

Kaif. D. Pharma Ist Year...

Sub. = Pharmacognosy.

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Aim $\Rightarrow$ To the study of microscope.

Reference $\Rightarrow$ Thakur n. Vishnu. "Practical
book of Human Anatomy & physiology."

Published by Nirali Prakashan, 11th edition
November - 2015

Page No - 1

Requirements - Microscope

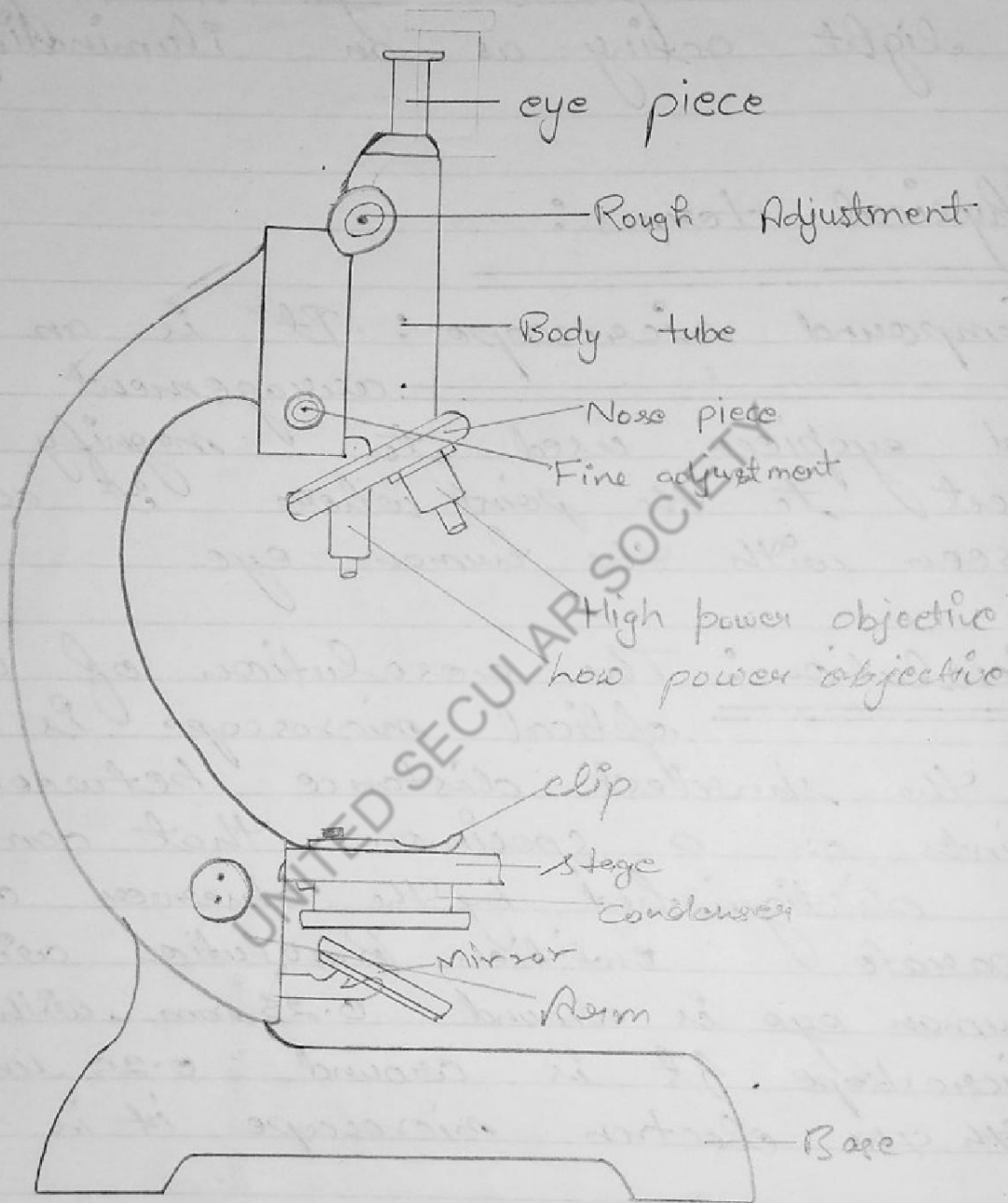
Theory - Microscope is an optical instrument which uses visible light & a system of lenses to view magnified images of very small objects. This microscope also called light microscope.

- i) Simple microscope
- ii) Compound microscope
- iii) Electron microscope

i) Simple Microscope $\Rightarrow$ Has one set of lence and low magnification.

ii) Compound Microscope $\Rightarrow$ Has two set of lences and objective with

Teacher's Signature : _____



higher magnification.

- (c) Electron Microscope :- This microscope differs from optical microscope. In that the electron interact with the sample to generate image instead of light acting as an illuminating source.

Physical Terms :

Compound Microscope : It is an arrangement of objective and eyepiece used to magnify an object to the point where it can be seen with the human eye.

- (b) Resolution : The resolution of an optical microscope is defined as the shortest distance between two points on a specimen that can still be distinguished by the observer as separate entities. Consequently it describes how small objects can close to each other and can still be recognisable. Resolution with human eye is around 0.25 mm, with light microscope it is around 0.25 μm and with the electron microscope it is 0.5 nm.

Teacher's Signature : _____

- (c) Working Distance $\Rightarrow$ It is the distance between the objective lens and the specimen. The magnification increase in working distance. The ideal working distance is 0.15-1.5 mm for the oil immersion objective, 0.5-4 mm for high power objective and 5-15 mm for low power objective.

Parts of a Compound Microscope

- (1) The Support System
- (2) The Illuminating System
- (3) The magnification System
- (4) The adjustment System

(i) The support system $\Rightarrow$ The support system consist of various part which are described below.

(a) Base of microscope $\Rightarrow$ It is horse shoe shape and is the base on which the microscope rests.

(b) Pillars $\Rightarrow$ Projecting upward from the base, it is joined to the chandle of microscope.

Teacher's Signature : _____

Object: To study the microphology of the is foghula.

Reference: Kakate C.K practice pharmacognosy
4th edition Vallabh prakashan page no. 104

Requirements: Dried seeds of Isophoda.

Synonym: Isopogon Isopogal - Isogul psyllium.

Biological Source: Dried seeds of plantago
ovata forsk.

Family: Plantaginaceae.

Morphological Characteristics.

Colour $\rightarrow$ Pinkish gray to brown Size $\rightarrow$ to 35x70 to 2mm

Odour $\rightarrow$ None Shape $\rightarrow$ Cymbites Loent shaped

Taste $\rightarrow$ Mucilaginuous

Chemical Constituents:

1. Epidermal cell of is a pical contain mucilage mainly.
2. Isopogal luck constitute about 25-27% of seeds
3. Thick is fully mucilage seeds also contains fixed oil and proteins.

Use: It is used as laxative, demulcent, emall, etc.

Teacher's Signature : _____

Aim: To study the morphology & microscopy of Indian senna.

Reference: Kokate C.K. the textbooks of pharmacognosy published by "Nirali prakashan" 5th edition 2016 Page no - 9, 24, 29, 28.

Synonyms: Cassia, Senna.

Biological Source: It consists of dried leaflets of *Cassia angustifolia*.

Family: Leguminosae.

Morphological characteristics:

Colour $\Rightarrow$ Yellowish green

Odour $\Rightarrow$ Slightly characteristic

Taste $\Rightarrow$ Bitter

Size $\Rightarrow$ length 50-60 mm

Shape $\Rightarrow$ leaves are lanceolate

Chemical Constituents: Anthraquinone
Glycosides.

Teacher's Signature : _____

→ Sennosides A

→ Sennosides B

→ Sennosides C

→ Sennosides D

Resins, Sabinic acid and calcium oxalate.

Chemical test :- [Berntagars test] :-

→ In this test drug dried with the dilute sulphuric acid filtered and to the filtrate benzene or ether or chloroform is added and shaken well the organic layer is separated to which ammonia is added slowly the ammoniacal layer shows pink to red odour due to the presence of anthraquinone glycosides.

Uses : It is used as Laxative.

It is used for weight loss.

Microscopy study of Indian Senna :- Senna

leaflets has fasciculated structure. In transverse section of lamina and Cribra shows the following features.

Teacher's Signature : _____

Lamina : Upper & lower epidermis show similar features they consist of a single layer of polygonal cells.

The cell covered with thick cuticle epidermis consists of stomata are seen at regular intervals upper palisade & lower palisade differentiated by the mesophyll.

Midrib : Epidermal layers are continuous over the midrib but the cells of lower epidermis are small.

Teacher's Signature : _____

Aim $\Rightarrow$ To study the morphology of cardamom.

Reference $\Rightarrow$ K. R. Khandaleval. practical pharmacognosy Nirali prakashan 4th edition Page no - 141 - 143.

Synonyms - choti Elaichi.

Biological Source - It consist of dried nearly ripe fruit of *clatcia cardamom* var *minuscule*.

Family : Zingibareace.

Morphological characteristic $\Rightarrow$

Colour $\Rightarrow$ Pericarp, Green to pale buff.

Odour $\Rightarrow$ aromatic. greenish and pleasant.

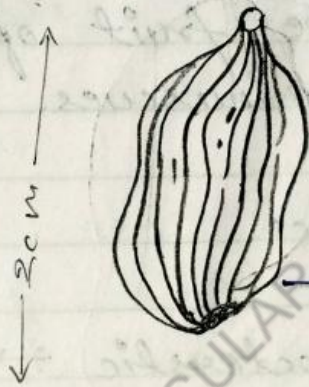
Taste $\Rightarrow$ Strongly aromatic.

Size $\Rightarrow$ Capsules are 2cm in length 0.6 to 1.0 cm in width.

Shape $\Rightarrow$ Oval elongated.

Other Surface $\Rightarrow$ fruit contain three chamber each consists of two source and seeds are inclosed in membrane occulus each chamber contain six to ten seeds in to sources.

Teacher's Signature : _____



Cardamom

Shortly breakd
at apex

Three sided
smooth or
congitudonally
stercited surface.

Chemical Constituents →

Volatile oils → Cineol, limonene, borneol, terpenoids, starch, fixed oil, silica.

Uses : It is used as carminative agent.

(i) It is used as aromatic and flavouring agent.

(ii) It is used as stimulants.

Result → Given the crude drugs of cardamom was successfully.

Aim → To study the morphology and microscopy character of Ginger.

Reference → Kokate C.K. text book of pharmacognosy published by Nirali prakashan 4th edition Page No - 1-128-131

Synonyms → Alarut - Zingiber.

Biological Source → It consists of the fresh and dried rhizomes of zingiber officinal.

Family → Zingiberaceae.

Morphological Characteristic →

Colour → Buff

Taste → pungent

Shape → Conchoid flared species.

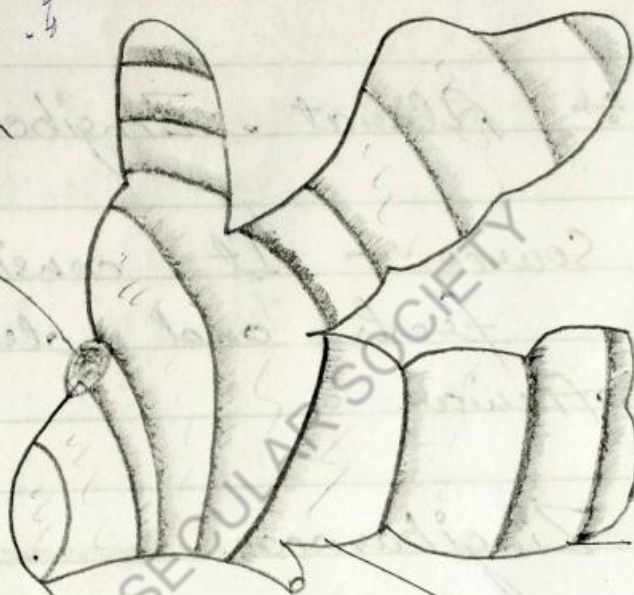
Size → rhizome are about 15cm long and 1.5 - 6.5 cm.

Chemical Constituents: It consists of Volatile oil, starch, fat, fibre, inorganic, metallic, residual moisture.

Teacher's Signature : _____

Scarleft
branch

by

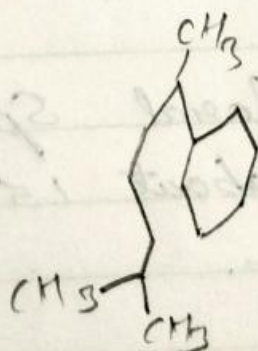


Note

Inter mode

Boed

Grenger shizones



Gringerin

2) Ginger also consist terpenoid hydrocarbons
Sesquiterpene hydrocarbons phenyl
propanoids.

Sesquiterpene hydrocarbon :- α -Gingerol
 β - Bisabolol
 γ - farnesol

Microscopic Character :- Cork consists
irregular orange cell
followed by cortex made of thin wall
barotelymatus. tissues vascular bundle just
inside the endodermis are free of
fibres oil droplets cell and starch
grains are found though out
ground tissues endodermis is free
of starch.

Uses: It is used as aromatic.

- 1) It is used as carminative.
- 2) Ginger oil also used as a mouth wash.
- 3) It is used as stimulant.
- 4) Ginger powder is effective in motion sickness.

Ginger Rhizomes

Result: To the study of the given crude
drugs was studied successfully.

Teacher's Signature : _____

Object: To study the morphological characteristics of "Nutmeg."

Reference :- "Kokate" C.K. The best book of pharmacognosy published by Nirali Bookshan 4th edition 298 page no-4.109.

Synonyms :- myristica, Nix - musenta.

Biological Source :- Dried pericarps of seeds myristica fragrans Horst.

Family :- Myristicaceae.

Morphological characteristics :

Colour :- The kernels are greenish brown

Odour :- Strongly aromatic

Taste :- Pungent and aromatic

Shape :- Ellipsoidal

Size :- 20 to 30 x 20 mm.

External features :- Kernels are irregularly wrinkled and covered with arellus.

nutmeg - 6/11/11



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Chemical Constituents: Nutmeg kernels contain 7.13% of volatile oil fat about 25-30% and starch.

- 2) Volatile oil is the chief active constituents of the drug containing myristicin in the chief constituents and responsible for flavours.

Uses: It is used as carminative and flavouring agent.

b) It is used as antibacterial.

c) It is used as in the manufacturing nutmeg oil in fragrance in the cosmetic products.

Report: To study the morphological characteristics of given crude-drugs study was successfully.

Teacher's Signature : _____

Aim: To study the morphological characteristics of "Black Pepper"

Reference: "Kokate C.K" the best book of pharmacognosy published by Nirali Prakashan 4th edition 2018 Page no. 980

Requirements:

Drug: Dried fruits of black pepper.

Biological Source: Dried unripe fruit of pepper zizum.

Synonyms: pepper, pipes, zizum, maucha.

family: piparaceae.

Morphological characteristics:

Colour: Blackish, Brown to greyish brown.

Odour: Aromatic.

Taste: pungent and spicy.

Size: Berries are 3-5 mm in diameter.

Shape: oval.

Teacher's Signature : _____

External feature: Globular and Relatively wrinkled with stigma at apex.

3) The pericarp is thin with single kernel. Kernel is white and hollow at the centre.

Chemical Constituents:

3) Black pepper contains to 25% of Volatile oils
piperine 6-10%.

Uses:

1. It is used as the Carminative.
2. It is used as the Aromatics.
3. It is used as the Stimulant and Stomachic.

Report: To study the morphological characteristics given crude drug was successfully.

Teacher's Signature : _____

Object $\div$ To study the morphological characteristics of "Cinnamon"

Reference $\div$ "Kokate C.K" text book of Pharmacognosy published by Nirali Prakashan 1st edition page no-455.

Synonyms $\div$ Ceylon Cinnamon. Kalani Dalchini

Biological Source $\div$ Dried inner bark of shoots of coppiced trees of Cinnamon *zeylanicum*.

Family $\div$ Lauraceae.

Morphological characteristics $\div$

Colour $\div$ Dull yellowish brown externally Dark yellowish internally.

Odour $\div$ Aromatic fragrance.

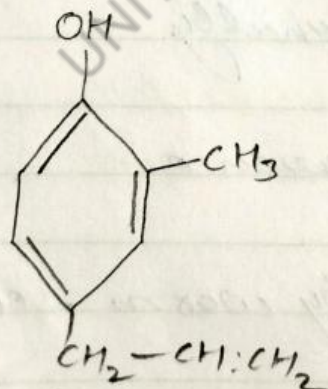
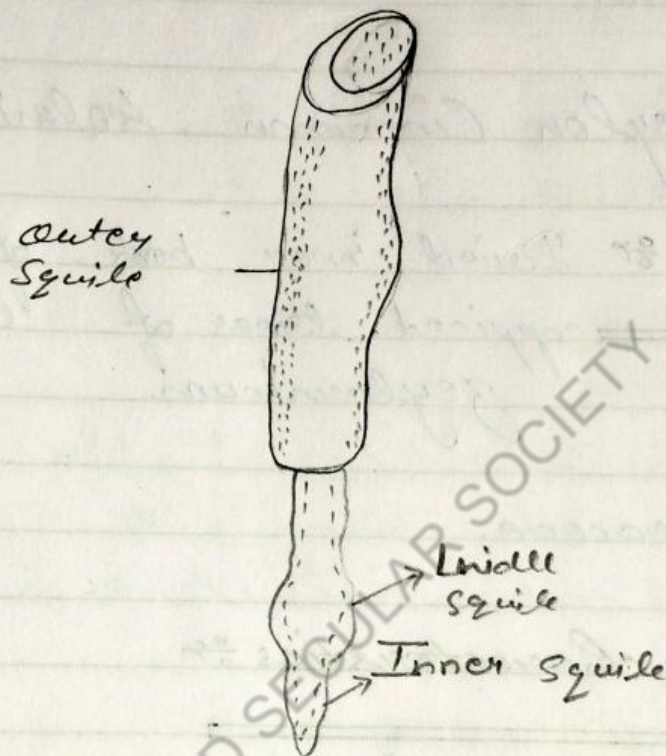
Taste $\div$ Sweet followed by warm sensation

Shape $\div$ Compound squills approximately 0-3 mm in the thickness.

Teacher's Signature : _____

Cinnamon:

दालचीनी



Eugenol

Size - 1 metre in length and 2.1 cm in diameter thickness of the bark is approximately 0.5 mm.

External feature:

Fracture : Splintery

→ The outer surface of the bark is marked by wavy longitudinal striations with small holes of scars left by the lenticles.

* The inner surface also shows longitudinal striations. Bark is free of cast.

* Chemical constituents :-

→ Cinnamon bark contains 0.5 to 0.1 % Eugenol Volatile oil. 1.2 % tannins
Volatile oils contains Cinnamylaldehyde, eugenol, benzaldehyde, Cinnamyl alcohol.

→ It also contains mucilage Calcium oxalate starch substance as medicinal.

Uses :- It is used as stomachic.

Teacher's Signature : _____

- (ii) It is used as Carminative and Stimulant.
(3) It is used as inside astringent and antiseptic.

Report: To study the morphological characteristics of cinnamon.
"were done."

Teacher's Signature : _____

Object $\Rightarrow$ To study the morphological & microscopical characteristics of (Clove) of flower bud.

Reference $\Rightarrow$ "Kohate GK" text book of pharmacognosy published by Nirali prakashan 4th edition Page no- 4.72.

Requirement $\Rightarrow$ Clove, slide, microscope.

CLOVE $\Rightarrow$

Synonyms $\Rightarrow$ Clove flower & Caryophyllum.

Biological Source $\Rightarrow$ It consists of dried flower bud of *Eugenia Caryophyllus*.

family $\Rightarrow$ myrtaceae.

Morphological characteristics $\Rightarrow$

Colour $\Rightarrow$ Dark brown.

Odour $\Rightarrow$ Slightly aromatic.

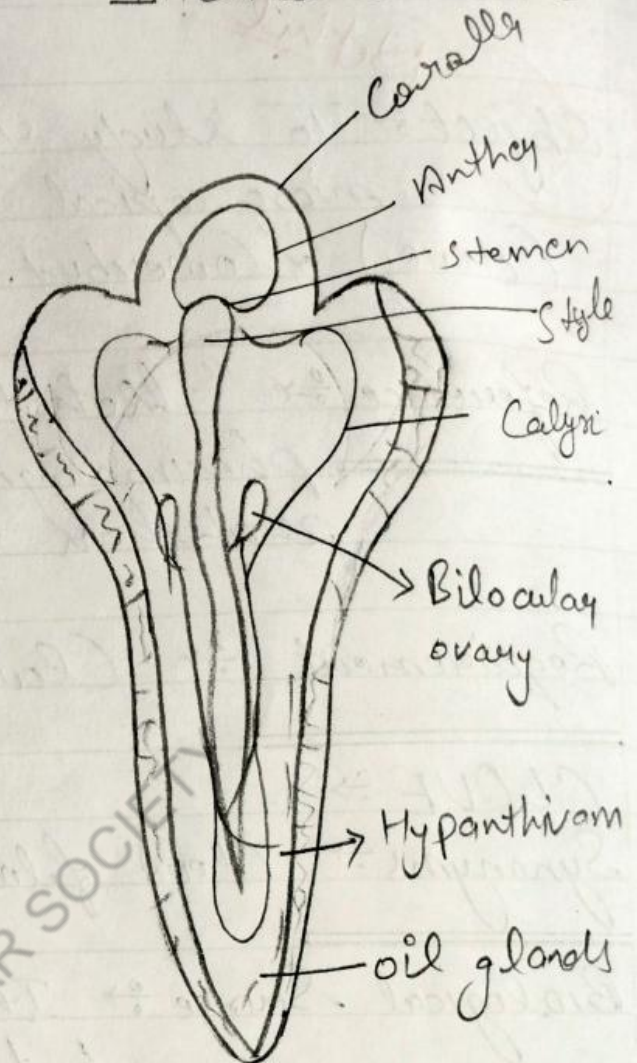
Taste $\Rightarrow$ Pungent.

Size $\Rightarrow$ 10 - 17.5 mm in length 4mm in width and 2 mm thickness.

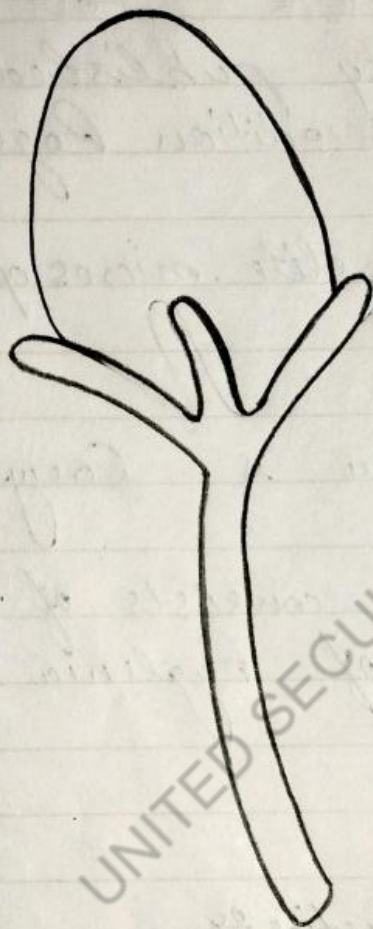
Shape $\Rightarrow$ Sub - Cylindrical.

Teacher's Signature : _____

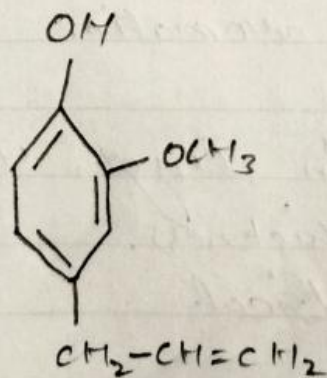
Internal Structure



External Structure



Clove flower bud



Eugenol

Microscopical Characteristics:

→ The epidermis of clove is covered with thick cuticle the epidermis itself consist of straight walled cell and large stomata.

2) Spongy cell are also present in a clove on which phloem fibers are present.

3) Oil glands are found in all part of the drug.

4) Cluster crystal of calcium oxalate stone cells are found on the drug.

5) Clove does not contain starch.

* Microchemical Test :-

S.No	Reagent	Observation	Characteristics
1.	Phloroglucinol concn HCl (1:1)	Pink	Vascular bundle of fibre.
2.	Sudan Red III	Red	Cuticle oil gland
3.	Strong KOH Sol ⁿ	Needle shaped Pits euginate crystals	eugenol of Volatile oil
4.	Dil. HCl	Soluble	Calcium Oxalate Crystals.
5.	H ₂ SO ₄ (60%)	Soluble needle calcium sulphate on standing.	Calcium oxalate Crystals

Teacher's Signature : _____

Chemical Constituents :-

- * 5 to 20 % Volatile oil
- * 10 - 15 % Tannins
- * Resin
- * Eugenol . Acetyl eugenol.
- * Eugenin.
- * Caryophyllenes.

Uses: It is used as dental Analgesic act as Stimulant.

2. It is used as carminative, flavouring agent and antiseptic.
3. Also use in the preparation of Cigarette.
4. The oil is used in perfumery.

Result :- morphology & microscopy of the given crude drug was perform successfully

Teacher's Signature : _____

Object : To study the morphological characteristics of "Ephedra."

Reference : W. Handewal M.R. "Practical Pharmacognosy Nirali prakashan 22 edition April 2022 Page no-19, 4-19, 6."

Kokate C.K. Probst A.P., Gokhale S.B., "Pharmacognosy, Nirali prakashan, 36 edition September 2008, page no-502, 509."

Biological Source : It consists of dried young stem of "Ephedra gerardiana."

Family : Crenetaceae / Ephedraceae.

Synonyms : Ma-Huang

Morphological Characteristics :

Colour : Greenish Yellow

Odour : Agreeable & slightly aromatic

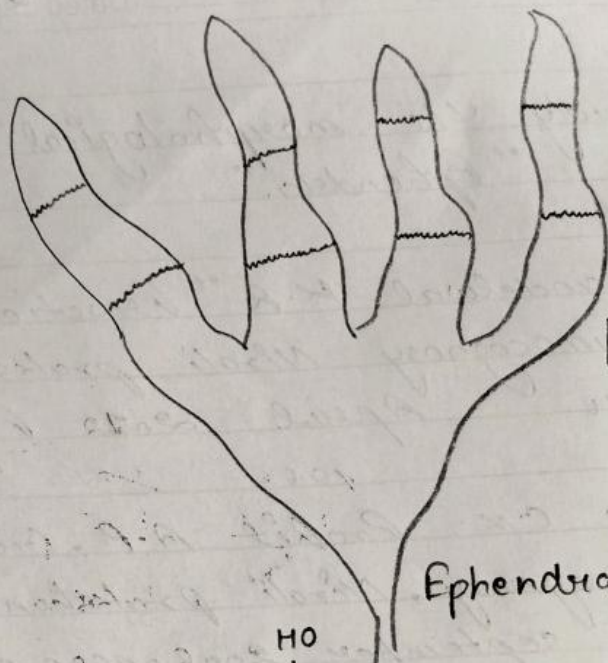
Taste : Astringent & bitter

Shape : Cylindrical

Size : 12-33 cm length 0.8 to 1.5 cm, thickness

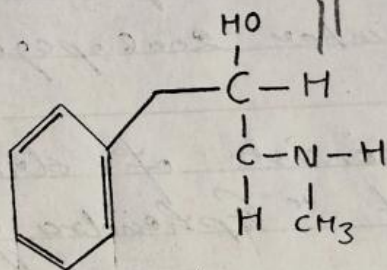
Surface : Rough

Teacher's Signature : _____

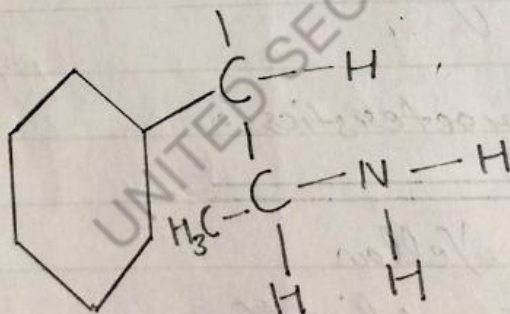


Node
[3.6 cm Inter nodes]

Ephedrine



Ephedrine



Nor - ephedrine

Chemical Constituents :-

Ephedra contains the amino alkaloids or
alkaloids amino like.

Ephedrine [30 - 90 %]

Nor - ephedrine

n-methyl ephedrine

Pseudo ephedrine etc.

Uses :- It is used as

- (i) Symptomatics
- (ii) Bronchodilators in Asthma.
- (iii) Treatment of allergic condition.
- (iv) Like heavy fever.

Allied drugs :- E - Sinice
E - alata

Report :- The morphological characteristics
of ephedra was successfully
stupid.

Teacher's Signature : _____

Object $\Rightarrow$ To study the morphological characteristics of Rauwolfia Root.

Reference $\Rightarrow$ Khandelwal K.R. Practical Pharmacognosy Nirali prakashan 22nd edition April 2012 Page no 1814 - 1815.

$\rightarrow$ Kokate C.M. Purohit A.P. Gokhale S.B. Pharmacognosy Nirali prakashan 36th edition September 2006 Page no 466 - 468.

Synonyms $\Rightarrow$ Saepagandha.

Biological Source $\Rightarrow$ It consists of dried root rhizomes of Rauwolfia Serpentina.
family $\Rightarrow$ Apocynaceae.

Chemical constituents $\Rightarrow$ It consists not less than 0.15% of creser pine group of alkaloids.

Morphological Characteristics $\Rightarrow$

Colour wood $\Rightarrow$ Pale Yellow

Root Bark $\Rightarrow$ Greenish Yellow to brownish

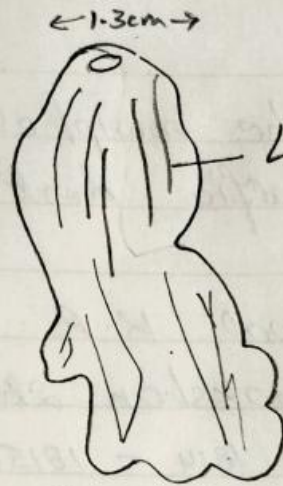
Colour $\rightarrow$ odourless

Taste $\rightarrow$ Bitter

Size $\rightarrow$ About 10-15cm long diameters

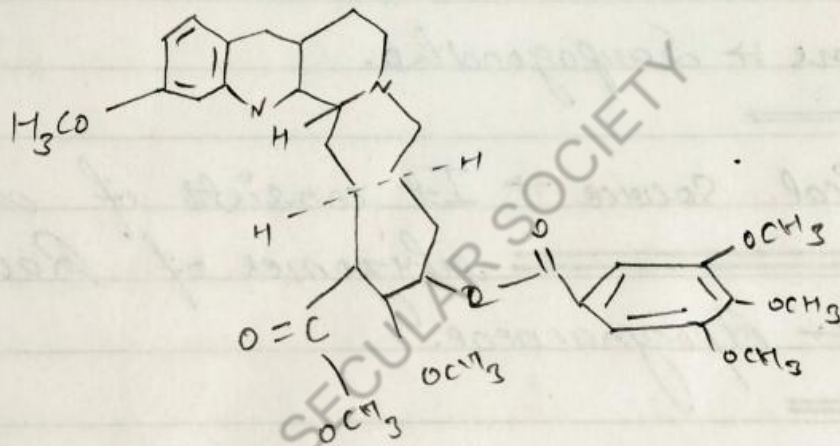
Shape $\rightarrow$ Sub cylindrical slightly tapering tetrae

Teacher's Signature : _____



Longitudinal Wrinkles

Rauwolfia



Reserpine

Fracture → Short conchoidal.

Chemical Constituents → It contains about 30 indole alkaloids.

→ The important alkaloids of Rauwolfia is Reserpine.

→ The other alkaloids present in the drug are

→ Rauwolfiine

→ Reserpinine

→ Serpentine

→ Serpentinine

→ It also contains also resin phytosterol fatty
Acids Alcohol & sugars.

Uses : It is used as →
i) Antihypertensive and
tranquillizing agent.

Report :

The morphological characteristics
of Rauwolfia Root was success
fully studied.

Teacher's Signature : _____

Aim:

To study the morphological characteristics of *Gnaphalium* *cruciatum*.

Reference: Bailey J.S. "Pharmacognosy" B.S.
Sharma publication 14th edition
Page no. 258.

Biological Source →

It consists of fruit of *Tribulus terrestris* (Zygophyllaceae).

Morphology:

Size : 1.2 cm diameter 1-1.5 mm thickness.

Shape : Globular with imbricate corolla.

Colour : Yellowish brown.

Odour : characteristic

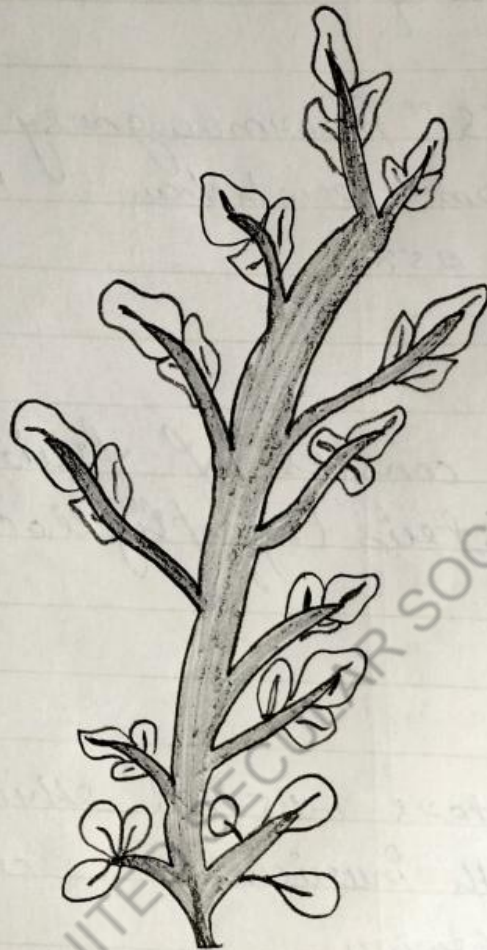
Taste : Mucilaginous

Chemical Constituents:

Contain protodioscin, diosgenin, sarsogenin, ginsenoside, flavone glycoside, caffeoyl zellinioside, alkaloid and potassium nitrate.

Uses: It is used as diuretic, cooling, demulcent, aphrodisiac action.

Teacher's Signature : _____



St. of Punarnava twig

→ Tst is used in the treatment of kidney stones genuerhoeagat.

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Teacher's Signature .

Aim: To study the morphological characteristics of "Gokheru" punarnava.

Reference: Oadery j.s pharmacognosy B.S shan prakashan 11th edition Page no- --.

Biological Source: Drug consists of dried nature whole baccharia diffusa baccharia eripens - B productens.

Morphology:

Stem: Prostrate divaricately swollen at nodes nearly globose green

Size: 0.6-0.9 m long

Leaves: Upper Surface green and glabrous simple thick opposite in unequal pairs at each node.

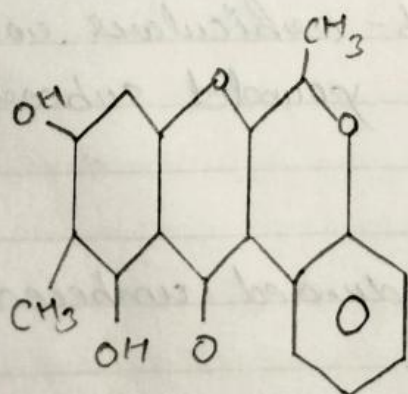
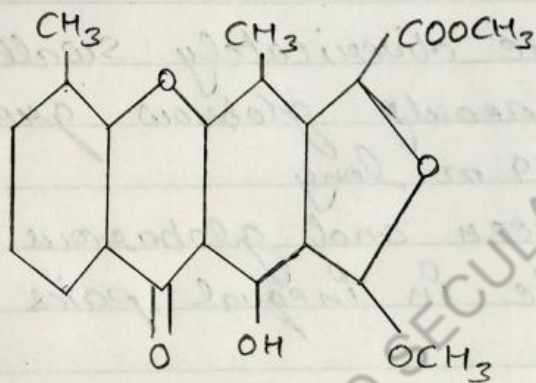
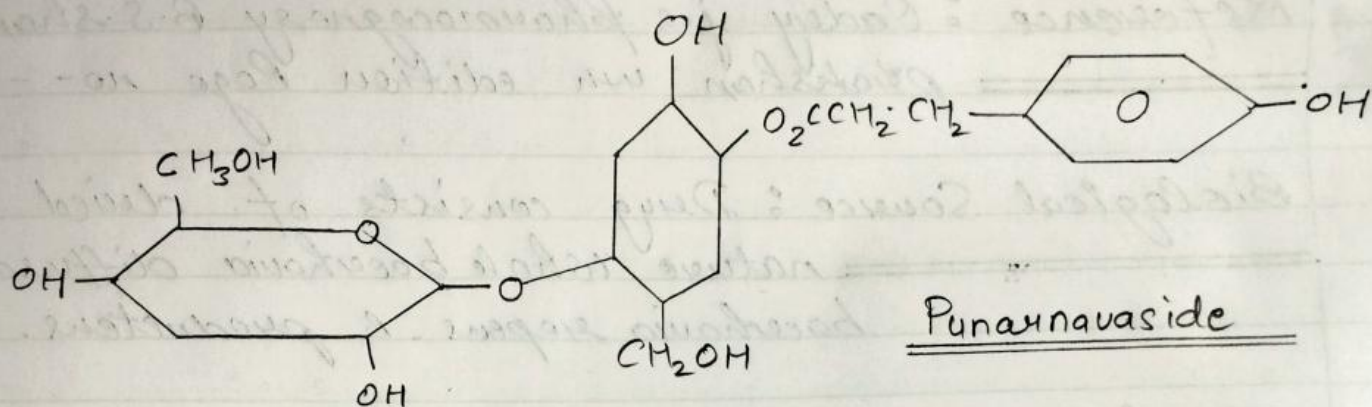
Size: 2.5-3.8 cm Smaller 1.3-2 cm

Colour: Green upper and silvery white beneath

Appearance: Broadly ovate sub-orbicular rounded at upper usually rounded subcordate beneath.

Flower: Small long axillary peduncled umbellate globose

Teacher's Signature : _____



Colour: Pink

Odour: No distinct odour

Taste: highly bitter

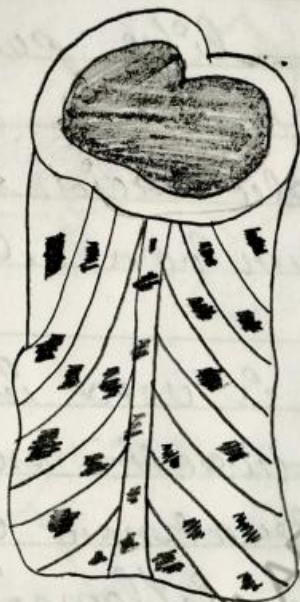
Chemical Constituents: To contain alkaloids like punarnavaside, punarnavacalide, B-Sitosterol, virensic acid, fatty acid like stearic acid, arachidic acid, flavonoids like, boerhaavinone, C-methyl flavones.

Therapeutic Uses: It is used in the treatment of diuretic expectorant.

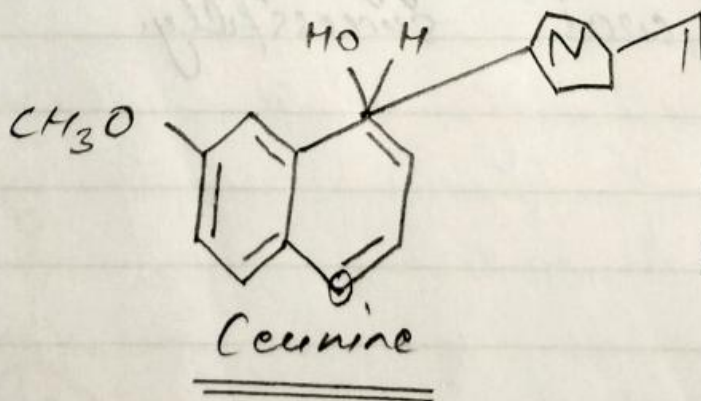
- It is also used in the treatment of jaundice.
- It is also used in anti-inflammatory and anti-bacterials.
- It is used in anti-fungal.
- It is used as cardiac tonic.

Report: The morphology of punarnava studied was successfully.

Teacher's Signature : _____



Eg : Cinchona Bark.



R = CH₃ (Quinine)
R = H (Cinchonine)

Object : To study the morphological characteristics of "cinchona bark."

Reference : Khondelwal K.R. Practical pharmacognosy techniques and exp. Vimal prakashan 22nd edition page no-163.

Biological Source : It consists of dried bark part of cinchona succirubra coccinifera.

Family : Rubiaceae.

Morphological characteristics :

Shape : Cylindrical with cell marked.

Size : 20-30 mm diameter 2-6 mm thick.

Colour : Reddish brown

Taste : Bitter

Odour : Characteristic.

Chemical Constituents : It contains . Quinine
• Quinine
• Quinidine
• Cinchonine
• Cinchonidine

Teacher's Signature : _____

* Therapeutic Uses:

- It is used as anti-malarial.
- It is used as analgesic.
- It is used as cardiac depressant.
- It is used as arial fibrillation.

Result: The morphological characteristics as the cinchona was successful.

UNITED SECULAR SOCIETY

Aim: To the study of morphological characteristics of Agar.

Reference: Kopate ch the best book of Pharmacognosy published by Nirali prakashan 4th edition 2018 page no - 5-24.

Synonyms: Agar-agar Japanese - Tsinglass vegetable gelatin.

Biological Source: Dried gelatinous substance derived from red algal Gelidium Omansia.

Family: Rhodophyceae

Geographical characteristics:

Colour: Yellowish grey to white or colourless.

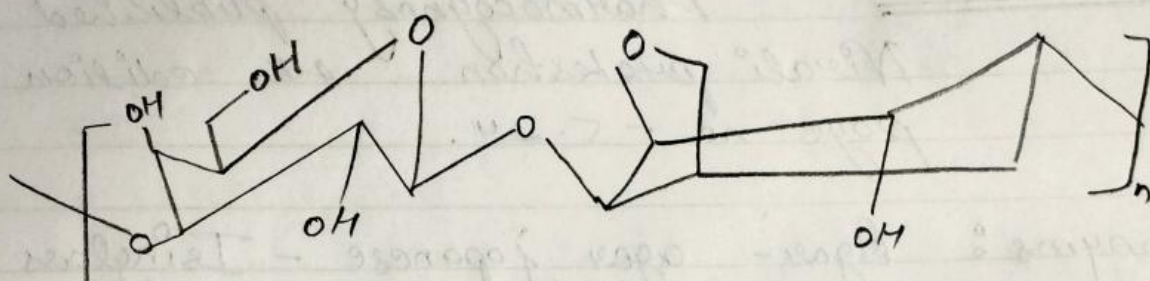
Odour: odourless.

Taste: mucilaginous.

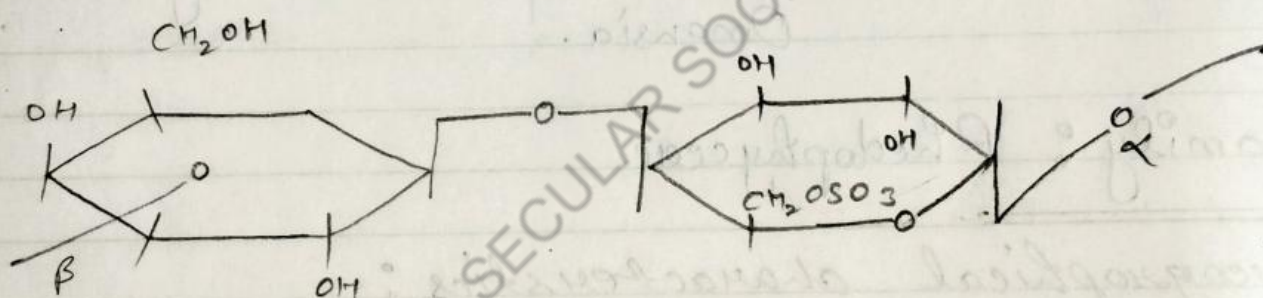
Shape: Various forms like strips, sheets, flakes
Coarse powder.

Size: 4 mm in width and 4 to 60 cm in length.

Teacher's Signature : _____



Agarose



Agaropectin

External features: Strips are translucent, lustrous and stander while the flakes are greyish to white in colour.

Solubility: Insoluble in water and alcohol soluble in warm water.

Chemical Constituents: Agar contains of polysaccharide as agarose and agaropectin.

It contains about 3.5 % cellulose and 6 % nitrogen containing substances.

Uses: It is used as emulsifying agent. It is used as break lenative in the preparation of culture media.

Result:

The morphological characteristics of "Agar" studied was successfully.

Teacher's Signature : _____

Aim: To study the microscopical characteristics
T.S of Azadirachta

Reference: Kokate CK. text book of pharmacognosy
published by Nirali prakashan 4th
edition page no- 4.6-4.7.

Requirements: Dried fruits of Azadirachta (neem)
microscope slide staining agent
glycerine.

Synonyms: Bishop's seed Caryocarpium
link tetrachyspermum carpum
Hierac.

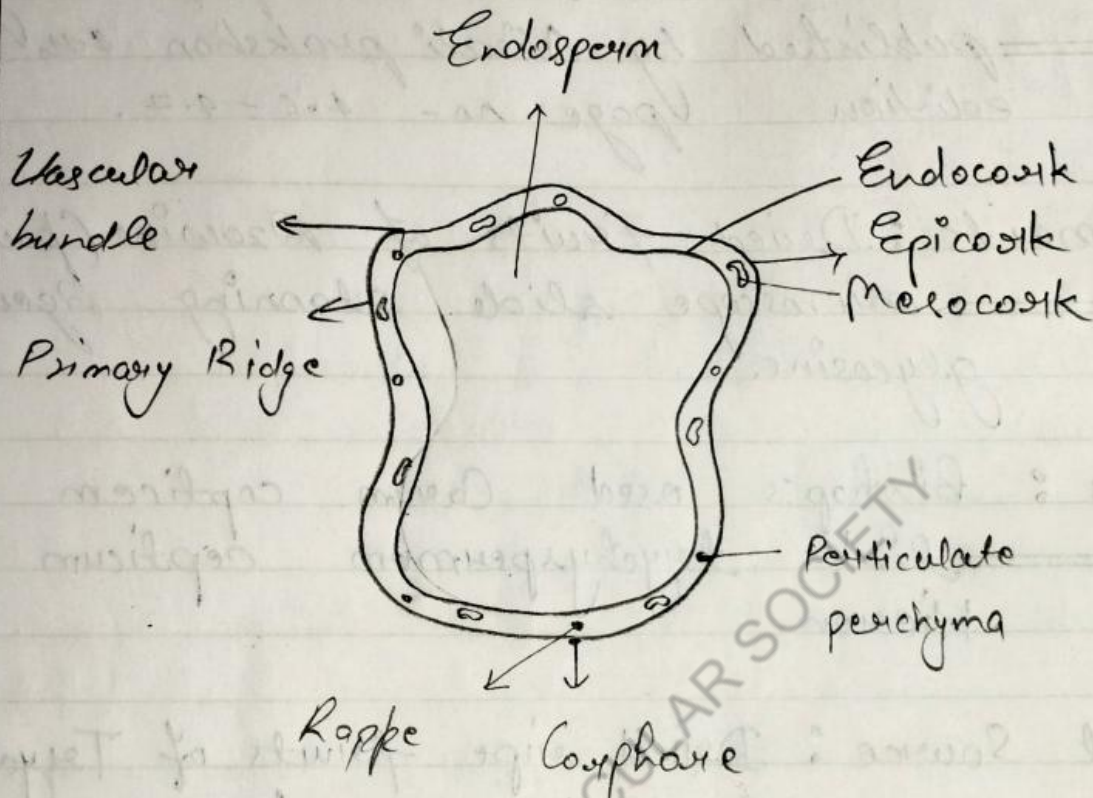
Biological Source: Dried ripe fruits of Tetrachys-
spermum ammi.

Family: Umbelliferae.

Microscopical Characteristics: polygonal cells
constitute the
epicarp while reticulate and lignified
parenchyma is present near the
vascular bundles in the mesocarp starch grains
are absent.

A elongated was with Rosquetay convergence is

Teacher's Signature : _____



T. S. of Jujube fruit mericarp.

Represented by endocarp six number of vittae are present four on the mesocarpic region and two on the commissural surface of mesocarp polyhedral thick walled endosperm cells contain volatile oil globules and also aleurone grains. The tannin and calcium oxalate crystals absent.

Powder characteristics:

1. Pore arrangement of endocarp.
2. Volatile oil globules.
3. Thick walled endospermic cells.

Therapeutic Uses:

- (i) It is used as Carminative (ii) Antispasmodic
- (3) It is used as bronchitis and spasm.
- (4) Dil is used in the preparation of deodorant gargles - mouth washes and also as flavouring agent.

Result:

To study microscopic character - stick of Azadirachta successfully.

Teacher's Signature : _____



Eg: Datura leaf.

Object : To study the morphological characteristics of *Datura* leaf.

Reference : Chandelwal A.R. Practical Pharmacognosy
Technique and experiment Nirali prakashan
22 edition 2012 page no-143.

Biological Source : It consists of fresh and dried leaves part of.

Family : Solanaceae.

Morphology : Shape : Oval, Oblong, Simple

Size : 5-25cm long, 7-15cm wide

Colour : Dull green

Odour : characteristics

Taste : Bitter

Surface : Hairy-soft.

Margin : A symmetrical - Angular Base

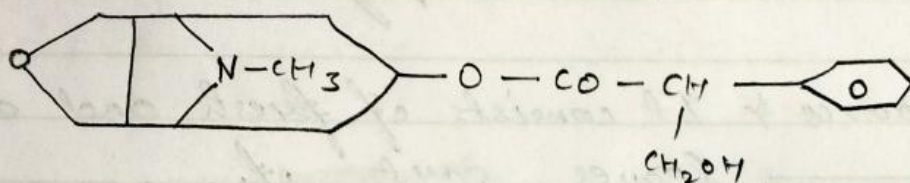
Chemical Constituents : Terpene alkaloids Nitrogen
sweet present

- Atropine

It contain 0.5-1% total alkaloids especially scopolamine (hyoscyamine) is the main alkaloid. with a small amount of atropine, hyoscyamine, scopolamine and esters of tropic acid.

Teacher's Signature : _____

Chemical Structure :



UNITED SECULAR SOCIETY

Uses :

- It is used as CNS depressant.
- + It is used as parasympathomimetic (circulate cholinergic).
- + Mydriatic (pupil dilator).
- + Antispasmodic and cerebral sedative.

Report : Morphological characteristics of datiscena leaf was successful studied.

Teacher's Signature : _____

Object : To study the powder microscopy of cinnamon.

Reference : Kokate C.K. "practical pharmacognosy" 4th edition Vallabh prakashan page no-55.

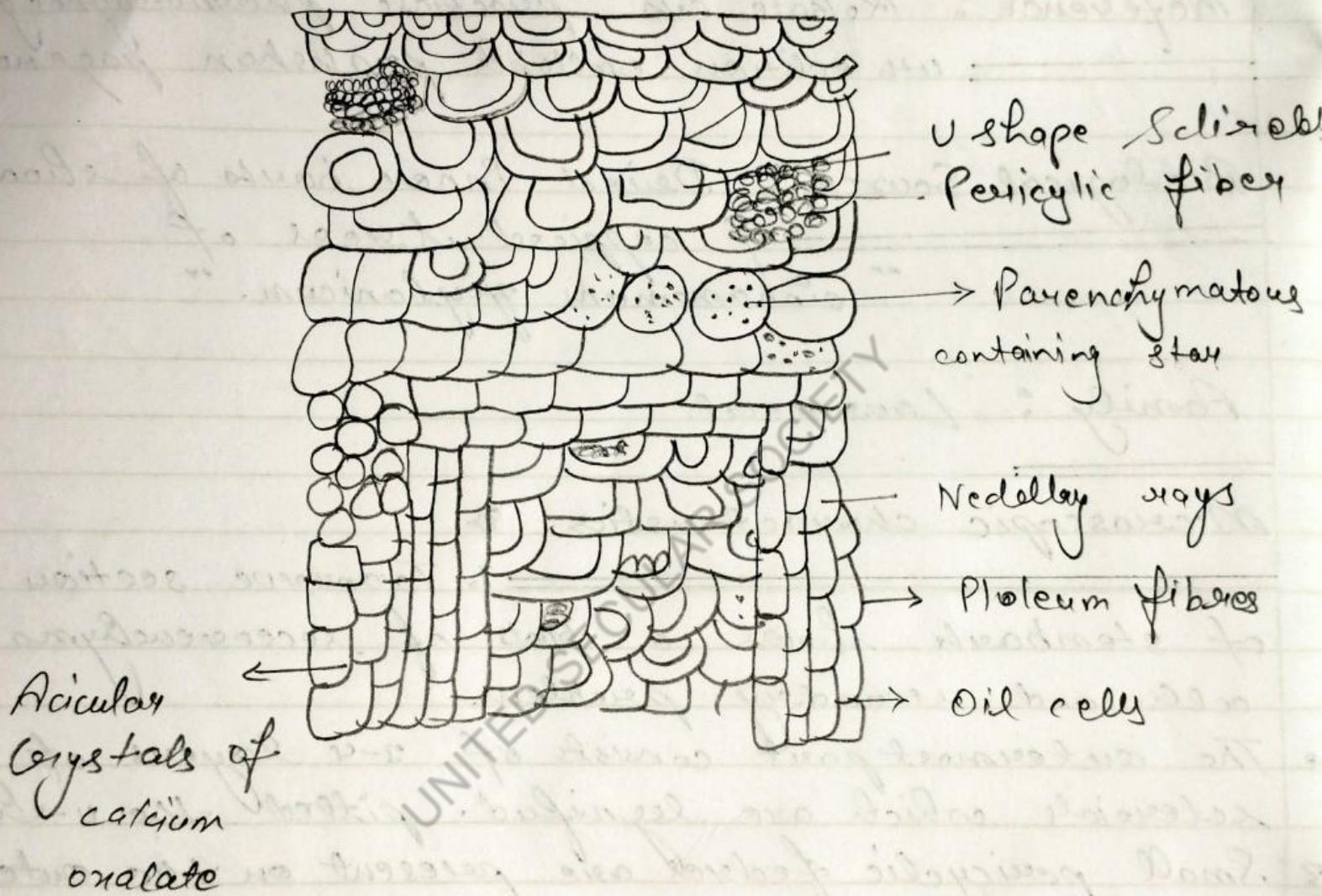
Biological Source : Dried inner bark of shoots of coppiced trees of "*cinnamomum zeylanicum*."

Family : Lauraceae.

Microscopic characteristics :

1. Transverse section of stem bark shows a bark of sclerenchyma cells and secondary phloem.
2. The outermost part consists of 3-4 layers of sclereids which are lignified. pitted the U-shaped.
3. Small pericyclic feders are present on the outer side of layer of stone cells.
4. Secondary phloem contains phloem parenchyma, phloem fibers and medullary rays. starch grains and prismatic calcium oxalate crystals are present in the phloem.
5. Aerially elongated oil cells are present through out the phloem parenchyma.

Teacher's Signature : _____



Eg : Cinnamomum zeylanicum stem bark

a. Medullary rays are uni-or bi-seriate and contain acicular calcium oxalate crystals.

Powder characteristics :

Fibres : Pointed thin and isolated, less than 3 µm.

Stone cells : Isodiametric outer cells wall less thickened inner walls significantly pitted V-shaped.

Oil cells :

Isolated, big, ovoid.

Calcium oxalate crystals : Acicular in phloem parenchyma and medullary rays cells 5-8 µm.

Starch grains : Numerous, simple and compound 10 µm in cortex.

Uses : It is used as stomachic.

It is used as stimulant.

It is used as mild astringent and antiseptic.

Report : The microscopy characteristics of cinnamon powder was done.

Object : To study the morphological characteristics of cinchona bark.

Reference : Khandelwal K.R. practical pharmacognosy
" Nirali prakshan, 22 edition april 2012
page no - 18, 12-13-15.

Kokate C.M. Purohit A.P. Chopale S.B. Pharmacognosy
nirali prakshan - 36th edition september 2006, page no - 496-498.

Synonyms : Kunen.

Biological Source : It consists of dried bark of the cinchona succubera.

Family : Rubiaceae.

* It contains not less than 6% of total alkaloids of cinchona.

* Morphological characteristics :

Colour : Reddish brown powder.

Odour : Slight en : characteristics.

Taste : Intensity bitter & slightly astringent.

Size : 20-40 mm in diameter & 2-5 mm thick

Shape : cylindrical

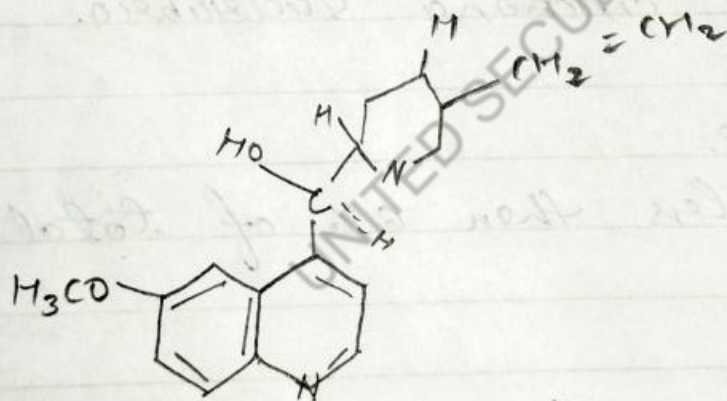
Surface : Longitudinal wrinkles, but less transverse cracks.

20-40mm

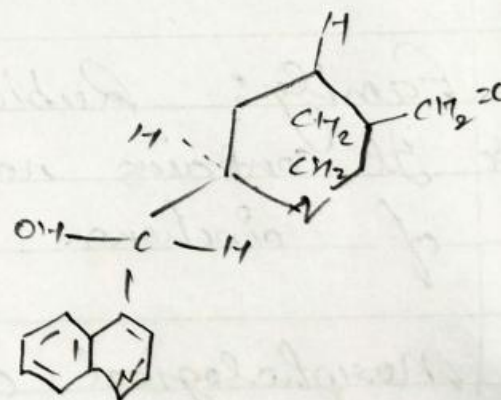


Longitudinal wrinkles

Cinchona bark



Quinine



cinchonine

Chemical Constituents : Cinchona bark contains about 25 alkaloids which belong to quinoline group the important alkaloids are :-

Quinine

Quinidine

Cinchona

cinchonidine

+ cinchona succubifera contain 5-7% of total alkaloids of which 30% is quinine.

Use : Cinchona bark is antimalarial in nature. It is also used as bitter stomachics and anti-pyretic.

Report : The morphological characteristics of cinchona bark was successfully studied.

Teacher's Signature : _____

Object : To study the microscopical characteristics of carbindee.

Reference : "Khandelwal M.B." "practical pharmacognosy" nirali prakashan 2nd edition april 2002 - page no - 14-18 to 16, 18.

Requirement : microscopy, stick coverslips, staining solution.

Synonyms : Dhania, coriander fruit.

Biological Source : Dried ripe fruit of corianderum salivam linn.

Family : Umbelliferae.

Microscopy : The transverse section of coriander shows the presence of a dorsal surface and a commissural surface.

- * The dorsal surface consists of two vittae and a carapane. The dorsal surface has five primary ridges and four secondary ridges.
- * The epicork consists of a single row of small thick walled cells with calcium oxalate crystals.
- * The mesocarp has an outer layer arranged tangentially elongated parenchyma cells and

Teacher's Signature : _____



Pericarp

Molt covering

Epicarp

Endocarp

Testa

Rephale

Lacune

Sclerenchyma

Carophere

Ridge
Vitta

To S of cremocarp

- the middle layer consisting of sclerenchyma.
- * The middle layer is again divided into the outer region of sclerenchyma is represented by longitudinally running fibres where as the inner region has tangentially running fibres.
- * The vascular bundles are present below the primary ridges.
- * The inner layer has polygonal irregularly arranged parenchyma cells the endocarp has the porosity arrangement.
- * In the testa it has single layered yellowish cells and endosperm is thick polygonal colourless parenchyme with fixed oil and alverone grains.
- * "Mericarps usually coherent cremocarp usually coherent cremocarps nearly globular from 3 to 5 mm in diameter externally light brown or rose coloured smooth with 5 calyx teeth and a short stylopodium. Each mericarp with 5 prominent, strengthening longitudinal primary ribs and 4 indistinct undulate secondary ribs. Mericarps easily separated deeply concave on the inner or commissural surface and showing in transverse section 2 surface and short vital (oil tubes) on the inner surface.

Teacher's Signature : _____

of each.

Under the microscopic section of cereals show an epidermis of small cells with thick walls a layer of several rows of thin-walled more or less collapsed parenchyma separated from a broad zone of strongly lignified.

Teacher's Signature : _____

Object: To study the powder microscopy of
withania.

Reference: Khondkeval K.K "practical pharmacognosy"
sivali prakashan 22nd edition April 2012
page no - 18.26 - 18.29.

Synonyms: Ashvagandha.

Biological Source: It consists of dried root
parts of.

Family: Solanaceae.

Powder microscopical characteristic:

Cork: Irregularly outlined.

Vessels: Lignified bordered pits, spiral and annular.

Fibres: Lignified thick walled.

Calcium oxalate: microspineoid.

Starch: Simple few compound, periform & oval
abundant in parenchymatous cells.

Uses: It is used as $\pm$ Anty tumor

Teacher's Signature: _____

- * Hypotensive.
- * Respiratory stimulant.
- * Antispasmodic.
- * Antidiarrhetic.
- * Hepatoprotective etc.

Report: The powder microscopy of withania powder was successfully done & studied.

Object : To study microscopical characteristics of ligoric powder & its of ligoric stolen or root.

Reference * Dr. K.R. Khandekar "practical P. cognogy nirali pratishan. Pune pradhition x/x 2008. Page - 123.

Synonyms : Glycyrrhizae radicalis, glycyrrhiza mulethi jethimeth.

Biological Source * It consists of dried peeled or unpeeled roots & stolon of glycyrrhiza glabra linn family.

Family * Leguminosae.

Microscopy =

Colour * Peeled - pale yellow, unpeeled yellowish brown to dark brown.

Odour * Faint & characteristic.

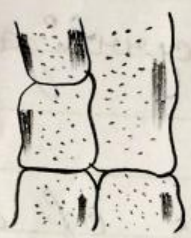
Taste * Sweet - free from bitterness.

Shape * Regular in shape.

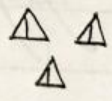
Teacher's Signature : _____



Fibres



Xylem vessels



Calcium oxalate
Crystals



Starch grains

Microscopical characteristics :-

Fibres : Lignified thickened yellow walls in bundle of about 10-50 with anastomosing cells each containing single prism of calcium oxalate.

Xylem vessels : Large with numerous bordered pits. Surface is lignified.

Calcium oxalate Crystals : Individually prisms shaped 10-15 to 25-35 long present in parenchymatous cells and many are scattered in live powder.

Starch grain :- most are simple oval or rounded about 2-4 to 10-20 μ long showing no striations.

Cork : Abundant fragments of orange brown cork composed of thin walls of polygonal cells.

Chemical Constituents :

Saponin glycosides
glycyrrhizin (3-9%)
glycyrrhizic acid
cyclopentanoid flavonoid glycosides

Teacher's Signature : _____

Tsoliqusaritin & ligreeritin common derivatives
Herniaria umbellifera.

Identification test

SNo	Reagents	Observation	characteristics
(i)	Phloroglucinol + Conc HCl (1:1)	Pink	Signified xylem fibres phloemfibres
(ii)	Iodine Soln	Blue	Starch
(iii)	Acetic Acid	Insoluble	Calcium oxalate crys- tals.
(iv)	HCl	Soluble	"
(v)	H ₂ SO ₄ (60% w/w)	Soluble readily of Ca ⁺⁺ sulfate on standing.	Ca ⁺⁺ oxalate crystals.

Uses : (i) used as expectorant & demulcent.

(ii) as antilucer. sweetening agent.

(iii) also used for masking undesirable flavour.

Report : The microscopical characteristics of
ligreerice powder had been studied
 successfully.

Teacher's Signature : _____

Object : To study the microscopy of clove Bud and powder.

Reference : Kokate C.S. "practical pharmacognosy" 4th edition calloph prakashan page 70.

Requirements :

Synonyms : Lavang

Biological Source : It consists of dried flower buds of "*Engenia caryophyllus* Spreng.

Family → myrtaceae.

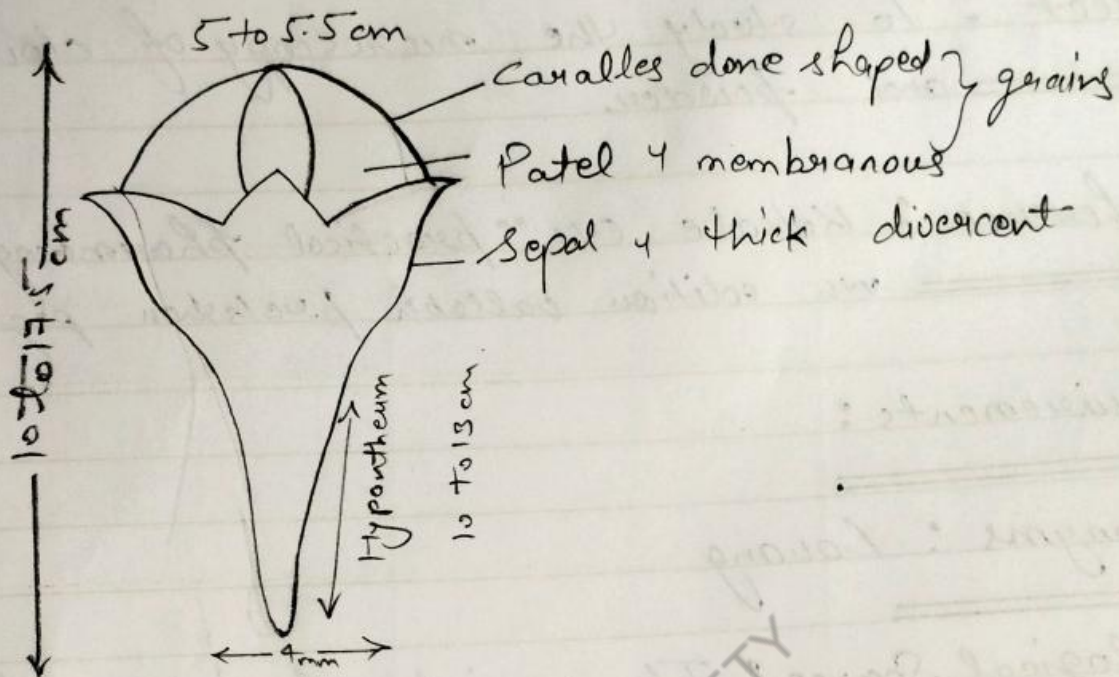
Microscopical characteristics :

1. Epidermis ⇒ Single layer, strength walled cells with anomocytic crumenculaceous stomata very thick cuticle.

2. Cortex : Three zones

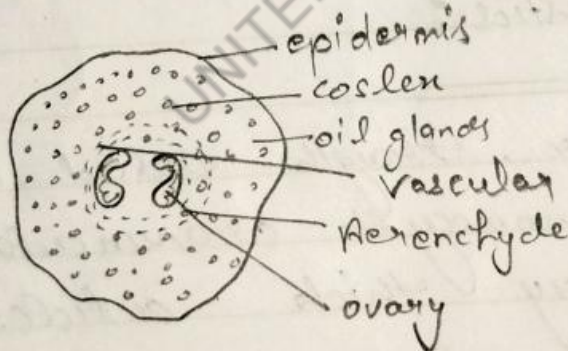
i) Upper zone → upper zone contains radially arranged parenchymatous cells with two three layer of big ellipsoidal. Trichizalysignous oil glands parenchymatous cell contain tannins hence show

Teacher's Signature : _____



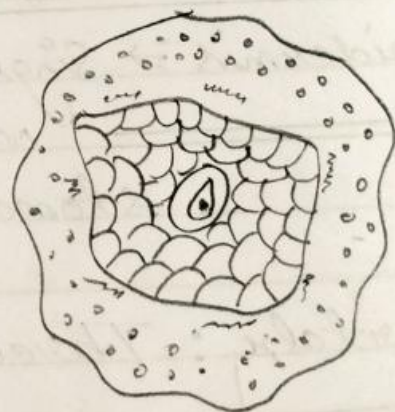
Shape sub - Cylindrical slightly flattened

Clove bud



T.s of clove

Hypanthium
passing through
ovary.



T.s of clove
Hypanthium passing
through columella.

dark colour when stained with ferric chloride.

- (2) Middle zone & middle layers or region containing a ring of bicollateral vascular bundles where xylem is composed of three to five lignified spiral vessels about 15 vascular bundles are present in ring isolated pericyclic fibres (lignified) may be present ground the vascular bundle (fibres vascular bundle)
- * Fibres are prominent and show distinguished pink colour on staining.

- (3) Lower zone & Lower zone or inner zone of parenchyma composed of air spaces (aerenchyma) separated by lamellae one cell thick which supports the central columella.

Columella &

parenchymatous, rich in calcium oxalate clusters a ring of vascular bundles towards the periphery.

- * 25-30 small vascular bundles are present to periphery.

- * It is passing through ovary instead of columella two bean shaped lobes with ovules will be seen in the center.

- * Calcium oxalate prisms starch trichomes and stone cells are absent:

Teacher's Signature : _____

Staining Diagnosis / micro-chemical tests :

S. No	Reagents	Observation	characteristics
01	Phloroglucinol + + conc ⁿ HCl (1:1)	Pink	vascular bundles and fibres
02.	Suchon Red III	Red	Cutical oil glands
03.	Strong KOH Solution	Needle shaped potassium	Aligenal and volatile oil
04.	Dil hydrochloric acid	lugenate crystals crystals soluble	Calcium oxalate crystals
05	Sulphuric acid (20% w/w)	Soluble needles of calcium sulphate on standing	Calcium oxalate Crystals.

Uses: It is used as carminative.

2. It is used as aromatic and stimulant
3. * antiseptic and flavouring agent.

4. It is used as dental analgesic oil
in microscopic work for isolation
of lugenol.

Report: The microscopical characteristics of clove
(flower bud) was studied successfully.

Teacher's Signature : _____

Object : To study the microscopical characteristics of Turmeric (Curcuma).

Reference : " Kokate C.K. Text book of pharmacognosy published by Nigali Prakashan 11th edition page no - 4.149.

Synonyms : Maladi - Haridra Curcuma.

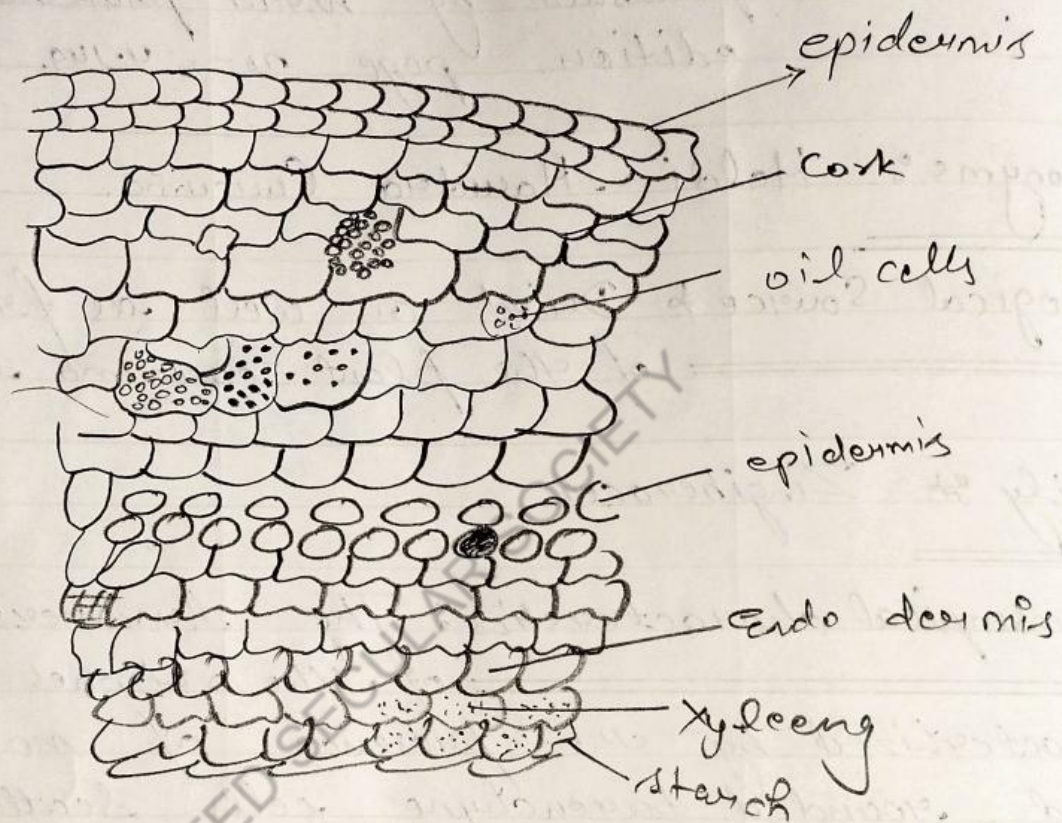
Biological Source : Derived as well as fresh rhizomes of the plant Curcuma longa Linn.

Family : Zingiberaceae.

Microscopical characteristics : The transverse section of the rhizome is characterized by the presence of mostly thin walled rounded parenchyma cells scattered vascular bundles definite endodermis few layers of cork developed under the epidermis and scattered oleiferous cells with brownish contents.

- The epidermis is consisted of thick walled cells cubical in shape of various dimension,
- The cork cambium is developed from the sub-epidermal of the cork the epidermis is retained.

Teacher's Signature : _____



S. of $\rightarrow$ Turneric

- Cork is generally composed of four to six layers of thin walled brick shaped parenchymatous cells. The next region of cortex is composed of few layers of thin walled polygonal parenchymatous cells containing gelatinized flattened starch grains yellow coloured matter and vascular bundles.
- Cortex region also shows presence of oil cells having suberized wall containing orange yellow globules of volatile oil or amorphous resinous masses.
 - Endodermis is present below cortex and is composed of single layer of thin walled cells.
 - Inner most region of pith is composed of parenchymatous cells containing starch grains and vascular bundles numerous oil cells and vascular bundles.
 - The vascular bundles in this region are scattered and form a discontinuous ring just below endodermis.

Powder characteristics :-

1. Fragment of cortex :- Thin walled parenchymatous cells containing gelatinized starch, grains, yellow colouring matter.

Starch grains :- Simple, oval, long uns shaped flattened Grains show transverse

Teacher's Signature : _____

stereations and small lumen.

3. Fragments of pith & Thin walled parenchymatous cells containing starch grains.
4. Vessels & Mainly spiral, reticulate and annular vessels are few in number.

Uses & It is used as anti-septic.

2. It is used as expectorant.

3. It is used as coloring agent.

Report & To study the microscopical characteristics of turmeric was study successfully.

Object * To study the microscopical characteristics of *Nux-Vomica* Seed.

Reference * Khandelwal I.R. practical pharmacognosy techniques and experiment Nirali prakashan 22nd edition 2012 page no-13-3.

Synonyms * Semen *strychnine*, *Kuchla* = *2xkashura*

Biological Source * It consists dried ripe seeds of *strychnos nux-vomica*.

Family * *Cogoniaceae*.

Microscopical characteristics of powder drug of nux-vomica.

1. Trichomes * Entire or fragments of trichomes lignified base is pitted and beaded.

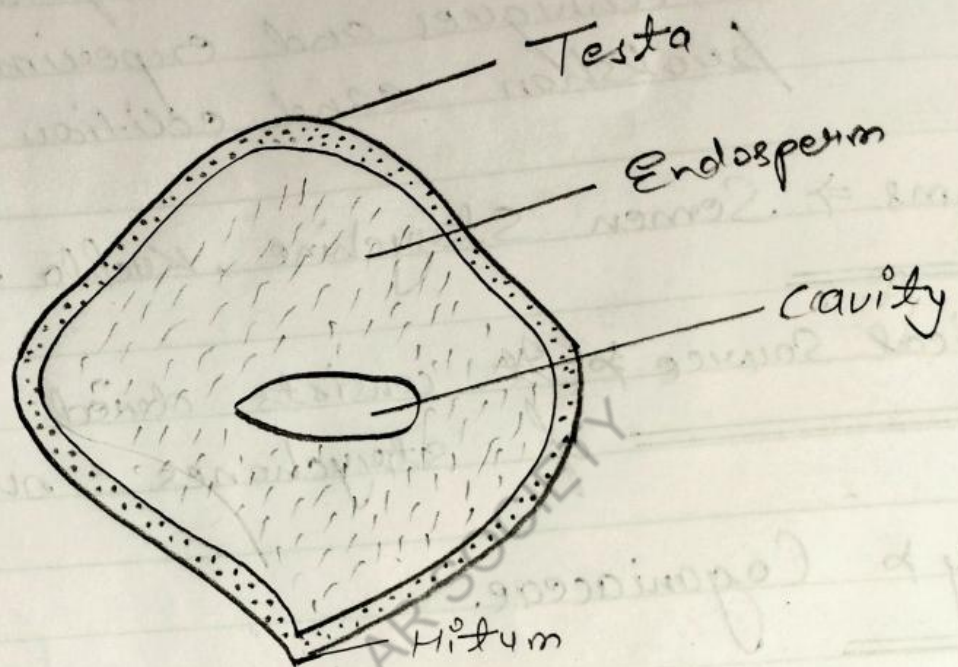
Apex * Apex is rounded.

Ridges * Ridges are present on the surface.

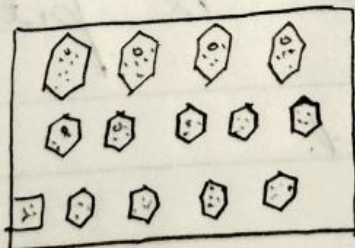
Length * 60-1000 μ diameter about 25 μ .

2. Endosperm * polygonal cellulosic cells with oil globules and aleurone grains.

Teacher's Signature : _____



Trichomes



Endosperm

Testa

1. Lignified trichomes $\Rightarrow$ thick walled bent and twisted lignified trichomes
emerged from epidermis parallel
in one direction.

Length $\approx$ 600-1000 μ diameter about 25 μ .

Epidermal cells $\approx$ Single layer forms lignified trichomes large thick walled with oblique linear pits
base of trichomes.

- (1) Collapsed parenchyma $\approx$ Two layers flattened parenchyma present below epidermal trichomes.

- (2) Endosperm $\approx$ Thick walled cellulose parenchymatous cell, Cells show hemicellulose in the cell wall and following characteristics.

i) plasmodesma $\approx$ Fine protoplasmic strands b/w the walls of endospermic cells.

Starch grains $\approx$

about 30 μ in diameter only
globoids are present.

Oil globules & Fixed oil as small oil droplets in the cells.

Staining / Diagnosis / micro-chemical Tests :

S/N ^o	Reagents	Observation	characteristics
01	Phloroglucinol concentrated HCl (1:1)	Pink	Lignified epidermal trenches
02	Dil Potassium Sulphuric Acid	Blue	Hemicellulose Endospermic wall (Plasmodesma)
03	Alcoholic picric	yellow	Alcurone grains present in the cell of endosperm.
4.	Sudan red III.	Red	Oil globules present in the cell of endosperm.

Uses : It is used as bitter stomachic.

2) It is used as spinal Cord stimulant.

3) It is used as vasae tonic.

Report : To the study of microscopical character-
istics of was successfully.

Teacher's Signature : _____

Object : To study the microscopy of *vasaka* leaf.

Reference : Khandewal K.R. practical pharmacognosy
Nirali prakshan 22nd edition april 2012
page no - 12.30 - 12.33.

Biological Source : It consists of fresh & dried leaves of plant *adhatoda vasica*

Family : Acanthaceae.

Microscopy :

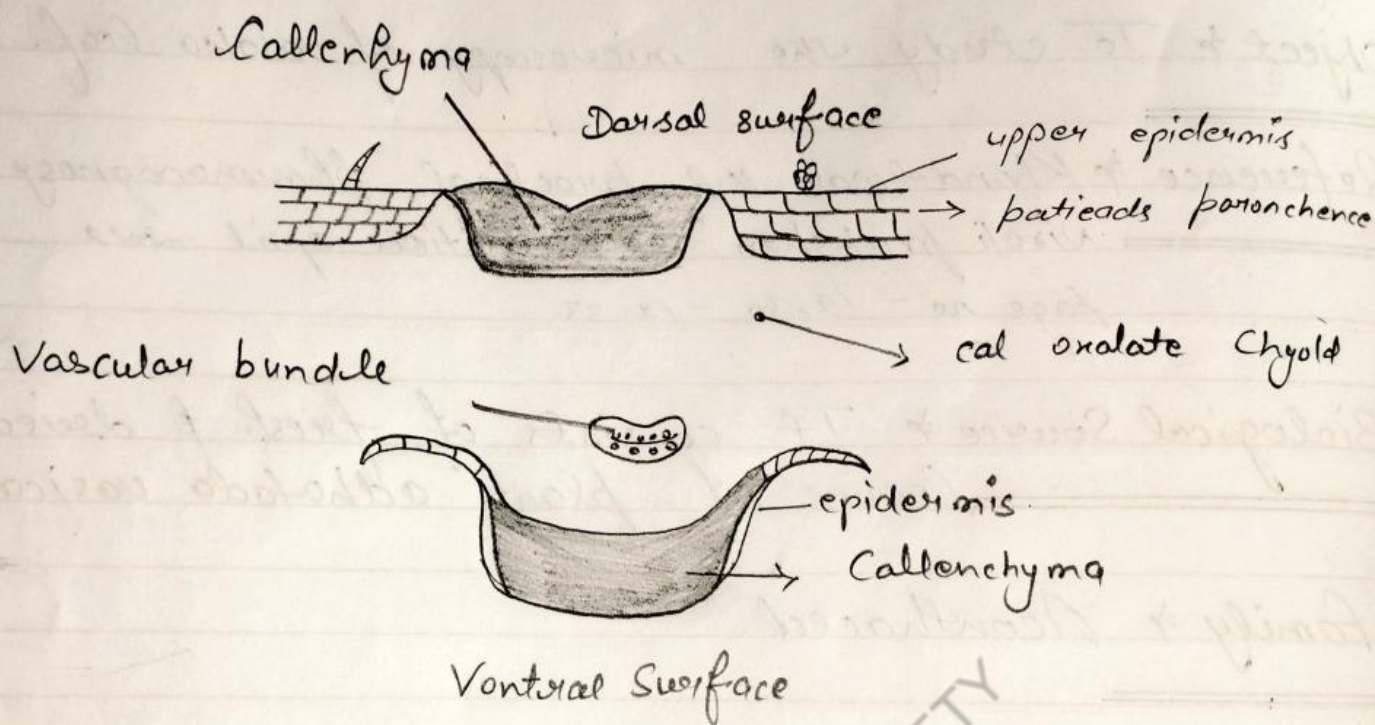
1. Upper epidermis : Single layered, rectangular cells, wavy anticlinal walls cuticularized, lowering and glandular trichomes (basile without stalk) and diacytic stomata are present.
2. Morphyl : Dorsiventral
Palisade : 2 layered, compact & radially elongated cells

Spongy parenchyma :

4 to 5 layered, loosely arranged with intercellular spaces presence of calcium oxalate crystals.

Lower epidermis : Resembles upper epidermis but no

Teacher's Signature : _____



T.S of Vasaka leaf.

of trichomes & stomatal pores are more.

4. Covering trichomes & 2-4 cells blunt, thick walled
pointed.
5. Glandular trichome & Sessile with quadricellular heads.
6. Stomata: Caryophylloceous diacytic.
7. Collenchyma: 2-4 layers below upper epidermis also
present above lower epidermis.
8. Cystoliths: few crystals can be seen in cortical
parenchyma.
9. Vascular bundles: These are - shaped. Collateral.
Xylem: Lignified
phloem & Non-lignified.
10. Collenchyma & Thick walled cellulosic cells.

Report: The microscopy of the vascula
cleaf was successfully studied.

Teacher's Signature : _____

Object: To perform the physical & chemical test for "ASAFOETIDA"

Reference * Kokate SK pharmacist Ap. Kokate SB
test book of pharmacognosy 51
edition nimali publication page no - 5.33.

Requirements

Apparatus * Mortar and pestle test tube
conical flask, beaker, filter paper
drug sample, weight balance.

Chemicals: HCl ammonia 50% HNO_3 & H_2SO_4
water

Biological Source * It is the also resin
obtained from roots and
rhizomes of ferula foetida.

Physical characteristics:

Appearance = Crystalline
Colour = yellow brown
Odour = Intense penetrating and alliaceous
Shape = Tear and masses
Taste = Bitter acid alliaceous taste

Solubility: partially soluble in alcohol.

Teacher's Signature : _____

S/No	Test	Observation	Inference
01	Test with H_2O	yellow orange emulsion	Aerofetida present
02	Test fractured surface with 5% nitric acid	Green colour	Aerofetida present
03	Test fractured surface with conc sulphuric acid	Red or reddish brown colour	Aerofetida present
04	Combined umbellifer test 0.5g to drug + sand + 5ml HCl acid add 2ml water filter filtrate + equal vol of ammonia	Blue fluorescence (umbelliferone)	Aerofetida present
05	Alcoholic extract + pphloroglucinal and conc ⁿ HCl	pink colour	"
06	On burning	yellow flame	"

Teacher's Signature : _____

S/N	Test	Observation	Inference
01	Test for water with H_2O	yellow orange emulsion	Aerofactida present
02	Treat fractured surface with 5% nitric acid	Green colour	Aerofactida present
03	Treat fractured surface with conc sulphuric acid	Red or reddish brown colour	Aerofactida present
04	Combined umbellifer test 0.5g to drug + sand + 5ml HCl acid add 2ml water filter filtrate + equal vol of ammonia	Blue fluorescence (umbelliferone)	Aerofactida present
05	Alcoholic extract + pphraglucinal and conc ⁿ HCl	pink colour	"
06	On burning	yellow alone	"

Teacher's Signature : _____

Uses: It is used also carminative relieve
excessive collection of gas in the
stomach.

e. It is used as expectorants.

Result: The chemical acid and physical
test of asfoetida was
successfully.

Aim : To perform the physical and drug chemical test for the given crude drug "BENZON."

Reference : "Kokate C.K" The test book of pharmacognosy, published by nirali prakashan 6th edition 2010 page no - 5, 36.

Requirement

chemicals: KmnO_4 solⁿ, H_2SO_4 , Feeds sulphuric acid.

Apparatus: china dish glass rod, broken filter paper heating mantle test tube T.T. holder.

Physical characteristics:

Color: greyish brown or grey mass
odor: agreeable and balsamic
Taste: sweetish and slightly acid.
Shape: tears mass lamp
Size: varying in size

Uses: It is used as expectorants carminative
diuretic antiseptic and protective.

* Chemical test

Teacher's Signature : _____

s/No	Test	Observation
01.	0.5 mg benzoin powder heated with 10 ml of $KMnO_4$	odour of benzaldehyde
02.	Alcoholic solution of benzoin + H_2O	milky solution (acidic to litmus)
03.	Heat 0.5 g benzoin powder slowly in dry test tube	Evolves irritating whitish fumes which condense to form whitish crystalline sublimate at upper part of test tube.
4.	Sublimates after cooling	Crystals of cinnamic acids.

Result: To perform the physical and chemical test for the given crude drug was done.

Teacher's Signature : _____

Object : To the study of the physical character of given crude drug of "pale catechu."

Reference * Kokate CK text book of pharmacognosy
published by nirali prakashan, 4th edition
page no - 559.

Requirements: Test tube holder, spatula, test tube stand, spirit lamp.

Chemical $\Rightarrow$ HCl, vanillin, light petroleum hydrocarbon
Soln.

Apparatus & china dish, glass rod, beaker heating
gentle test tube and T.T
holder.

Chemical Constituents: *Pal catechu* contains mainly catechins about 7.33%. catechus tannic acid are catechus even in addition to quercetin and gembien fluorescin.

Procedure

Sl. No.	Experiment	Observation	Inference
01	Mix with in	red and pink	quercetin is

~~Teacher's Signature .~~

	vanillin and HCl	colour	present
02.	pal catechu when treated with HCl	purple colour phloroglucinol	presence in catechu
03.	To alcoholic extract of pale catechu add sodium Hydroxide and few drops of light petroleum shake well.	green fluores cence	gambier fluorescence

Uses : It is used as astringent in diarrhoea and in the form of lozenges for buccal-cavity.

Result : The physical and chemical test for given crude drug was done.

Teacher's Signature : _____

Object : To study the physical and chemical test of given crude drug for Black catechu.

Reference : Kokate CK, Purohit A.P. & Chakhe S.B. pharmacognosy edition 11th, Nirali publication page no - 558.

Requirements Black catechu

Chemicals : Ferric chloride solⁿ vanillin
HCl.

Synonyms : Cutch, Kattha, Khodir - cathetus.

Biological Source : Dried aqueous extract of heart wood of acacia catechu.

Family : Leguminosae.

Morphological Characteristics :

Colour : light brown to black powder.

Odour : None

Taste : Astringent.

Size : 2 to 5 cm cubes or rectangular pieces

Shape : Cubes or irregular fragments.

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Standards : pieces are feasible - parous
with vegetable dishes proctore
short.

Solubility: Soluble in water and alcohol.

Solubility: Soluble in
chemical constituents. It contains 10% of
catechin other constituents
are catechin and gallocatechin and gum but
contain chlorophyll and fluorescent substance
present in catechin.

Chemical test:

- Chemical test:
1. Turns barish black colour with ferric chloride solution.
 2. Pink or red colour with vanillin and hydrochloric acid.
 3. Brown colour with lime water.

Uses: It is used as the anti-diarrhoea
= astringent carminative and stimulant.

Result: The physical character of Black catfish was done.

Teacher's Signature :