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Diploma in Pharmacy 1st Year
Pharmacognosy
Experiment

To perform the Gross anatomical study (Transverse Section) of Curcuma.

Aim:

To perform the Gross anatomical study (Transverse Section) of Curcuma.

Reference :

Dr. Gupta G.D , Dr. Sharma Shailesh , Kaur Navjit , "Practical Manual of Pharmacognosy" Published by Nirali Prakashan , Pg.No 98 - 101

Biological Source :

Turmeric is the dried rhizome of Curcuma longa Linn. (syn C domestica Valeton) which belongs to Zingiberaceae family.

Materials and Apparatus Required

Curcuma, sharp razor, brush, dropper, needles, watch glass, microscopic slides, cover-slips, safranin, glycerine, and compound microscope.

Theory

Turmeric (Curcuma longa) is an ancient Indian spice, medicinal herb, and culinary dye that belong to the ginger family It's rhizomes, or root stems, are bright yellow or orange. Curcumin, which makes up around 3% of turmeric, is the most frequently studied curcuminoid.

Morphological Characters

1) **Epiblema:** It is a single-layered epiblema. It is made up of cutinized cells with thick walls. The epiblema has faded and been replaced by ten-layeredrectangular cork cells in older specimens.

   i) **Cortex:** It is heterogeneously divided into:

      a. **Outer Cortex:** It is composed of secondary and primary cortex parenchymatous tissue.

      b. **Middle Cortex:** The trabaculae are one-cell thick partition walls that separate radially oriented air chambers (a character of hygrophilous plant)

      c. **Endodermis:** The cells in the cortex's deepest layer are rectangular and barrel-shaped.

   ii) **Pericycle:** This three to four-layered structure is made up of rectangular cells.

   iii)**Vascular Tissue:** They are arranged in a radial pattern. Phloem patches and xylem are alternately organised, with xylem being exarch.

   iv) Pith: It is well-developed parenchymatous tissue with thick walls.

2) **Rhizome:** Triangular to round are the TS of rhizome whereas epidermis is single layered made of very thick wall cells and covered with thick cuticle.

   i) **Cortex:** It consists of three to five layers of thick-walled collenchymatous cells, ill-developed endodermis.

   ii) **Pith:** They are large parenchymatous, with a large number of cells filled with starch grains or sphaeraphides, and a number of vascular traces that traverse the pith, which could be leaf traces.

   iii) **Vascular Tissue:** Vascular bundles are joined and dispersed, and the xylem is made up of vessels and parenchyma. Phloem parenchyma is made up of sieve tubes.

   iv) **Epidermis:** The top and lower epidermis are identical, they are both single-layered, cuticle-covered, and stomata-perforated.

v) **Mesophyll:** Palisade and spongy parenchyma are not distinguished in mesophyll; they are jumbled together, and the entire mesophyll is chlorophyllins with dispersed oil holes. The epic-based wall of oil cavities is strongly delineated.

vi) **Vascular Bundles:** They are mixed with oil cavities, and each bundle is conjoint and collateral with an arch of sclerenchyma over xylem. Cortex

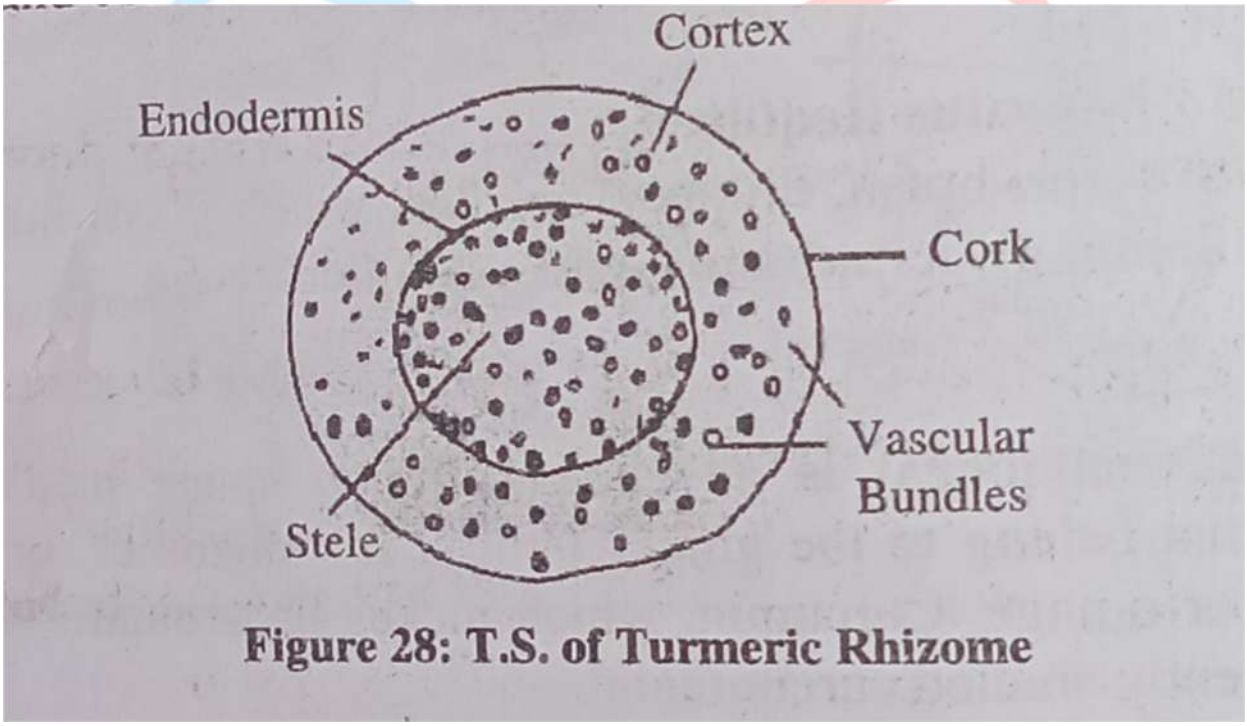

Figure 28: T.S. of Turmeric Rhizome

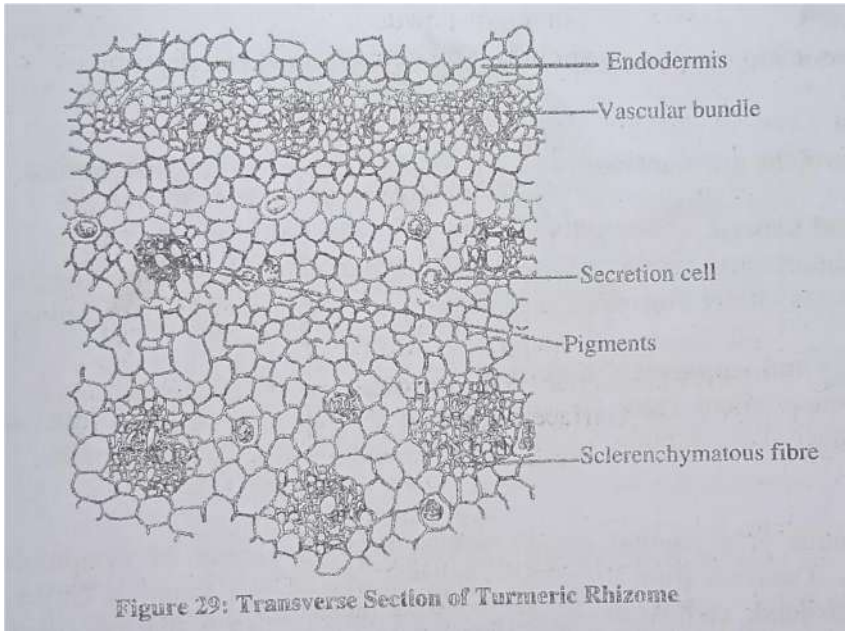

Figure 29: Transverse Section of Turmeric Rhizome

Procedure

1) Taking Sections:

i) The dissected plant should be placed between index finger and thumb, keeping the razor's edge perpendicular to the plant's longitudinal axis. It should be cut down into thin sections.

ii) These sections should be shifted into a watch glass with the help of a brush using the edge of blade. The watch glass must hold water.

2) Process of Staining:

i) 2 to 4 thin transverse section should be picked and shifted to a different watch giass which contains safranin stain.

ii) The seed should be left completely rest in the stain for few minutes.

iii) After a while, the section of the stain should be removed and rinsed again with water to remove any extra strain.

3) Mounting:

i) Stained section should be placed in the middle of the clean slide and mount it with water or glycerinc.

ii) The coverslip should be placed slowly using a needle.

iii) Blotting paper can be used to remove excess water or glycerine from the edge of the coverslip. iv) It should be confirmed that no air bubbles emerge during the mounting process.

4) Precautionary Measures:

i) Enough water should be available to both the blade and the substance during dissecting the segment.

ii) A brusin should be used during working with sections.

iii) The coverslip should be gently placed to prevent air bubbles.

iv) Excess glycerine can be removed with filter paper.

Result :

The gross anatomical study of Curcuma was performed and determined.