

Ethnopharmacognastical Investigation on *Ipomoea pes-tigridis* Linn

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A B S T R A C T

The present investigation was undertaken to analyze the Pharmacognostical, physicochemical and preliminary phytochemical profile in the leaves and roots of *Ipomoea pes-tigridis* Linn. with the back ground of Ethnic importance. This plant is used by the tribes of Nellore district as a single drug remedy to treat as Laxative and skin diseases. In the present work the leaf and root part of the plant were subjected to various microscopical and physico- preliminary phyto chemical evaluations. In the microscopical studies, the different cell structures and arrangements were studied. Physicochemical parameters like loss on drying, total ash value, acid insoluble ash, water insoluble ash, various extractive values etc., were carried out. Further, qualitative tests for various functional groups like Triterpenoids, alkaloids, glycosides etc..., were carried out.

Keywords: *Ipomoea pes-tigridis* Linn Macro-, microscopical characters of root, stem, leaf, macerate, physical constants studies.

Introduction

Ethnobotany is a science that reveals the relationship of man with his surrounding flora. Pharmacognasy means "knowledge of drugs" (pharmakon = drug, gnosis = knowledge). It includes the study of the physical, chemical, biochemical and biological properties of drugs, drug substances or potential drugs or drug substances of natural origin but not synthetic drugs. So broadly Ethnopharmacognasy means study of the relationship of man with his surrounding flora and study of the physical, chemical, biochemical and biological properties of crude drugs of plant and animal origin. These two sciences are the age old sources for several medicinal systems like Ayurveda, Sidda and Unani. One of the important and difficult problems encountered in all Traditional systems is the use of several different botanical species under the same drug name. Further these are claimed to possess similar therapeutic efficacy and used by the physicians as the same drug. Such drugs are today termed as controversial drugs. In such cases pharmacognastical

studies help to identify the genuine plant used, which prevent adulteration of drugs by using standardization and microscopical methods. The plant *Ipomoea pes-tigridis* Linn. is distributed More or less throughout India, Ceylon, Malaya, China, Polynesia, tropical Africa(Kirtikar &Bassu).The plant has good medicinal value. The root of this plant is used as a Perfect Laxative and leaves are used to heal Sores and Boils by the tribes of Nellore district in Andhra Pradesh of India. Many literatures expose the same medicinal values.(K. M. Nadkarni: Kirtikar &Bassu;K Madhavachetty.). The plant has resemblance with *Merremia aegyptia* (L.) Urb. belongs to Convolvulaceae Family. For this identification of the plant with macroscopical characters is too hard and also for the pharmacognostical standardization it is new one. With this back ground present work was taken.

Taxonomy of the plant



Ipomoea pes-tigridis Linn Stems twining, clothed with long spreading hairs. Leaves 3.8-10 cm. diam., rotundate in outline, usually more or less deeply palmately 5-9-lobed, sometimes 3-lobed or occasionally entire; lobes ovate, acute or acuminate, narrowed at the base, hirsute on both surfaces; petioles 3.8-7.5 cm. long, hairy. Flowers sessile, 3 or more in a head; peduncles 2.5-7.5 cm. long, very hairy; outer bracts nearly 2.5 cm. long, the inner about 1 cm. long, all ovate-oblong, subobtusate, very hairy. Sepals 8-13 mm. long, densely hairy and ciliate -with long stiff hairs, the 2 outer sepals broader than the inner, ovate-lanceolate, the 3 inner linear-oblong, acute. Corolla about 2.5 cm. long, tubular.campanulate, white or pale

pink. Capsules 5 mm. diam., globose, glabrous, papery, concealed in the calyx. Seeds grey-pubescent.

Materials And Methods

Fresh leaves and roots of *Ipomoea pes-tigridis* Linn were collected from the Tribes of Nellore district. Identification and confirmation were done by D department of Botany Sri venkateswara University. The voucher herbarium specimen was processed followed by standard procedure⁶. Microscopical and microscopical studies were carried out.⁷⁻



Fig:1 *Ipomoea pes-tigridis* Linn.



Fig.2:Macroscopical characters of Ipomoea pes-tigridis Linn (Root).

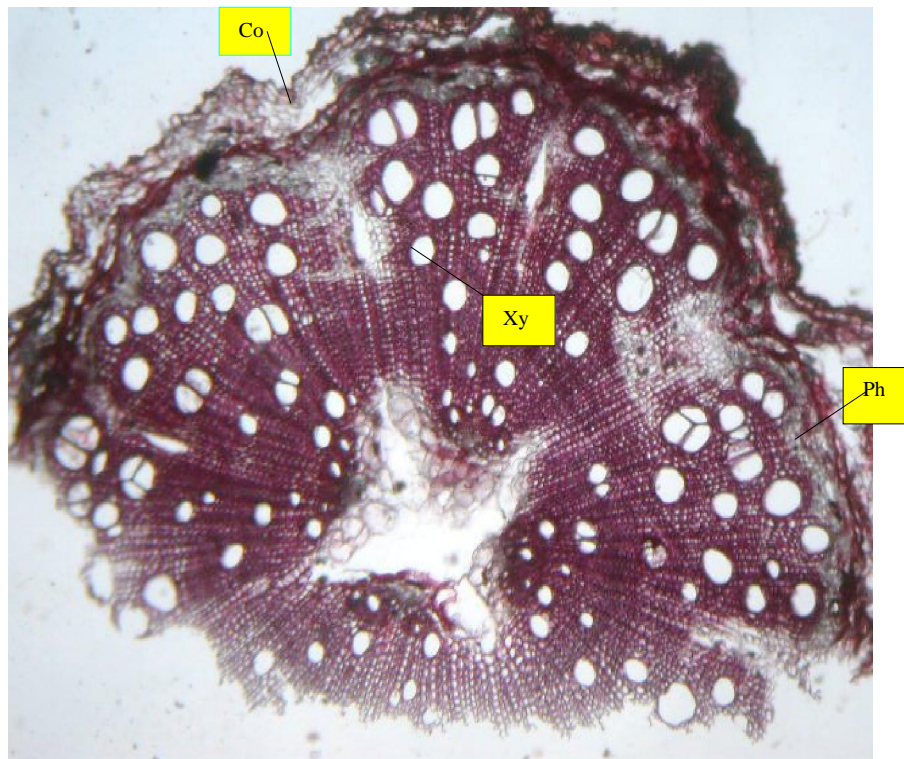


Fig 3:T.S. of the root 10xX10x.
Legends: Co: Cortex; Xy: Xylem; Ph: Phloem.

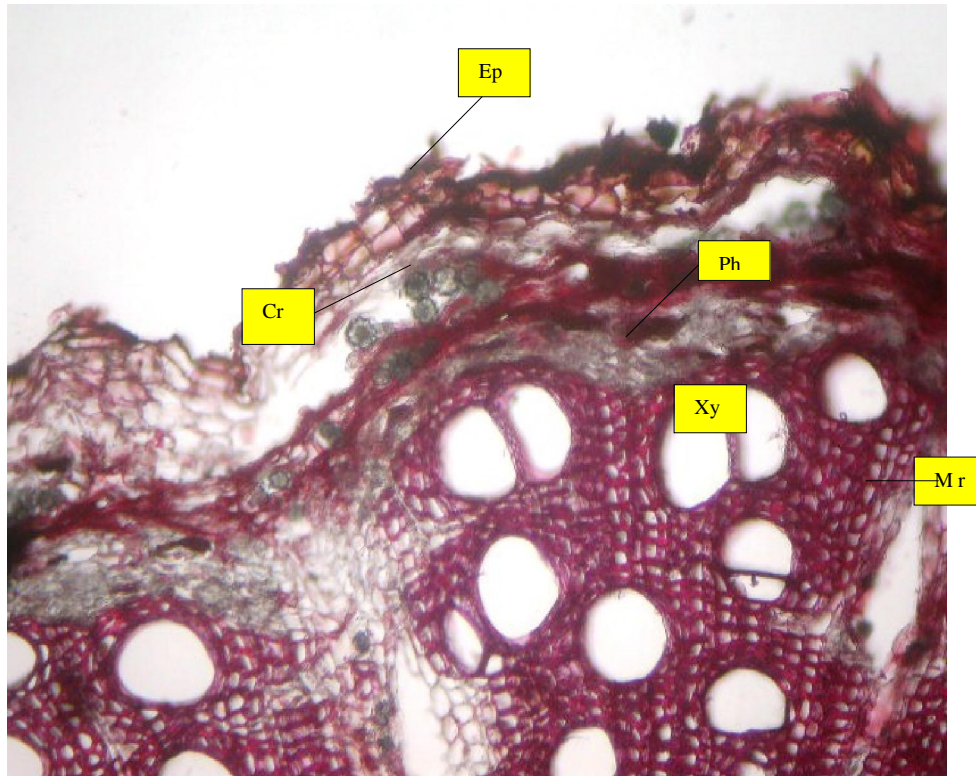


Fig4:T.s. of the root enlarged showing cork and cortex region.10xX40x.
Legends: Ep:Epidermis; Cr:Crystals; Ph:Phloem; Mr: Medullary rays.

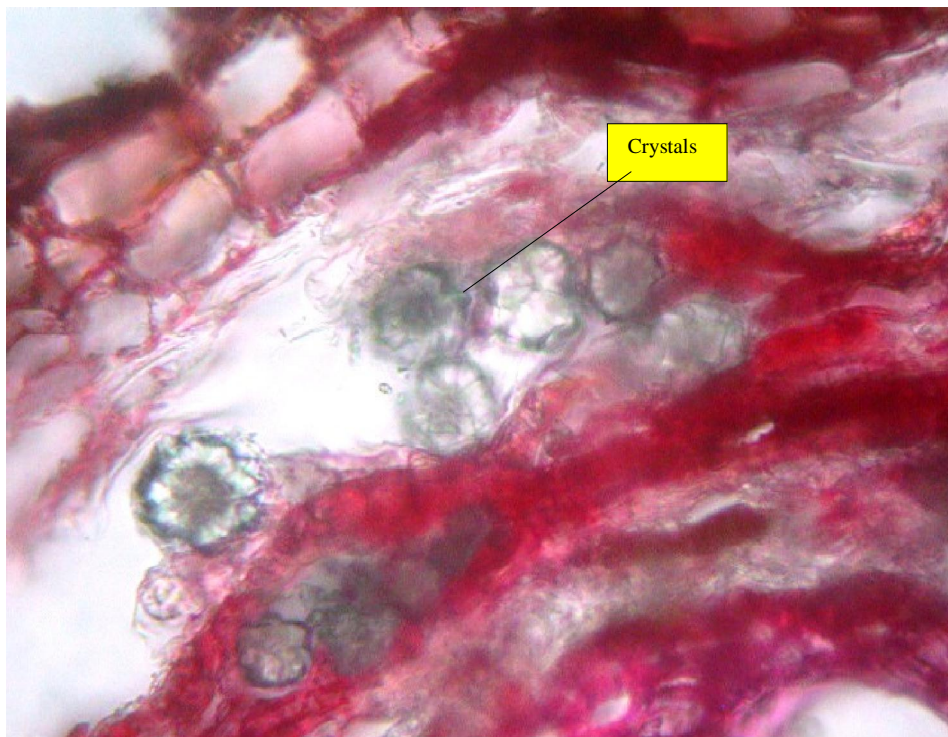


Fig5:T.s. of the root enlarged showing cork, cortex with abundant calcium oxalate crystals. 10xX40x.

Results

Macro and Microscopical Characters of Root

Macroscopical Characters: Fairly thick, 6 mm thickness, tap root is long, lateral roots are very slender, hairy(Fig:2), bitter, no specific odour.

Root - Microscopy

T.s of the root is circular in outline with well developed 3-4 layered cork, where cells are narrow and compressed, suberised, some of the cells shows abundant clustered calcium oxalate crystals(Fig:3&4). Cortex is also narrow 3-5 layered filled with abundant calcium oxalate crystals(Fig:5). Phloem cells thin walled and xylem well developed with large vessels traversed with uni to biseriate medullary rays(Fig:4&6). Near the phloem region also abundant calcium oxalate crystals are present(Fig:9). Some of the cortex region shows simple rounded starch grains(Fig:8). Cortex region cells are thin walled and compactly arranged. Central region of the root shows thin walled parenchymatous cells(Fig:7).

Diagnostic characters

- 1). Presence of abundant calcium oxalate crystals in the cork and cortex region.
- 2). Presence of simple starch grains in the cortex region.

Powder microscopy of Root powder *Ipomoea pes-tigridis* Linn.

Root powder light brown in colour (fig:11.1), coarse to touch, smell agreeable, tastes slightly sour to bitter , with abundant fibers, when treated with chloral hydrate solution and water following fragments of different tissues were observed under the microscope.

1. Fragments of abundant crystal fibers. (Fig:11.4)
2. Fragments of xylem vessels with intervascular pitting. (Fig:11.10)
3. Fragments of thinwalled parenchymatous cells. (Fig:11.7)
4. Fragments of Abundant tracheids, narrow with simple pits. (Fig:11.8)
5. Fragments of epidermal cells.
6. Fragments of helical to spiral vessels.
7. Fragments of thinwalled parenchyma cells.
8. Fragments of abundant, thinwalled elongated parenchyma cells.
9. Fragments of parenchyma cells with reddish tannin contents. (Fig:11.12)
10. Parenchyma cells with clustered calcium oxalate crystals and prism crystals.
11. Abundant prism shaped crystals. (Fig:11.14)
12. Abundant fibers with simple pits.

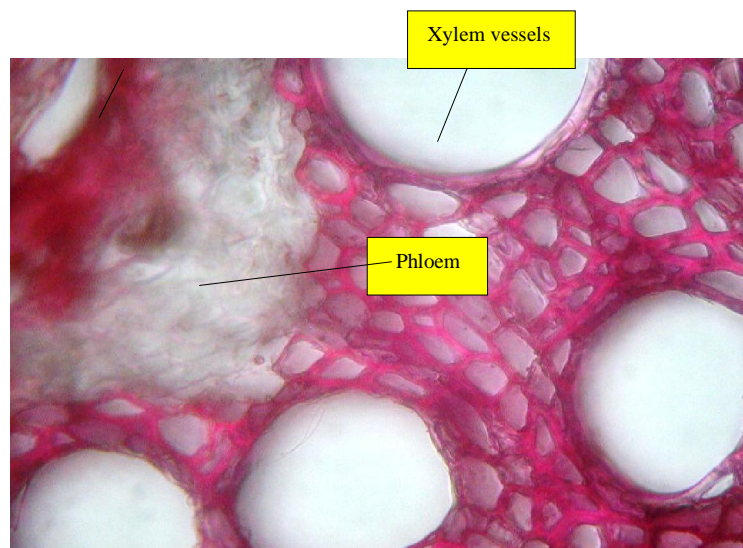


Fig6:Stelar region enlarged showing xylem and phloem region.10xX40x.

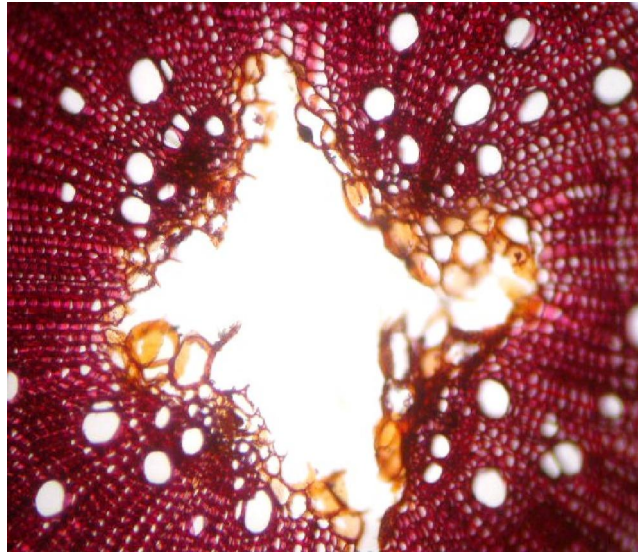


Fig7:T.s of the root showing central portion and stelar region 10xX10x.

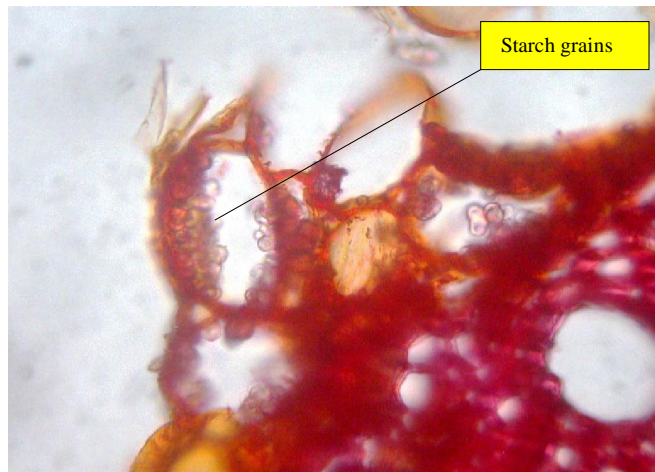


Fig8:T.s of the root showing starch grains in the parenchymatous region 10xX10x.

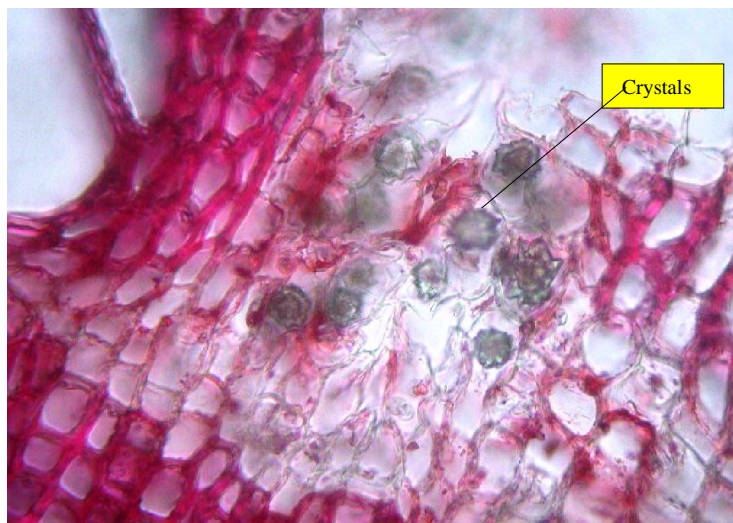


Fig9:T.s of the root showing abundant calcium oxalate crystals near the stelar region 10xX10x.

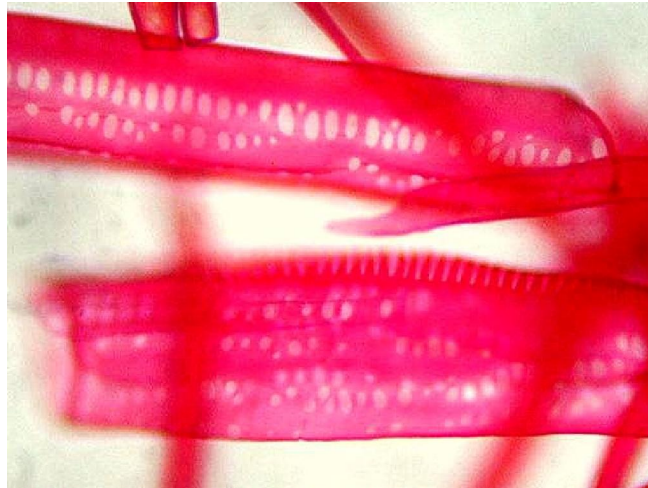
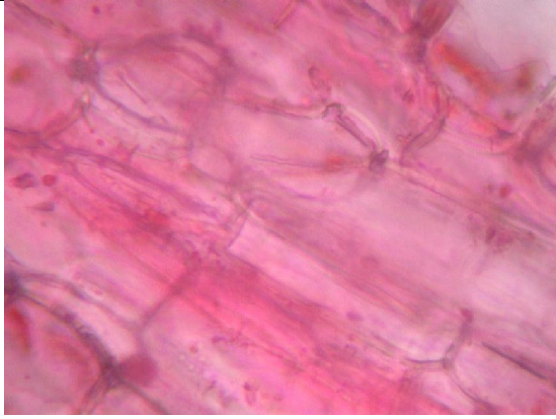

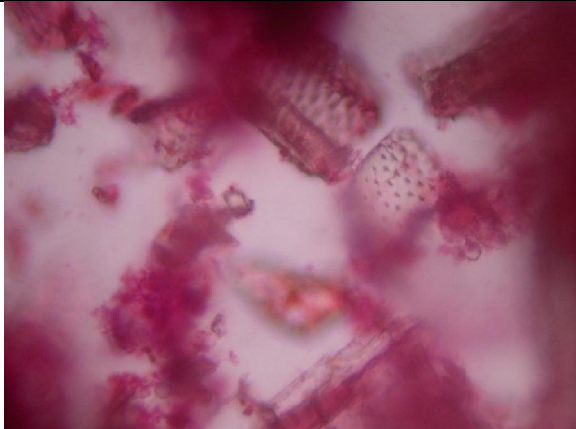
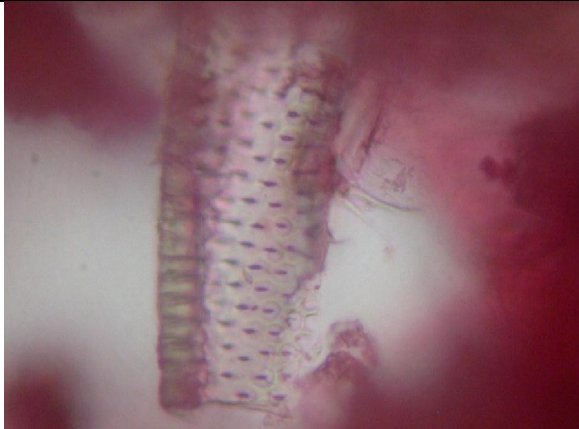
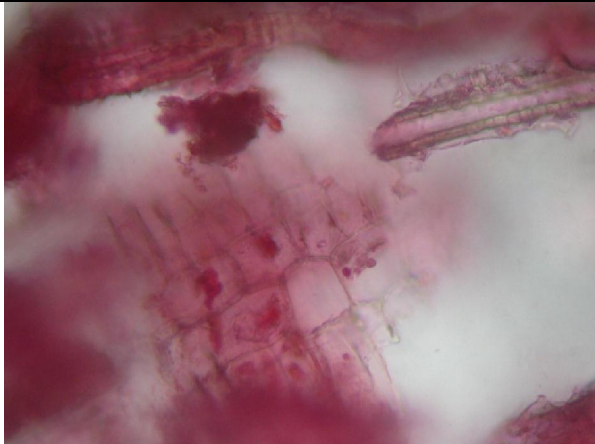
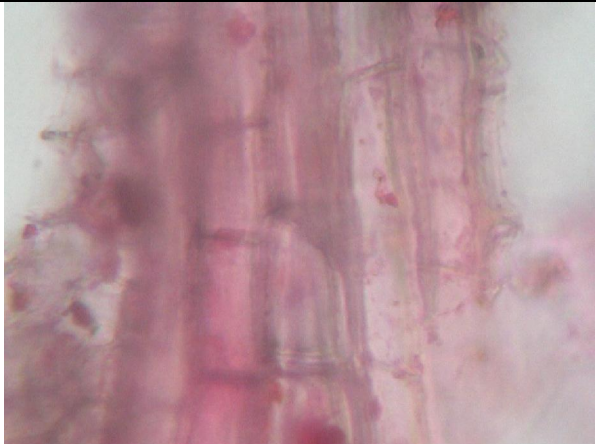


Fig10:Xylem vessels with reticulate thickenings. 10x X 40 x.

<p>Macroscopy ---Root powder Fig:11.1</p>		<p>Different fragments of tissues 10xX40x Fig:11.2</p>	
<p>Xylem vessel 10xX40x Fig:11.3</p>		<p>Crystal fibers 10xX40x Fig:11.4</p>	
<p>Tracheids 10xX40x Fig:11.5</p>		<p>Abundant fibers 10xX40x Fig:11.6</p>	

	
Parenchyma cells with cell contents 10xX40x Fig:11.7	Tracheid 10xX40x Fig:11.8
	
Fragments of xylem vessels. 10xX40x Fig:11.9	Xylem vessel with intervacular pittings. 10xX40x Fig:11.10
	
Parenchyma cells and fibers 10xX40x Fig:11.11	Parenchyma cells 10xX40x Fig:11.12

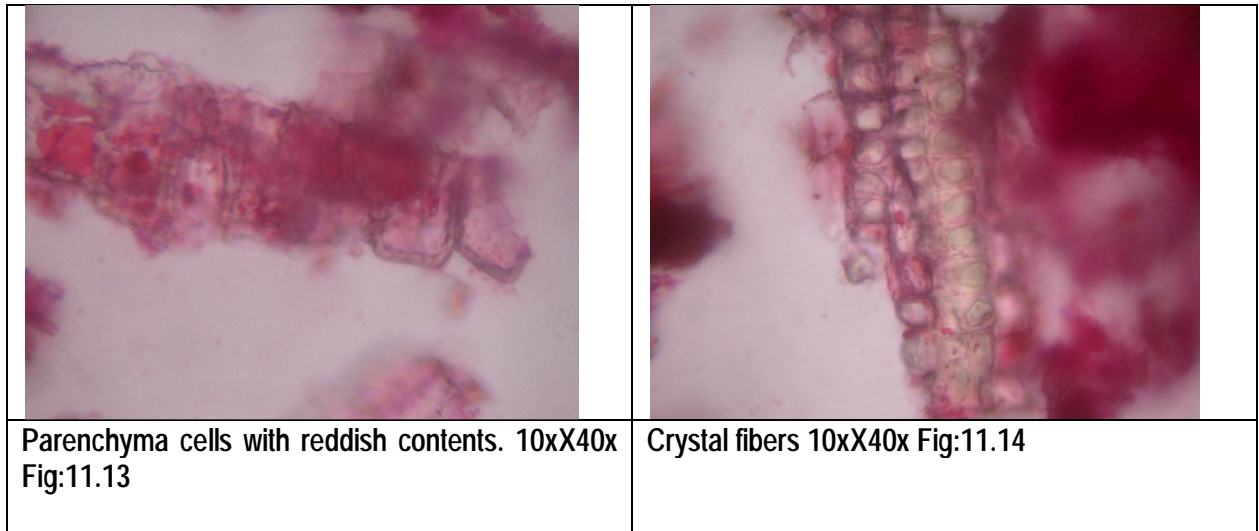


Fig11:Powder microscopy of Root powder Ipomoea pes-tigridis Linn.

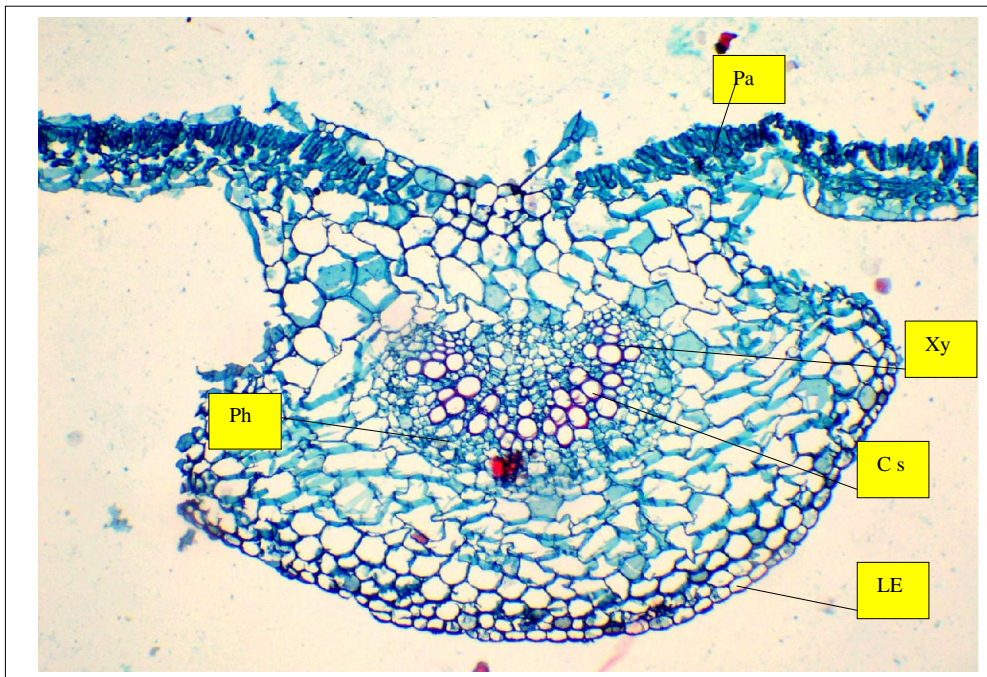


Fig12:T.s of the leaf showing laminar region, vascular bundle, upper and lower epidermis10xX10x.

Legends:

Ue:Upper Epidermis;
Pa:Parenchyma;
Xy:Xylem;
Le: Lower Epidermis;

Co:Collenchyma;
Ph:Phloem;
Cs:Centrally 'c' shaped vascular bundle is present with intraxylary phloem;
P.P: Presence of 2 layered palisade tissue in the midrib region.

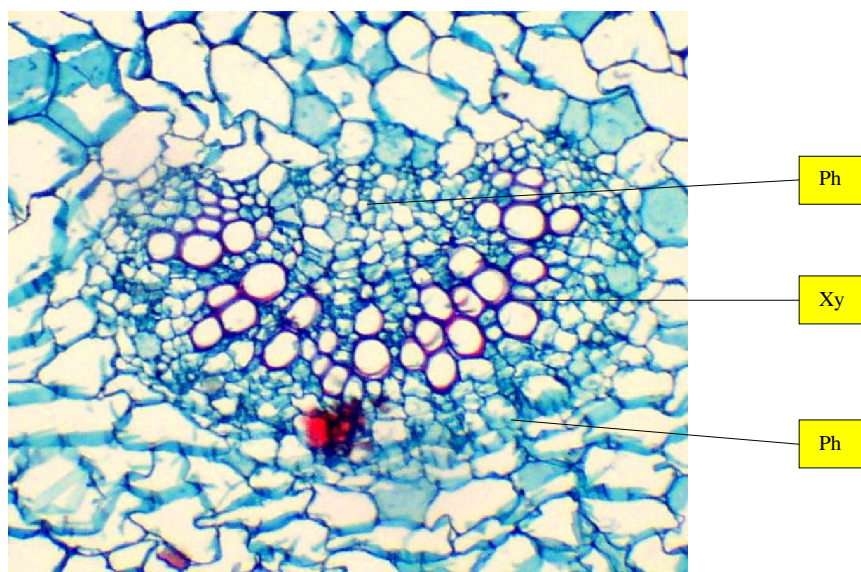


Fig13:Centrally 'c' shaped vascular bundle is present with intraxylary phloem.

Legends: Ph:Phloem; Xy:Xylem.10xX40x.

Diagnostic characters

1. Presence of abundant prism shaped and clustered type of crystals. (Fig:11.14)
2. Presence of abundant parenchymatous cells with reddish tannin contents. (Fig:11.12)
3. Presence of helical to spiral thickenings of xylem vessels.
4. Presence of abundant crystal fibers. (Fig:11.4)
5. Presence of abundant tracheids.
6. Presence of xylem vessel with intervascular pittings. (Fig:11.10)

Table—1 Behaviour of the drug powder with different Chemical reagents (Root).

Treatment	Colour observations
Powder +Distilled water	Light brown
Powder+5%Aqueous Fecl3	Black colour.
Powder+Glacial acetic acid	No change
Powder+5% HNO3	No change
Powder+N/10 Iodine Solution	Brown colour
Powder+ConHCL	Dark brown
Powder+ConH2SO4	Black
Powder+Ammonia solution	Light brown
Powder+5%Aqueous Naoh	Light brown.
Powder+5%Aqueous KOH Solution.	Dark brown

Macro and Microscopical Characters of Leaf

Macroscopical characters:

Leaves surface rough, hairy, hairs are prominent on the upper surface of the leaf, rough. Measure cms in length and cms breadth.

Microscopical Characters:

T.S of the leaf dorsiventral in structure, both upper and lower epidermis are well developed with irregular cells, covered by thick cuticle and shows elongated, uniseriate trichomes on both epidermis. Upper epidermis is followed by 3 to 4 layered Collenchymatous cells in the form of notch, followed by 2 layered palisade tissue, which continues up to the laminar region, which is of diagnostic character. Palisade tissue is followed by 1-2 layered thin walled parenchymatous region. Centrally 'c' shaped vascular bundle is present with intraxylary phloem. Xylem is surrounded by phloem on both sides. Phloem cells are thin walled. Towards the lower region, Collenchymatous cells are 2 to 4 layered, parenchymatous cells are 2 to 5 layered, filled with clustered calcium oxalate crystals. T.S through laminar region shows 2 layered palisade tissue and loosely arranged 1 to 2 layered spongy tissue. Small veins are represented by vascular bundle with xylem and phloem. Both the epidermis shows elongated unicellular, uniseriate trichomes. Stomata are present on both sides, but in lower region stomata are more.

Diagnostic Characters:

1. Presence of intraxylary phloem.
2. Presence of 2 layered palisade tissue in the midrib region which is of diagnostic character.

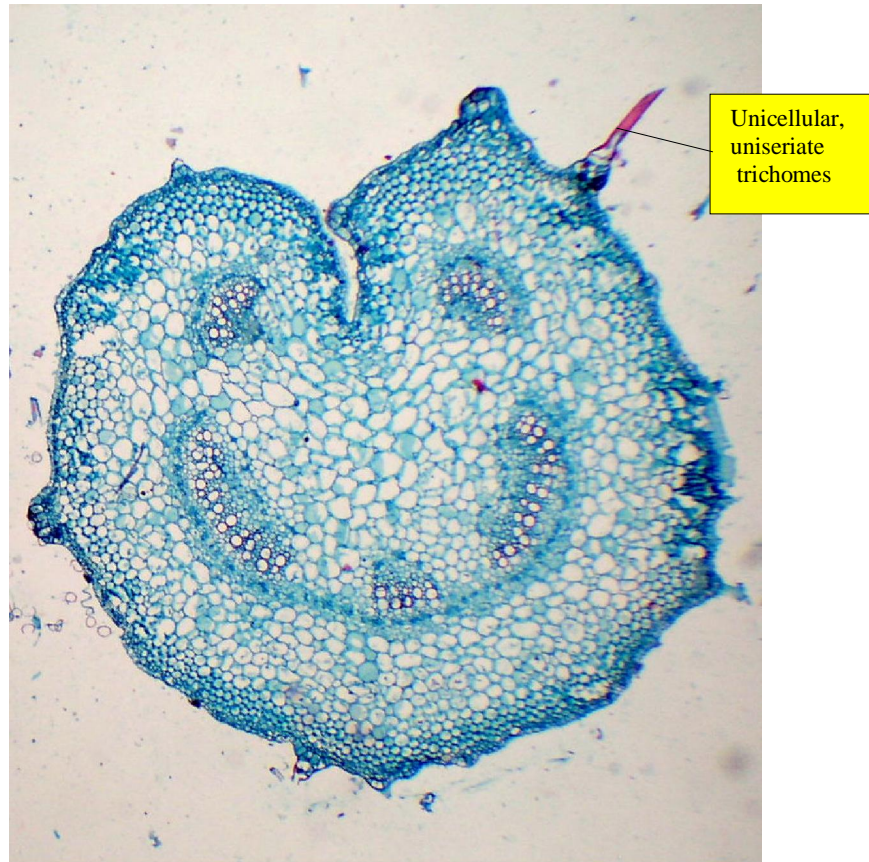


Fig14:T.S of Petiole. 10xX40x

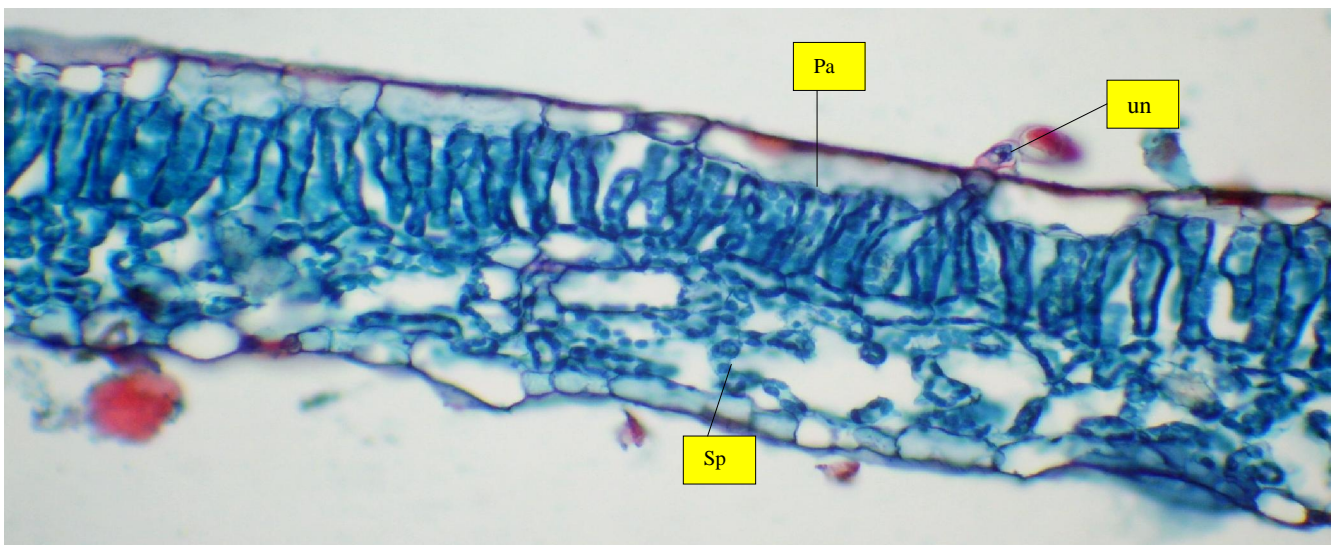


Fig15:T.S. of leaf with short glandular trichome in the adaxial. 10Xx40X

Legends: Pa: Palisade tissue; Un: Unicellular, uniseriate trichomes; Sp: Sponge parenchyma.

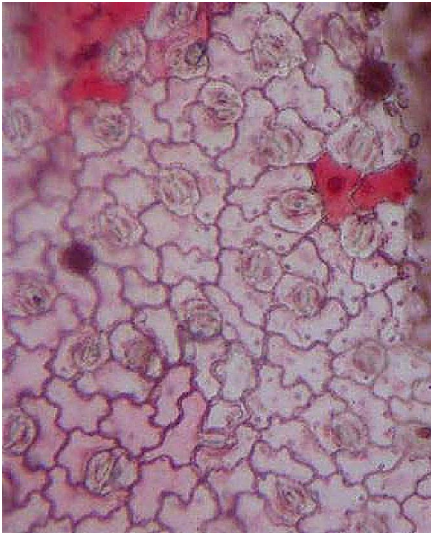


Fig16:Anomocytic stomata 10Xx10X

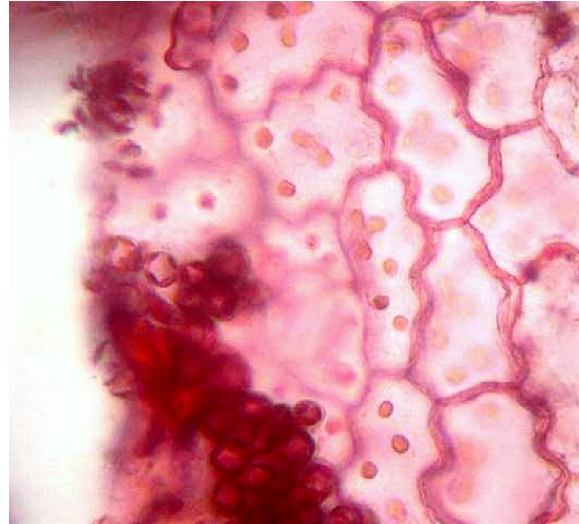


Fig17:Epidermal cells with abundant crystals. 10Xx40X

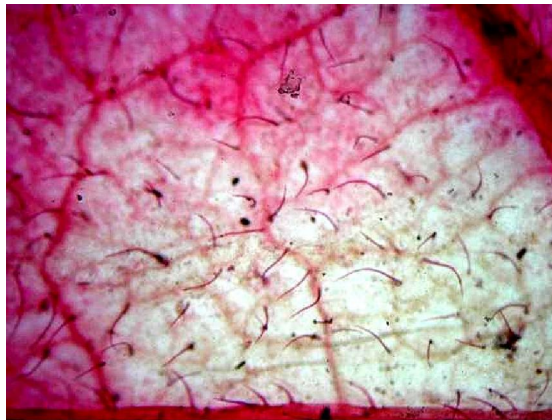


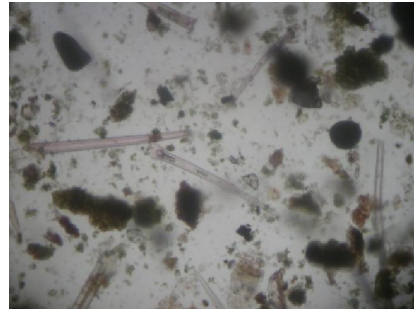
Fig18:Trichomes and veins lets.



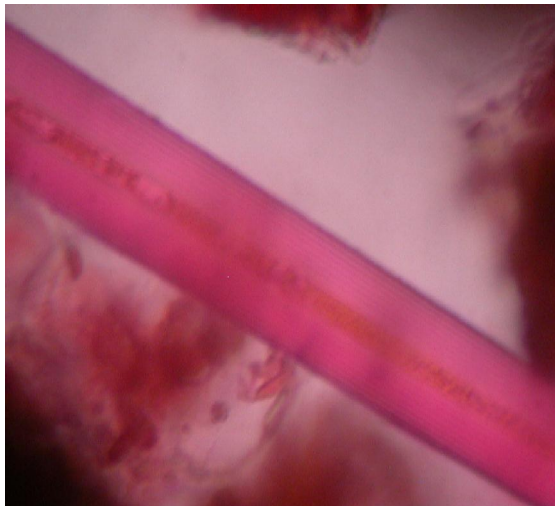
Fig19:Veins with spiral elements 10Xx40X



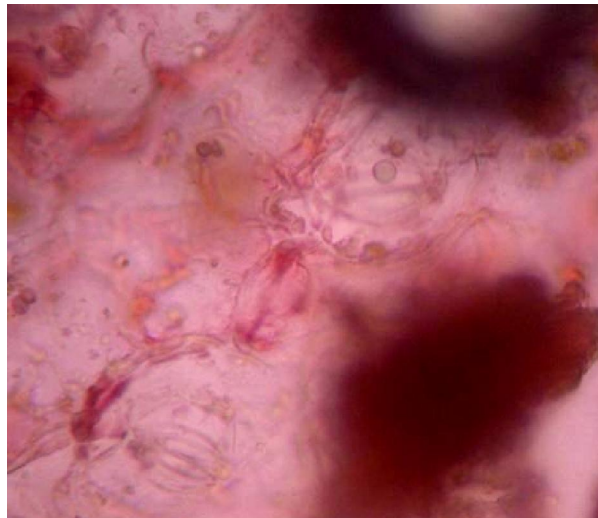
Macroscopy----Leaf powder. Fig:20.1



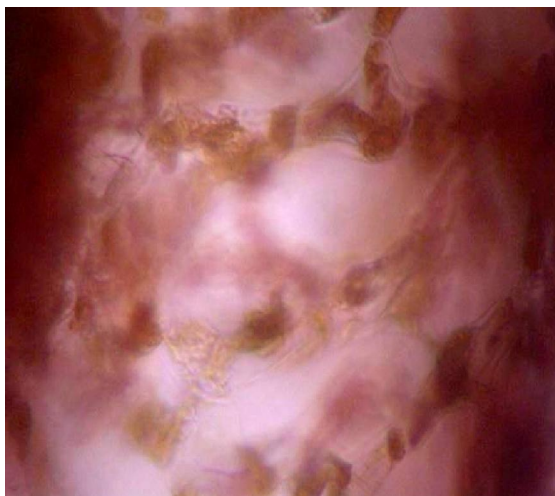
Different fragments of tissues 10xX10x Fig:20.2



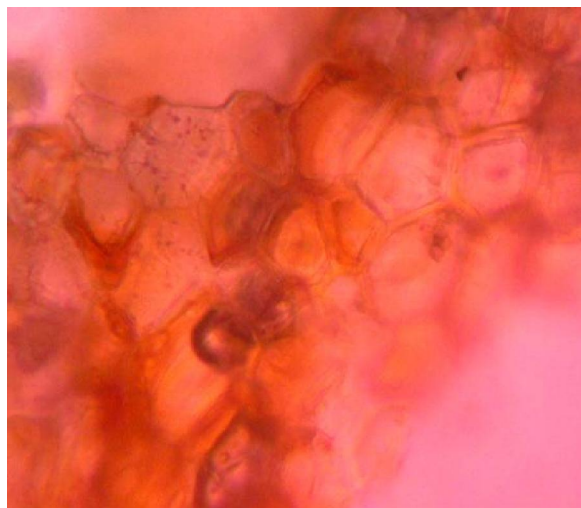
Fibers 10xX40x Fig:20.3



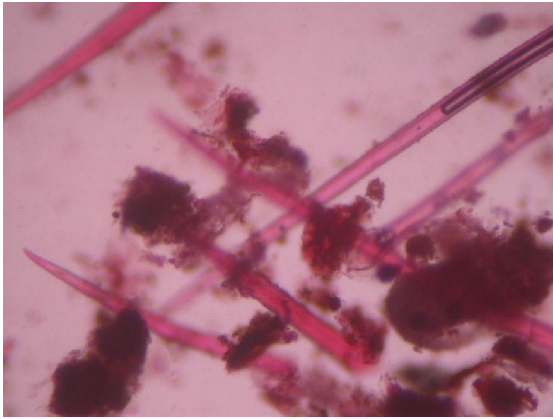
Fibers, trichomes and crystals. 10xX40x Fig:20.4



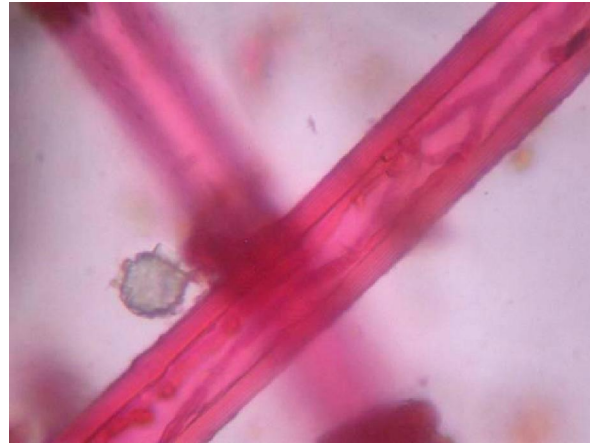
Collenchymatous cells 10xX40x Fig:20.5



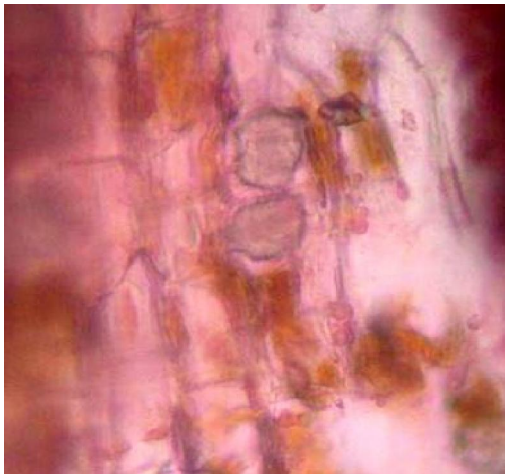
Epidermal cells surface view. 10xX40x Fig:20.6



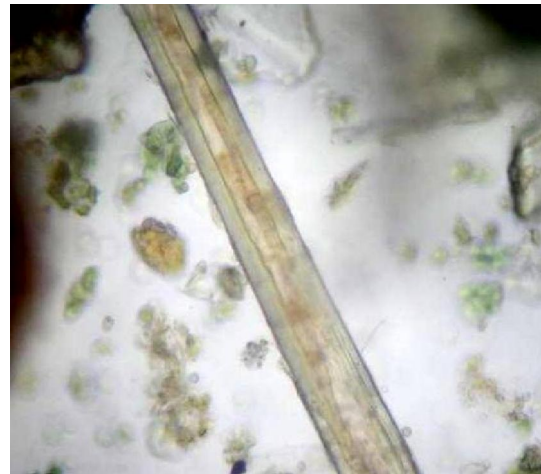
Abundant Trichomes. 10xX40x Fig:20.7



Crystal and fibers. 10xX40x Fig:20.8



Abundant crystals and Parenchymatous cells.
10xX40x Fig:20.9



F iber10xX40x Fig:20.10

Fig20: Powder microscopy of Leaf powder.

Powder microscopy of Leaf powder Ipomoea pes-tigridis Linn.

Green in colour, coarse to touch, smell agreeable, tastes slightly sweetish, when treated with chloral hydrate solution and water following fragments of different tissues were observed under the microscope.

1. Fragments of abundant elongated unicellular trichomes.
2. Fragments of. Elongated and long abundant trichome with stomata
3. Fragments of thinwalled parenchymatous cells.
4. Fragments of thinwalled epidermal cells.
5. Fragments of thinwalled epidermal cells with clustered crystals.
6. Fragments of epidermal cells with simple trichomes.
7. Fragments of rounded thinwalled parenchymatous cells.
8. Fragments of abundant elongated fibers in groups.
9. Fragments of collenchymatous cells.
10. Presence of Anomocytic stomata.

Diagnostic characters

- 1) Presence of abundant elongated trichomes. (Fig:20.7)
- 2) Presence of Clustered type of calcium oxalate crystals abundantly.(Fig:17)
- 3) Presence of abundant fibers (Fig:20.10)

Table----2---Behaviour of the drug powder with different Chemical reagents (Leaf)

Treatment	Colour observations
Powder +Distilled water	Light Green
Powder+5%Aqueous FeCl3	No change
Powder+Glacial acetic acid	No change
Powder+5% HNO3	No change
Powder+N/10 Iodine Solution	Blue colour
Powder+ConHCL	Light Green
Powder+ConH2SO4	Black
Powder+Ammonia solution	Light green
Powder+5%Aqueous Naoh	Light green.
Powder+5%Aqueous KOH Solution.	Light Green

Physico-chemical details

Physical constants: The physical constant determined by standard methods ⁹⁻¹⁰.

The results are given in table-4

Table-4:Physical Constants

PHYSICO-CHEMICAL PARAMETRES (% W/W)

Name of Test.	Root	Leaf
Total ash	7.9	8.1
Acid insoluble ash	1.54	1.1
Water soluble ash	2.75	2.1
Water insoluble ash	4.8	5.1
Moisture content (LOD) at 110 C	12.11	15.14

Preliminary phytochemical tests revealed the presence of Alkaloids, Glycosides, Flavonoids, Saponins, Tannins, Carbohydrates and Proteins given in (Table -6).

Table 6: Preliminary Phytochemical screening .

S.No	Chemical test	Root	Leaf
1	Flavanoids Lead acetate test	+	+
2	Glycosides Legal test	-	+
3	Steroids Leibermann buchard test	-	-
4	Alkaloids a)Dragendroffs test	+	+
5	Saponins Foam test	+	+
6	Carbohydrates a)Molishcs test	+	+
7	Proteins Biuret test	+	-
8	Tannins Ferric chloride test	+	+

Discussion and Conclusion:-

Ipomoea pes-tigridis Linn. is one of the important drug used as Laxative and in the treatment of Skin diseases. This plant has resemblance with *Merremia aegyptia* (L.) Urb. For the identification it is hard. With this study the plant was authentically identified. In this paper the macro, and microscopical characters of the root, stem and leaf along with the physico-chemical and Preliminary phytochemical analysis are presented. The parameters of present study can be used as a reference for further scientific investigations.

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