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# The Detail Pharmacognostic Account On Plant Beach Spider Lily (Hymenocallis Littoralis)

Pinki Jaiswal[1*], Sarang Jadhav[2], Kaushal Isame[3], Sunny Gupta[4], Ms. Shubhangi Kshirsagar[5], Dr. Smita Takarkhede[6],
Affiliated to Mumbai University, Ideal College of Pharmacy and Research,
Kalyan, Maharashtra, India

**Abstract:- Beach spider lily plant is tall with narrow sword shaped leaves and spider shaped petals containing white flower born in a cluster. The plant is anti-inflammatory, antioxidant, antibacterial and antiparasitic. The aim of the present study was to carry out detail pharmacognostic analysis of beach spider Lily plant (hymenocallis littoralis) family: amaryllidaceae. The present study deals with pharmacognostic characters as identification parameters of the leaves, flower, bulb and root which were subjected to macroscopic and microscopic evaluation. Phytochemical and physicochemical studies were done using standard recommended parameters and histological features of leaves such as stomatal number and stomatal index was also calculated by calibration of stomata as per standard procedure. The macroscopic study of leaf showed smooth leaf surface with entire margin while venation was parallel, acute at apex and flower was white in Color with six petals and 6 seamen with dorsifixed anther, while stigma was minute and trilocular and superior ovary. The microscopic study revealed the presence of paracytic stomata, lignified fiber, epidermis in leaf while flower showed anther, pollen, lignified fiber, phloem fiber and collenchyma, parenchyma, lignified epidermis, lignified fiber were present in bulb. The microscopic study of root revealed the presence of phloem, phloem fiber, non lignified fiber and brownish matter. Physicochemical parameters such as ash value and extractive value were also determined. The preliminary phytochemical screening showed the presence of alkaloids, tannins and carbohydrates. The present study will be useful in authentication and identification of crude drug.**

***Keywords:-*** *beach spider Lily, leaf, flower, pharmacognostic, physicochemical, phytochemical*.

## I. INTRODUCTION

The pharmacognostic study of drug of natural origin nowadays increases the interest because they are considered as medicine from natural source and these kinds of drug always supposed to be safe. In the case of Medicinal plants the quality and quantity of chemical constituents is the main factor responsible for therapeutic efficiency. pharmacognostic studies ensure plant identity and lay down standardization parameters such as morphological, phytochemical, physicochemical and microscopic analysis.[1] [2]

Plant spider Lily botanical name is hymenocallis littoralis belonging to family Amaryllidaceae. It is the plant species of genus hymenocallis, native to warmer coastal regions of Latin America and widely cultivated and naturalized in many tropical countries.[3]Beach Spider Lily is a plant 30-70 cm tall with narrow sword shaped leaves. In beach spider Lily plant 2 to 12 flower are born in a clustre and around the flower there is long stalk approximately 2ft arising from the centre of the leaves. The petals of the flower look like a spider legs, that's why it is called as Spider Lily.

It is one of important medicinal plant. The part of the plant such as leave has anti-inflammatory and antibacterial properties.[9] root and rhizome extract is used as nasal drop for snake bite, the only part of the plant is used for wound healing is the bulb. Throughout the history of spider lily plant various alkaloids had been discovered from its bulb.

There are various Plants which is belonging to the Amaryllidaceae family were notified to contain alkaloids that are known to exhibit a pharmacological activities in a wide range. [4]

A various number of alkaloids were isolated from spider Lilly plant such as such as lycorine, littoraline, haemanthamine, hippeastrine, tazettine, pretazettine, homolycorine, lycoramine, vittatine, macronine and lycorenine. These compounds were reported to exhibit various pharmacological effects such as antiviral, anticancer, antibacterial, antiparasitic, antioxidant [11], and wound healing [13]. Lycorin which is pyrrolophenanthridine alkaloid and it is one the major alkaloids found in hymenocallis littoralis.[5]There is no data available regarding its detail pharmacognostic study of spider lily plant therefore the present detail pharmacognostic study of plant Spider lilywas undertaken to evaluate its detail quantitative microscopy of powder, phytochemical evaluation, microscopical features, morphological character and physicochemical study such as ash value, extractive value. **(Figure No.01)**

## II. MATERIAL AND METHOD

### *A. Collection*

The plant was collected from medicinal garden of Ideal College of Pharmacy and Research, Kalyan.**(Figure No.02)**

### *B. Chemicals and instrument*

Sodium chloride, ethanol, tannic acid, concentrated sulphuric acid, lead acetate, chloroform, and microscope, stage micrometer, camera lucida.

### *C. Phytochemical test*

Determination of phytochemical was performed as per standard protocol followed in Ayurvedic Pharmacopoeia.

*D. Preparation of plant extract*

Ethanolic extract: The ethanolic extract was prepared by cold maceration. About 50 g of fresh flower, leave, and bulb were minced and were extracted with 150 ml ethanol solvent at room temperature and kept for 24 hr until the color of the plant part becomes pale.The extracts obtained were filtered separately using Whatmann No. 1 filter paper. This filterate was collected and concentrated at low temperatures on heating mantle. This concentrated ethanol extract is used for determination of phytochemicals and extractive value estimation.

Aqueous extract: The aqueous extract was prepared in as me manner as that of ethanol extract accept using water as solvent instead of ethanol. These extract is then used for further studies.

## III. PHARMACOGNOSTIC STUDY

*A. Macroscopic study*

Organoleptic evaluation of drug include the study of external character such as color, odour, size, shape, taste and special features including touch and texture etc. Organoleptic evaluation can be done by means of organs of special sense which includes the above parameters and therby define some specific characteristics of the material which can be considered as a first step towards establishment of identity and degree of purities.

*B. Microscopic study:*

Microscopic study is carried out by using microscope for detail examination of a drug whuch include counting of specific histological features such as stomatal index, stomatal number and can also be used for quantitative microscopy of drug.All determination was carried out by using compound microscope (10x, 40x) attached with a camera.

a) Powder microscopy:
The dried Leaves of plant beach spider lily were powderd and sieved to obtained fine powder. It was taken up for powder microscopy evaluation as follows: A small quantity of powder was kept on a slide and after mounting on glycerine, 10min were provided as spared out time. Finally, it was observed for powder microscopical characters. [7]

b) Stomatal number and stomatal index:
As per the standard procedure by adusting stage micrometer and camera lucida in microscope The stomatal number and stomatal index number was been calculated. The stage micrometer was adjusted and the calibrated after the calibration the glass slide for stomata was prepared and adjusted on the microscope and then there number was been calculated.

Stomatal number: It is the average number of stomata present in per square millimeter of the epidermis.

Stomatal index**:**It is the percentage proportion of the number of stomata to the total number of epidermal cells.

*C. Physiochemical studies:*

Physicochemical studies include ash value and extractive value to determine the quality and purity of the powder of plant of hymenocallis littoralis.

*D. Determination of Ash-value:*

- ***Total ash:*** Weigh accurately previously weighed and tarred crucible. Add 2-4gm of ground material. Ignite the material by increasing the heat to 500-600°C. Cool in desiccators and weigh. If carbon free ash cannot be obtained in this manner, cool the crucible and moisten the residue with 2ml. of water or a saturated solution of ammonium nitrate R. Dry on a water bath or hot plate and ignite. Allow the residue to cool for 30min. and weigh. Calculate of total ash value.
- ***Acid-insoluble ash:***To the crucible containing total ash, add 25 ml of hydro chloric acid, cover with a watch glass and boil gently for 5 minutes. Rinse the watch glass with 5ml of hot water and add this liquid to crucible. Collect the insoluble matter on an ash less filter paper and wash with hot water until the filtrate is neutral. Transfer the filter paper containing the insoluble matter to the original crucible, and then ignite at 450-500°C to constant weight. Cool in dedicator for 30 min and weigh without delay. Calculate the content of acid-insoluble ash in mg per gram of air-dried material.
- ***Water-soluble ash:***To crucible containing total ash, add 25ml. of water and boil for 5min. collect mater on ash less filter paper. Wash with hot water and ignite for 15min. at temperature not exceeding 450°C. Subtract the weight of this residue in mg obtained from total weight of total ash.

*E. Determination of solvent Extractive value:*

Weigh accurately, about 4g of coarsely powdered air-dried material to a glass stoppered conical flask. Macerate with 100ml of the required solvent for the given plant material for 6 hour, shaking frequently then allow to stand for 18 hour. Filter rapidly taking care not to lose any solvent, transfer 25 ml of the filtrate to a treated fiat-bottomed dish and evaporate to dryness an a water bath. Dry at 10°Celsius for 6 hour, cool in a desiccators for 30 minutes and weigh without delay. Calculate the contents of extractable matter in mg per g of air-dried material.[8]

*F. Phytochemical screening:*

The aqueous and alcoholic extract of the powdered drug were subjected to various qualitative tests for the identification of various plants constituents present in that species. [6]

a) Tests for Alkaloid:
- ***Dragondroff's test:***Extract was treated with 1ml of Dragondroff's reagent. An orange-red precipitate indicates the presence of alkaloid.[12]
- ***Mayer's test:*** Extract was treated with 1ml of Mayer's reagent. Whitish yellow or cream-colored precipitate indicates the presence of alkaloids.
- ***Hager's test:*** Extract was treated with 1ml of hager's reagent. Crystalline yellow colored precipitate shows the presence of alkaloids.

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- ***Wagner's test:*** Extract was treated with few drops of Wagner's reagent. Formation of reddish brown prepitate shows the presence of alkaloids.

b) Tests for Carbohydrates:
- ***Feeling test:*** To 1ml of the extract, add equal quantities of Fehling A and B, upon heating formation of brick red precipitate indicate the presence of sugar.
- ***Benedict test:*** To 1ml of Benedict reagent, add 1ml of extract solution and boil.formation of red color precipitate shows the presence of sugar. [12]

c) Test for Tannin:
To 1ml of the extract, add ferric chloride solution, formation of a dark blue or greenish black color product shows the presence of tannins.

d) Test for Flavanoids:
Extract is treated with amyl alcohol, sodium acetate and ferric chloride. A yellow color solution formed, disappear on addition of an avid indicate the presence of flavonoids.

e) Test for Saponins:
Take small quantity of alcoholic and aqueous extract separately and add 20ml of distilled water and shake in a graduated cylinder for 15 min lengtheise. A 1cm layer of foam indicates the presence of saponins.[6]

f) Test for steriods:
a. Salkowaski test:
Take a small quantity of extract and 2ml of chloroform and 2ml of conc. Sulphuric acid then shake the mixture. Chloroform layer appears red and acid layer shows greenish in color.

b. Libberman burchard test:
Take a 2ml of extract and mix with chloroform then add 2ml of aceric anhydried and 2 drop of conc. Sulphuric acid from the side of the test tube. First red then blue and finally green colour appears shows the presence of steroids.

g) Cardiac glycoside test:
a. Keller killani test ***:***
Dissolve 5ml Or aqueous in 3ml of concentrated acetic acid. Add 1drop of conc. Sulphuric acid gradually. A reddish brown ring forms at the interface, the upper acetic acid layer turns bluish green.
b. Fixed oil test :
Take the 5ml of extract and add 5ml of alcohol. The solubility of sample in alcohol shows the presence of fixed oils.

## IV. RESULTS AND DISCUSSION

### *A. Macroscopic Characteristics*

Leaves: Leave of spider lily plant was approximately 45-56 cm in length and 4.5 – 7.5 cm in width. The leaves were simlpe, greenish in color.The shape of leave was linear, entire margin, apex acute and parallel venation was observed in the leave. **(Figure No.03)**

Flower: Flower of spider lily is pure white in color. The flowers are in fragrant white umbels, each flower with slender recurved petals and elongated stamens emerging from a central cup. The flower tube is 14-17 cm long or longer. **(Figure No.04)**

Petals: 6 petals are arranged in two separate whorls of three part each (trimerous).
- Stamen: six stamens arranged in two trimerous whorls
- Anther: dorsifixed or pseudobasifixed
- Style: slender
- Stigma: Minute
- Carpel: number of carpels is 3
- Ovary: superior and trilocular
- Style: slender

### *B. Microscopic characteristics*

Leaf microscopy: The transverse section of leaf passing through midrib showed a single layer of epidermis on both surface. Paracytic Stomata were present in Upper and lower epidermis. It also contains lignified fiber. **(Figure No.05)**

Flower microscopy: The Anther, petals and ovary of flower were observe under the microscope.**(FigureNo.06)**

### *C. Powder microscopic study*

- Leaf: The leaf powder was brownish in color, epidermis, lignified fibers and paracytic stomata were present. **(Figure No.08)**
- Bulb: The parenchyma, collenchyma, lignified cells and epidermis were present in bulb powder. **(Figure No.07)**
- Flower: The flower powder was yellowish brown in color, pollen, anther, phloem and lignified fiber fragments were observed under the microscope. **(Figure No.09)**
- Root: The root powder was dark brownish in color, phloem, non lignified fiber and brownish matter were present when it was observed under the microscope. **(Figure No.10)**

### *D. Stomatal number and stomatal index*

The stomatal number and stomatal index was found to be 11 and 16.6 %. The stomatal index was calculated by formula:

$$I = S/E+S \times 100$$

Where S= number of stomata per unit area
E= number of epidermal cells in the per unit area
**(Figure No.11)**

*E. Physicochemical analysis*

Physicochemical parameter of powder of beach spider lily leaf is shown in table. Studies of physicochemical constant can serve as a valuable source of information and are usually used in judging the quality and purity of a drug. In physico chemical parameters, ash value was determined in three forms such as total Ash, water soluble Ash and acid insoluble Ash. The total ash was 11.5% while waters soluble ash and acid insoluble as was 5.5% and 2.5% respectively.

The extractive value gives an idea about chemical constitution of a drug. The water soluble extractive value was 5% and ethanol soluble extractive value was 3%. **(Table No.01)**

*F. Phytochemical screening*

Phytochemical screening of major principle constituents present in plant of hymenocallis littoralis such as flavonoids, tannins, saponins, alkaloids, steroids, carbohydrates were determined by standard phytochemical methods. The results of qualitative phytochemical analysis of crude powder of plant were shown in**Table No.02**.

## V. CONCLUSION

The pharmacognostic analysis is not reported previously in this plant thus making first report which provides detail pharmacognostic profile of beach spider Lily.The macroscopic, microscopic and phytochemicals as well as various aspects of various parts of plant were studied and describe along with physicochemical and stomatal number & index studies in authentication adulteration for quality control of raw drug. This study could be used as a diagnostic tool for the standardization of this medicinal plant and it will be helpful in crude drug characterization.

## ACKNOWLEDEGMENT

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| Ash values | % w/w |
|---|---|
| Total ash value | 11.5% |
| Acid insoluble ash value | 2.5% |
| Water soluble ash value | 5.5% |
| Ethanol soluble extractive value | 3% |
| Water soluble extractive value | 5% |

Table 1: Physicochemical Parameters of Hymenocallis Littoralis (%W/W)

| Name of phytoconstituent | Test | Result |
|---|---|---|
| Alkaloids | *Dragendroff's test,Wagner's test,mayer's test, hanger's test* | + + + + |
| Flavanoids | *Shinoda test* | - |
| Steroids | *Liebermann burchard test, solkowaski test* | - - - |
| Saponin gylcoside | *Foam test* | - |
| Cardiac glycoside | *Keller- killiani test* | - |
| Fixed oils | *Solubility test* | - |
| Tannins | *Vanillin- HCl test, lead acetate test* | + + |
| Carbohydrates | *Molisch test* | + |

Table 2: Preliminary Phytochemical Analysis of Spider Lily Plant

Fig. 1: Beach spider Lily plant

Fig. 2: Parts of beach spider Lily plant

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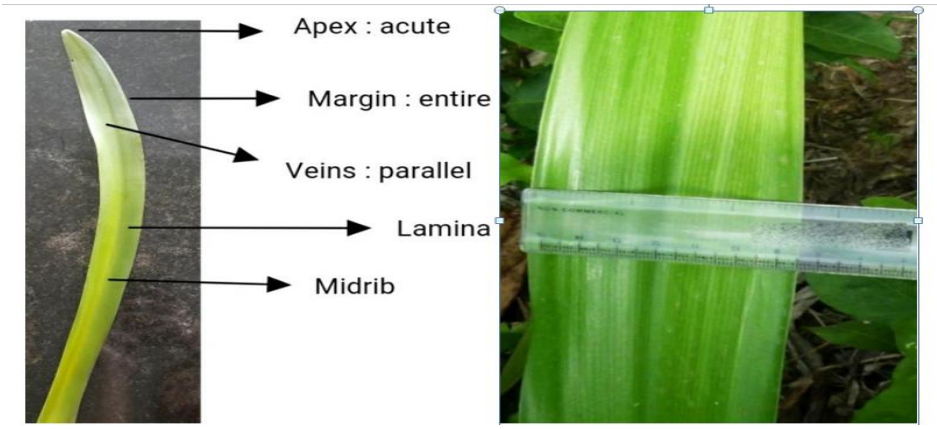


Fig. 3: Morphology of beach spider Lily leaf

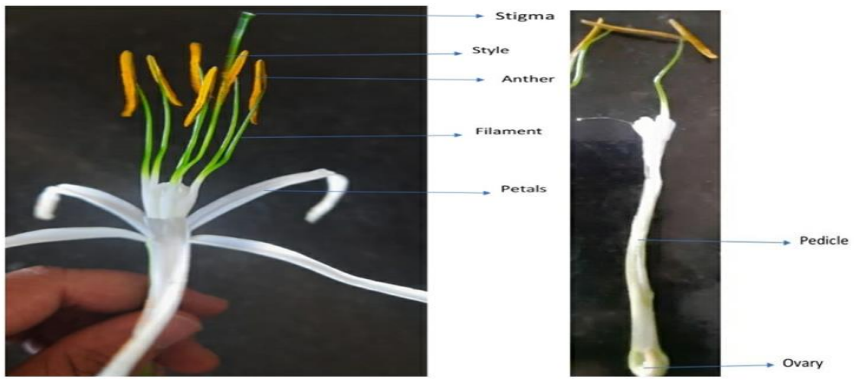


Fig. 4: Morphology of beach spider Lily flower

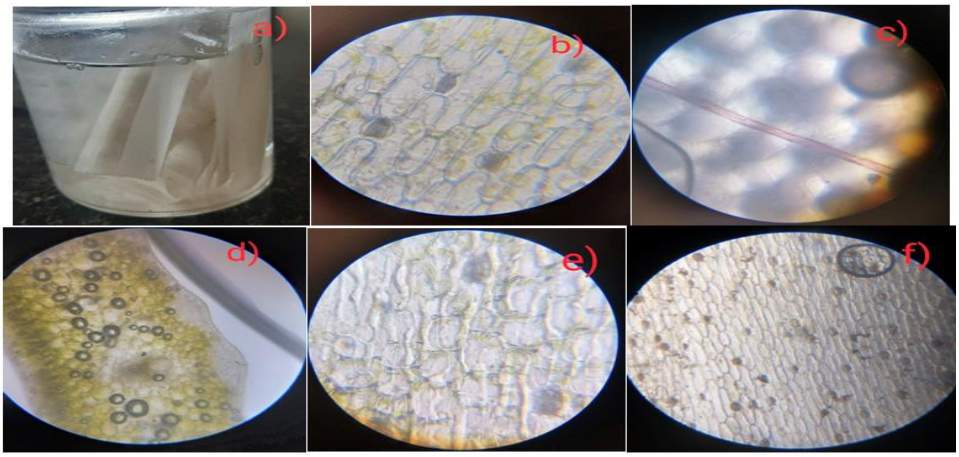


Fig. 5: Microscopic character of beach spider lily leaf.
a)Bleached leaves, b) Paracytic stomata, c) Lignified fiber, d) T.S. of leaf, e) Epidermis, f) Paracytic stomata under 10x

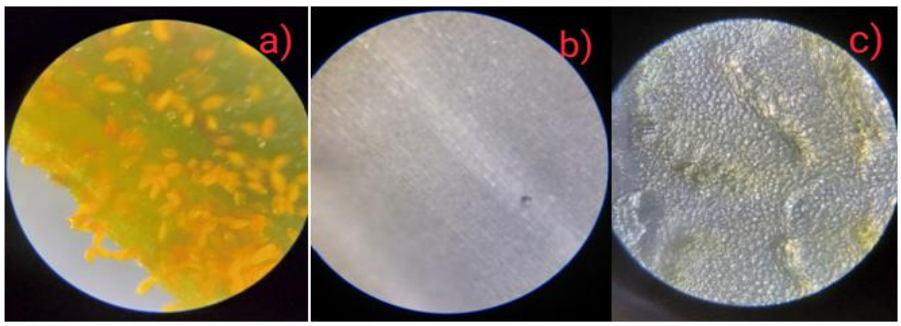


Fig. 6: Microscopy of Flower of beach spider lily plant. a) Anther, b) Petal, c) Ovary

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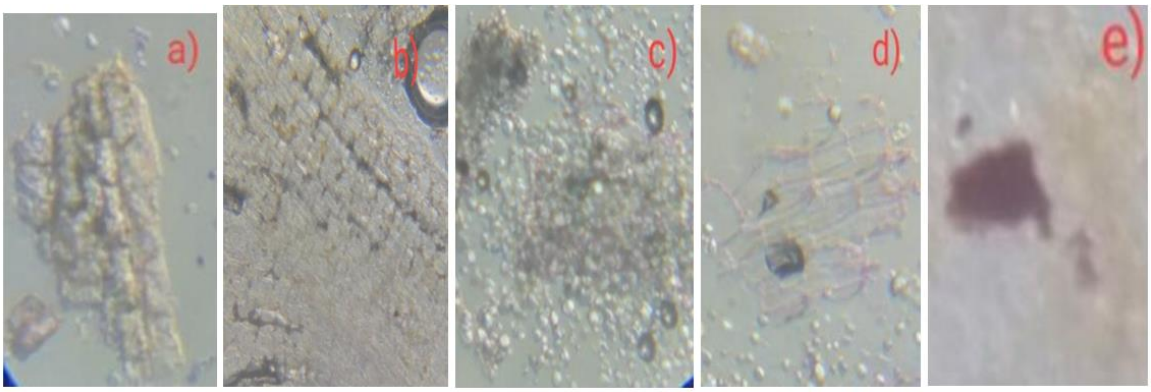


Fig. 7: Photomicrograph of microscopic characteristic of beach spider lily bulb powder.
a) collenchyma b) Epidermis c) parenchyma d) lignified epidermis e) lignified cell

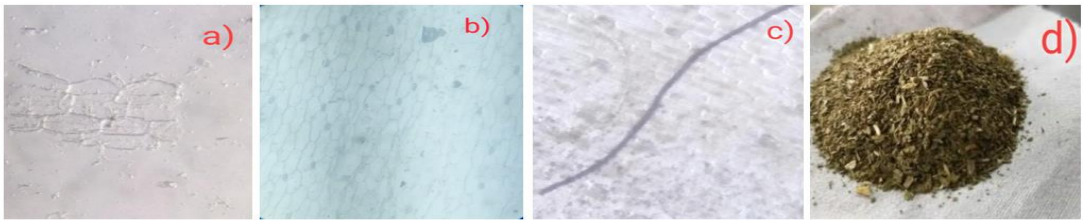


Fig. 8: The Photomicrograph of microscopic characteristic of powder leaf of beach spider Lily.
a) Epidermis, b)paracytic stomata, c)lignified fiber, d) leaf powder

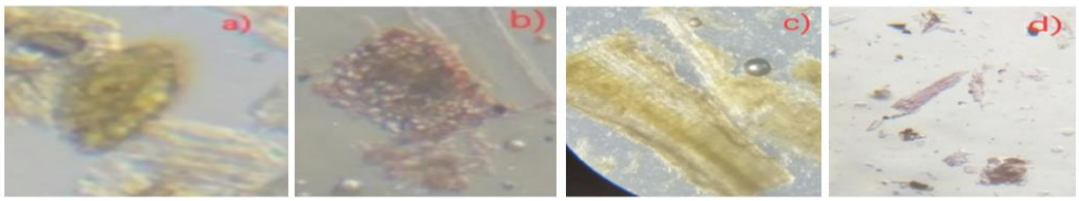


Fig. 9: The Photomicrograph of microscopic characteristic of beach spider lily flower powder.
a) Pollen, b) Anther, c) Phloem fiber, d) lignified fiber

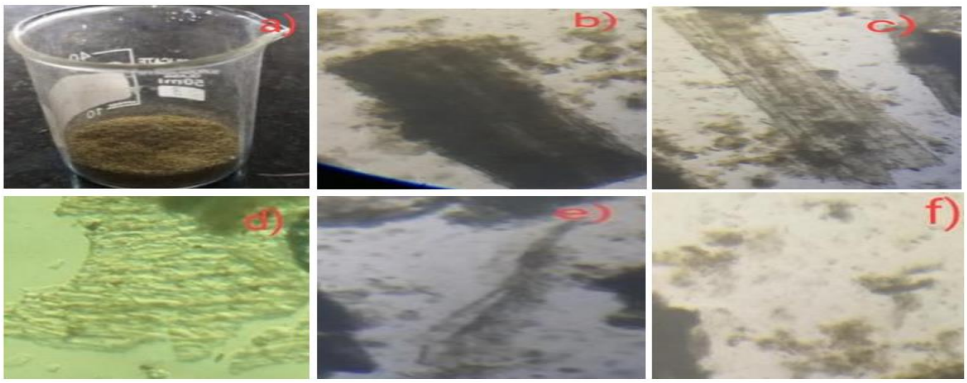


Fig. 10: The Photomicrograph of microscopic characteristic of beach spider lily root.
a) Root powder, b) Phloem, c) phloem fiber, d) Epidermis, e) Non lignified fiber, f) brownish matter.

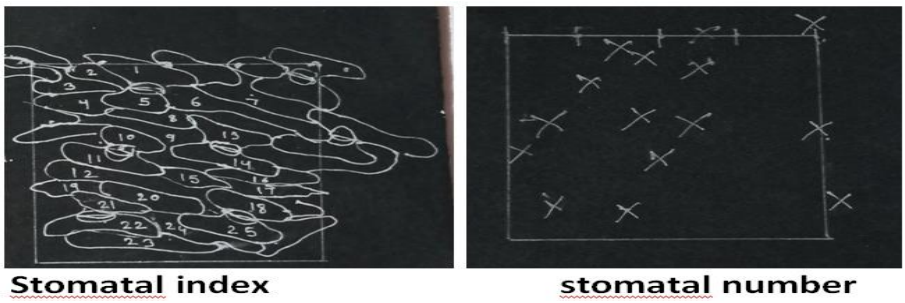


Fig. 11: A portion of lower epidermis of leaf magnified to show stomata.