

EXPERIMENT NO-5

STUDY THE MORPHOLOGICAL, HISTOLOGICAL, POWDER CHARACTERISTICS, EXTRACTION AND DETECTION OF CORIANDER FRUITS

Aim of the experiment : To study the morphological, histological, powder characteristics, extraction and detection of Coriander fruits.

Requirements:

1. **Apparatus:** Compound Microscope, Petri plate, cover slip, Glass-Slide, beaker, dropper, filter paper, forceps, tripod stand, wire gauze, dissecting needle, sharp razor, etc.
2. **Chemicals:** Conc. HCL, Flavoglucinol, Glycerine, Ethyl acetate, toluene, conc. HNO₃, vanillin- sulphuric acid. etc.

Theory:

CORIANDER

Synonyms: Dhania

Biological source: Dried ripe fruits of *Coriandrum sativum*. It contains not less than 0.3% volatile oil

Family: Umbelliferae

Chemical Constituents- It contains an essential oil (0.03-2.6%). The different parts of this plant contain linalool, monoterpenes, limpiene, α -pinene, β -terpinene, pcymentene, citronellol, borneol, camphor, coriandrin, geraniol, dihydrocoriandrin, coriandrons A-E, flavonoids, fixed oil, malic acid and tannins.

Uses: It is used as a stomachic, spasmolytic and carminative which have a greater bioactive property. It also possess antioxidant activity, diuretic, anti-convulsant anti-diabetic activity, sedative hypnotic activity, anti-mutagenic, anti-microbial activity, anthelmintic activity.

MACROSCOPIC CHARACTERS:

1) **Colour:** Yellowish- brown to brown

2) **Odour:** Aromatic

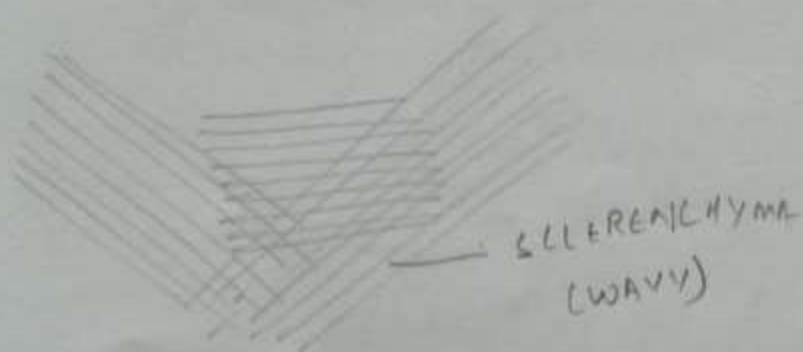
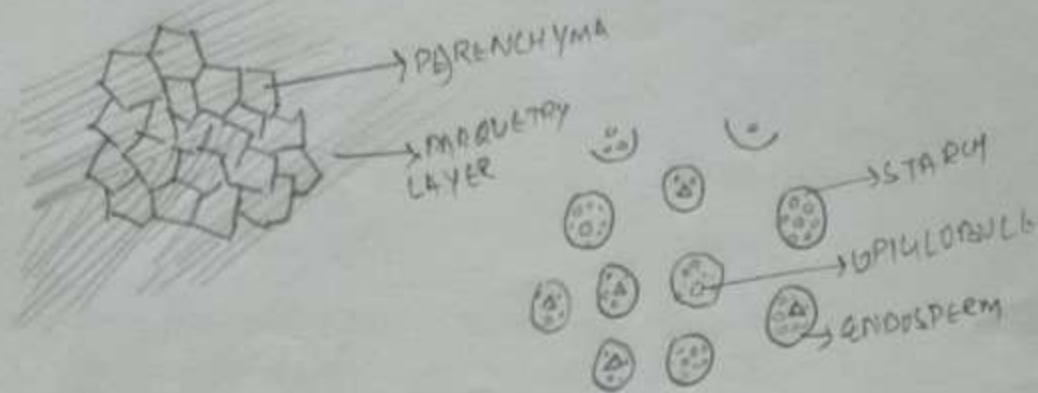
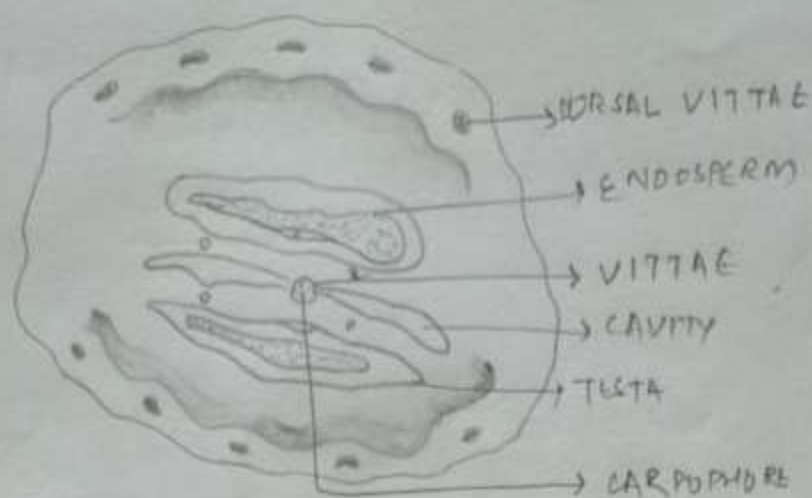
3) **Taste:** Spicy and characteristic.

4) **Shape:** Sub-globular cremocarpous fruit

5) **Size:** Fruits are 2-4 mm in diameter and 4- 30 mm in length

6) **Extra Features:** About 10 primary ridges and 3 secondary ridges are present. Primary ridge are wavy and inconspicuous, while secondary ridge are straight. It is further described as an

T.S of CORIANDER FRUIT



endospermic and acoelospemic fruit. The weight of 100 fruits is approximately 1 g.

MICROSCOPICAL CHARACTERS:

1. PERICARP

- a) **Epicarp:** Single layer, thickened, Polygonal cells with occasional stomata and calcium oxalate crystal, from 0.003 to 0.01 mm. in diameter, mostly in rosette aggregates, either isolated or in aleurone grains; covered by smooth cuticle.
- b) **Mesocarp:** Inner and outer layer of parenchyma with sclerenchyma in between
- c) **Outer layer:** Poorly arranged tangentially elongated non- lignified parenchyma. Lacunae at dorsal side
- d) **Middle layer:** Fusiform, lignified Sclerenchymatous cells in sinuous cells in tangential and longitudinal bands
- e) **Vascular bundle:** Five vascular bundles at dorsal side, present above longitudinally elongated sclerenchyma
- f) **Two vittae:** On the commissural surface and four lacunae on the dorsal surface
- g) **Inner Layer:** Large irregular, hexagonal, lignified parenchyma.
- h) **Endocarp:** Elongated cells forming parquetry layer.

2. Seed

- a) **Testa:** Single layered and yellowish in colour
- b) **Endosperm:** Thick walled, polygonal, cellulosic parenchyma containing oil globules and aleurone grains.

POWDER CHARACTERISTICS:

Sclerenchymatous layer: Groups of fusiform fibres running wavy, crossing each other and are lignified

Endocarp: Parquetary arrangement of thin walled lignified cells with polygonal cells of mesocarp.

Endosperm: Polygonal parenchyma with aleurone grain and oil globules. Microrosette crystals of calcium oxalate in the cells

Vittae: Few yellowish brown fragments of vittae, thin walled, small parenchymatous cells in groups

CALCULATION

$$\% \text{ Yield} = \frac{\text{Essential oil wt.}}{\text{Sample wt.}} \times 100$$

$$= \frac{0.727}{100} \times 100$$

$$= 0.727\%$$

$$R_f \text{ value} = \frac{\text{Distance travelled by solute}}{\text{Distance travelled by solvent}}$$

$$= \frac{2.6}{5.0} = 0.52$$

(20)

MICRO-CHEMICAL TEST:

Sr. no.	reagent	observation	characteristics
1	Phloroglucinol + Conc. HCl(1:1)	Pink	Lignified sclerenchyma, vascular bundles
2	Alcoholic picric acid	Yellow	Aleurone grains
3	Sudan red II	Pink	oil globules and cuticle

EXTRACTION OF VOLATILE OIL:

Steam distillation is a traditional method of extraction of an essential oil from coriander seeds. The alteration of chemical constituents of essential oils is a major problem associated with hydro-distillation methods this leads to destruction of the heat-sensitive compounds. Therefore, the quality of the essential oil extracts is extremely impaired. Solvent extraction is an alternative to steam distillation method but the method also has problem of destruction of thermally liable constituents due to application of high temperatures.

(27)

DETECTION BY TLC:

Volatile oil is identified by thin layer chromatography by using silica gel as stationary phase and Ethyl acetate: toluene (93:7) as mobile phase. After drying the TLC plate, the spot was detected after spraying vanillin- sulphuric acid solution. Calculate the Rf value by using formula

RESULT:

From the above experiment the morphological, histological & powder characteristics of Coriander fruits were studied.

The percentage yield of volatile oil from coriander fruits was found to be 0.727%.

The extracted volatile oil was identified by TLC method.

Rf value is 0.52

Signature of Faculty

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