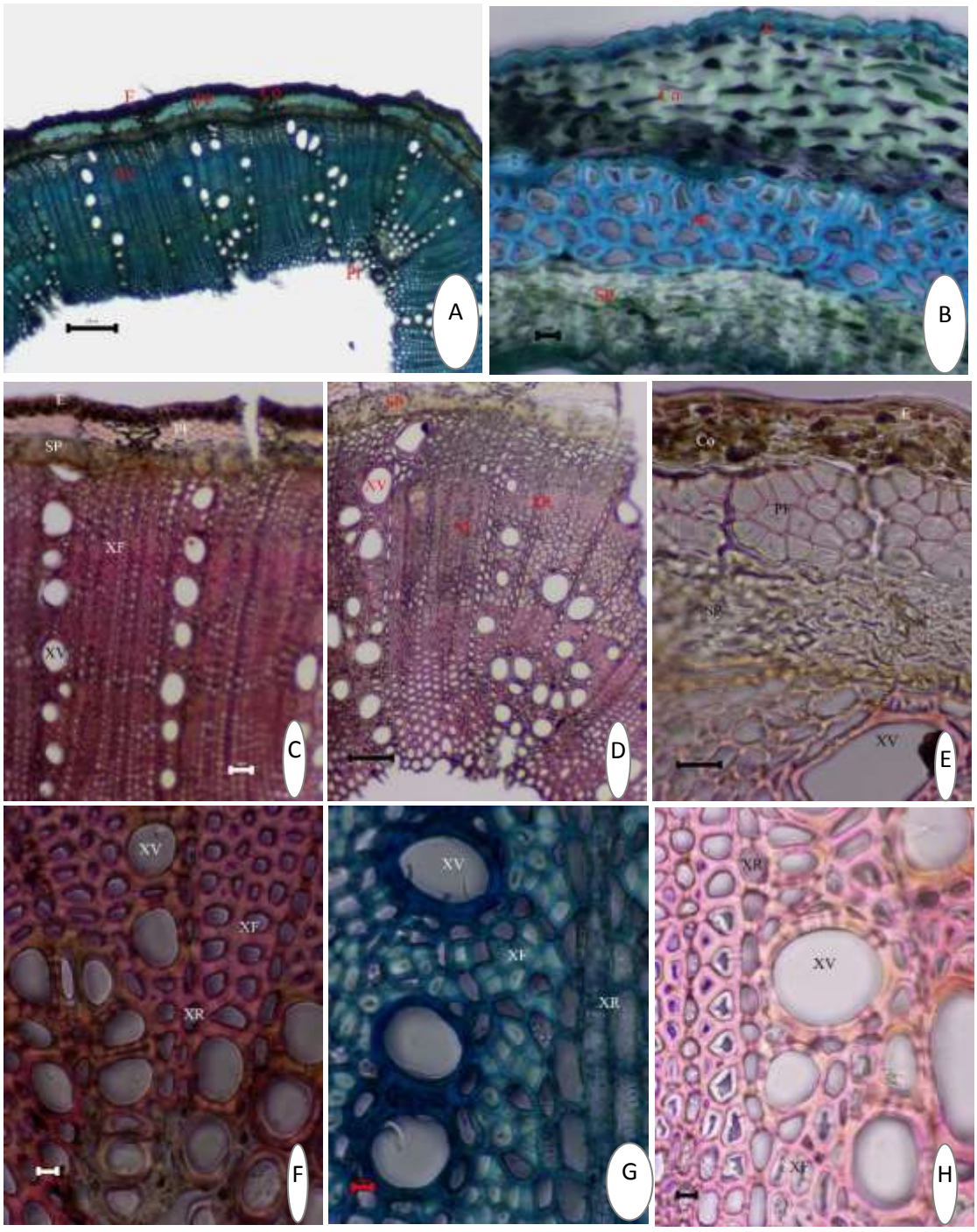
EPRA International Journal of Research and Development (IJRD)
Volume: 6 | Issue: 10 | October 2021 - Peer Reviewed Journal

Figure: 9Microscopy Sample 4



Co - Cortex; Ck - Cork; Fi - Fibres; SX - Secondary xylem; SP - Secondary Phloem; XF - Xylem Fibre; XR - Xylem Rays; XV - Xylem Vessels; XCF - Xylem crystal fibres

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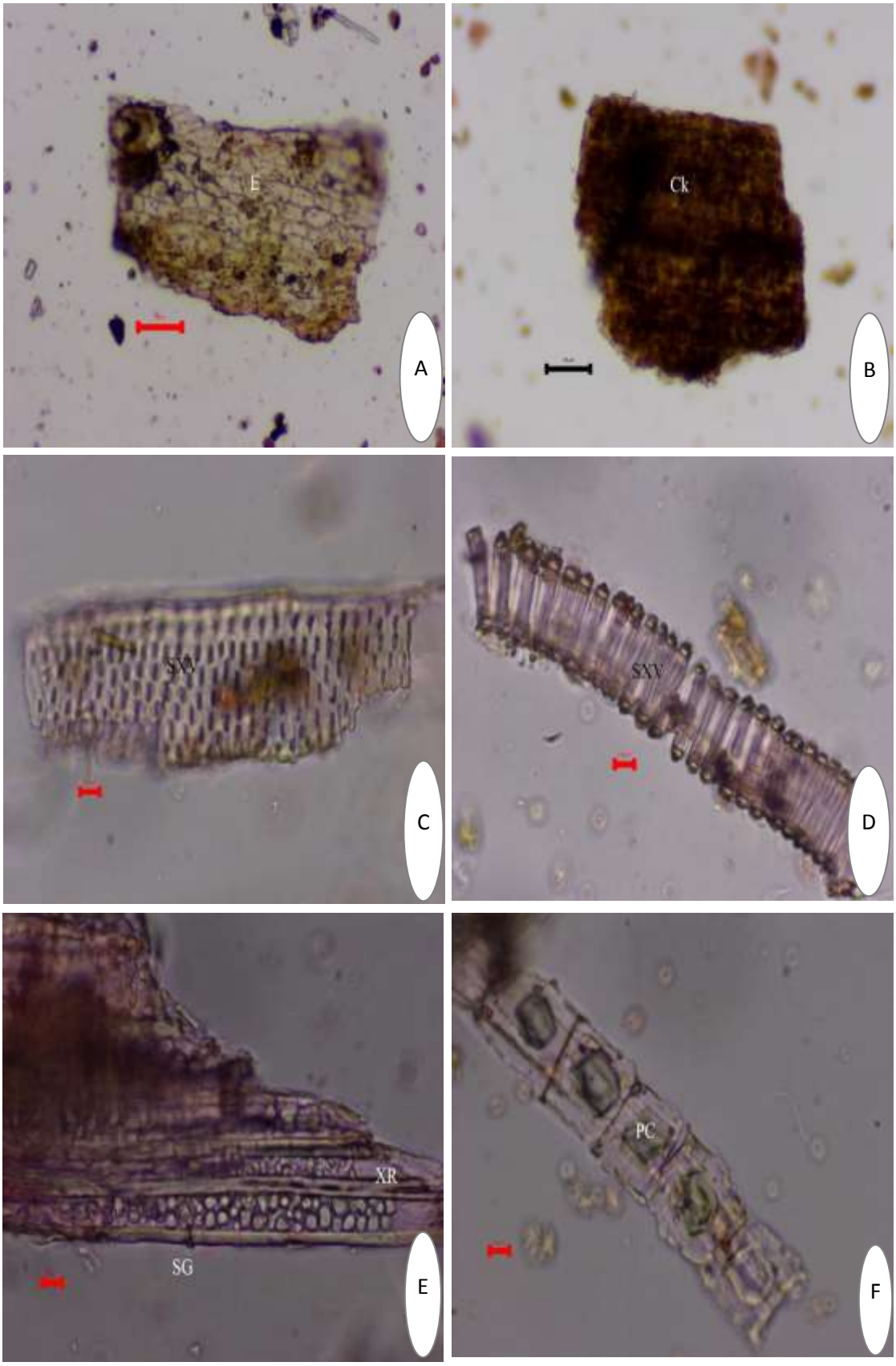
EPRA International Journal of Research and Development (IJRD)
Volume: 6 | Issue: 10 | October 2021 - Peer Reviewed Journal

Figure: 10 Powder microscopy Sample 4



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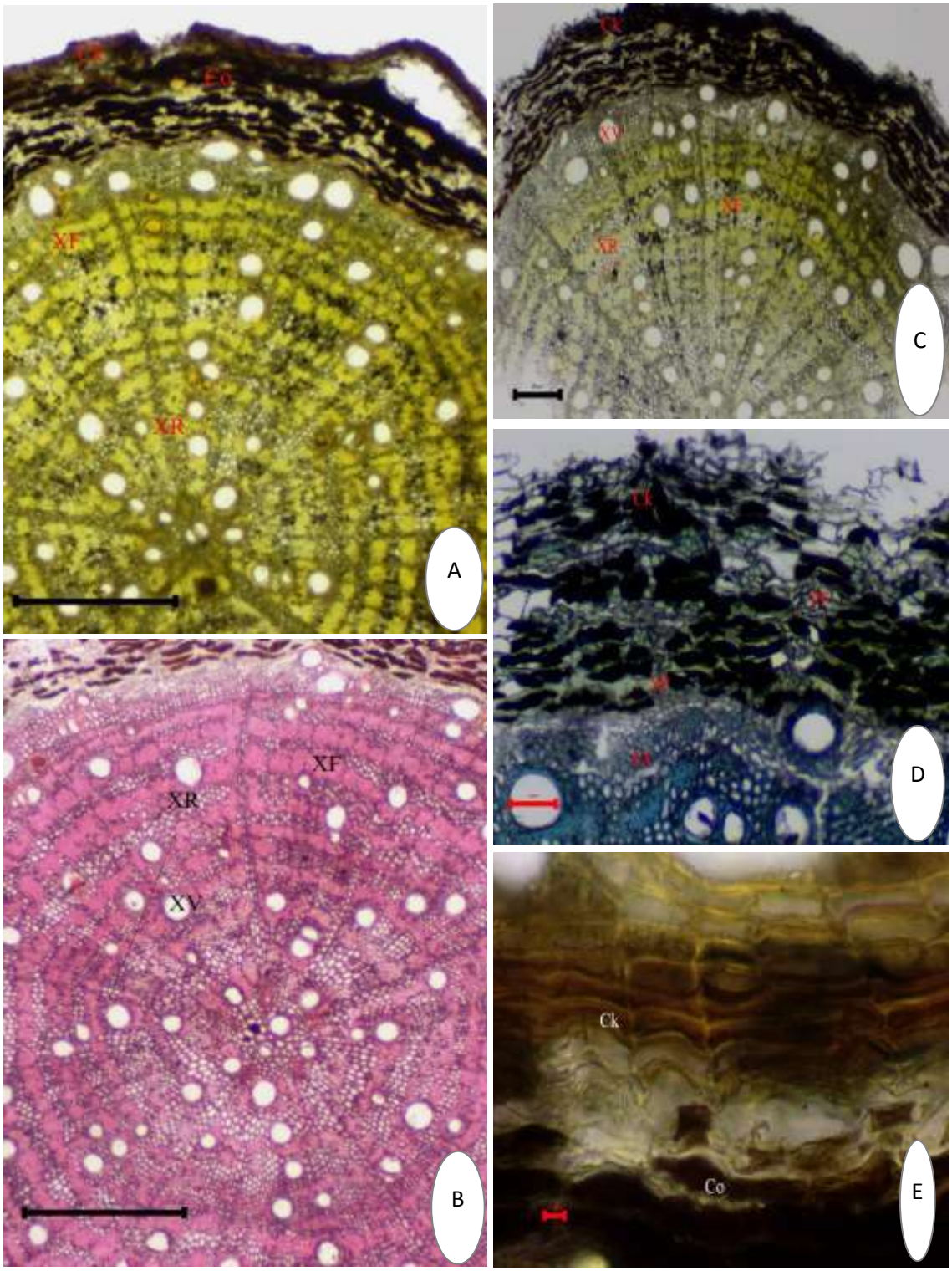
EPRA International Journal of Research and Development (IJRD)
Volume: 6 | Issue: 10 | October 2021 - Peer Reviewed Journal

Figure: 11 Microscopy Sample 5



BC – Brown content; Ck – Cork; Co – Cortex; PC – Prismatic crystals; Ph C – Phenolic content; SG – Starch Grains; SXV – Scalariform Xylem vessels; XR – Xylem Rays

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Volume: 6 | Issue: 10 | October 2021 - Peer Reviewed Journal

Figure:12 Powder microscopy Sample 5