

GLYCOSIDES ⇒

Cynogenetic glycoside (cynophoric) ⇒

Bitter Almond.

wild cherry bark.

Isothiocyanate glycoside ⇒

Black Mustard.

Flavanoids ⇒

Silymarin, Black wheat, Ginkgo,

Coumarin, Furan glycoside ⇒

visnora, Psoralea, Anisi.

Aldehyde glycosides ⇒

vanilla pods

Phenol glycosides ⇒

Barberris

Steroidal glycoalkaloids ⇒

Solanum.

Miscellaneous ⇒

Gentian, Picrorhiza, Chirata, Kalmegh,
(Endrographis-bitter tonics)

Glycosides ⇒

Metabolites ⇒

1° Metabolites ⇒ Plants directly obtained.

egs Carbohydrates, Proteins, fat, vitamins.

2° Metabolites ⇒ Product which are itself

useless but these medicinal use they 2°
Metabolites.

eg → Glycoside, Tannins, Resins, Flavonoids.

* Glycoside are 2° metabolites.
organic compound which are made up of two parts.

Glycose - Sugar Part

AGlycose - non sugar part

Glycose → solubility, Permeability.

AGlycose → Pharmaceutical activity or Pharmacological activity.

Properties of glycosides →

① Bound form - (Glycoside are present)

Fehling Test - (Carbohydrate) glycoside donot give test.

* Glycose + AGlycose → Bound form.

② If separate the glycoside the fehling test is positive. they are separated by hydrolysis -
Glycose part, aglycose part.

③ Glycosides are colorless.

④ Almost all the glycosides are bitter in test.

Exception - Licorice - mulethi (sweet).

⑤ They are soluble in H₂O and dil. Alcohol while insoluble in CHCl₃ and ether.

⑥ The glycosides are helped in the growth Regulation of Plants.

⑦ They are help in protection of Plants.

Classification → There are 3 basis type of glycosides.

(ii) Chemical Classification →

① Saponins Glycosides → Soap form.

② Liquorice (Sweetening Agent) Peptic ulcer.

③ Dioscorea → (Diosgenin) Precursor of steroids like-Testosterone, sex hormone.

④ Ginseng →

Digitallis → (Scilla deleni - Digitoxin and Gitoxin)
Cardiac ~~and~~ muscles tonicity ↑ (foxglove).

Thereticia → Resor.

Squill - Argenia indica

Strophanthus -

③ Anthraquinone Glycosides laxative & Purgative.

- * Aloe - 4 species.
- * Senna.
- * Cascara
- * Rhubarb.

④ Miscellaneous Glycosides - Furocoumarins.

Glycoalkaloids.

Flavonoid glycosides } Phenolic glycosides.

Coumarin glycosides } Anthocyanin glycosides.

eg → Psoralea.
chirata.

Kalmegh

Quassia.

Primitive type of classification →

- According to this types they are of 2 type.

α form (10%)

β form (90%)

Synthetic glycosides

Natural glycosides.

Saponin Glycosides →

Tetracyclic.

Pentacyclic (triterpenoids)

Test for Glycosides →

Glycosides hydrolysis →

Glycose + Aglycose.
(Sugar) (Genins)

Cardiac Glycosides

① Baljet's test → A thick section show yellow to orange colour with sodium picrate

② Legal test (test for Cardinolides (C-23)) → To aqueous or alcoholic extract, add 1ml pyridine and 1ml sodium nitroprusside pink to red colour appear.

③ Killer Killian's test → To 2ml extract, add glacial acetic acid, 10 drops 5% $FeCl_3$, and concⁿ H_2SO_4 . Reddish brown colour appear at the junction of two liquid layers and upper layer appears bluish green. (C-24)

④ Libermann's test (Test for Bufadienolides) mix 3ml extract, with 3ml acetic anhydride. Heat and cool add a few drops of concⁿ H_2SO_4 . Blue colour appears.

⑤ Kedde's test → Residue of $CHCl_3$ in treat + 1 drop 90% alcohol + 2 drop of
→ Purple colour.

⑥ Raymond's test → Test solⁿ + Hot methanolic alkali → violet colour produced.

Test for Anthraquinones glycosides

① Borntrager's test for Anthraquinone Glycosides → to 3ml extract, and add dil. H_2SO_4 boil and filter to cold filterate add equal volume of Benzene or $CHCl_3$, shake well separate the organic solvent add NH_4 ammonical layer turns pink or red.

② Modified Borntrager's test for cardiac glycosides → to 5ml extract add 5ml 5% FeCl₃ 5ml dil. HCl, heat for 5 min. in boiling water bath cool & add Benzene or any organic solvent, shake well separate the organic layer, add equal volume of dil. ammonia, ammonical layer shows pinkish red colour.

Test for Saponin Glycosides

① Foam test → Shake the drug extract or dry powder vigorously with water.

• Persistent foam observed (5 to 10 minutes)

② Haemolytic test → Add drug extract or dry powder to 1 drop of blood placed on glass slides haemolytic zone appears.

Test for cyanogenetic glycosides

① Grignard reaction or sodium picrate test

• Soak a filter paper stripped, first in 10% Picric acid. then in 10% Sodium Carbonate dry, in a conical flask placed a moisture powder drug, cork it place the above filter paper, stripped in the slit in the cork, filter paper turns brick red to maroon.

② To dry powder extract, add 3% aqueous mercurous nitrate solⁿ, metallic mercury forms.

SAPONINS →

① Liquorice → Syr. → Aulethi, Glycyrrhiza

B.S. → Stolons and Roots of various sp. of Glycyrrhiza glabra Family Leguminosaceae

Morphology →

Colour - Peeled - Pale Yellow.

unpeeled - Yellowish brown to dark Brown.

Odour - Faint and characteristic.

Taste - Sweet, free from bitterness.

Microscopy →

① Stolons →

• Cork consist of thin walled, radially arranged rows, polygonal cells.

• Cortex made up of parenchymatous cells.

* Xylem and Phloem being lignified.

* Medullary rays made up of cellulosic Parenchyma.

* Parenchymatous cell adjacent to vessel contain are solitary prism of Ca oxalate and other content abundant starch grain.

* Pith is present and Parenchymatous.

Roots \Rightarrow For small primary xylem bundles are arranged at the right angle to each protoxylem.

* Pith is absent.

Collection \Rightarrow In Oct. of 3rd year when the leaves fall, the plants are dry up, the stolons and roots are dried rapidly in the sun and finally in a heated chamber.

Types \Rightarrow unpeeled Licorice \Rightarrow Consist of chiefly of stolons with the few piecey roots, the pieces are unbranched, outer surface dark redish brown, longitudinally wrinkled.

Peeled Licorice \Rightarrow It is pale yellow colour and slightly fibrous.

Powdered Licuorice → Powdered is made from
Peeled roots.

Chemical constituent →

Saponin glyco sides →

Glycyrrhizin (3-9%)

Glycyrrhizinic acid (a glycolose)

Flavanoides glycosides - Iscoueritin & Iqueri-
-tin.

Coumarin glycosides derivatives →

Hernialin.

umbelliferone.

uses → It is used as an expectorant,
demulcent, antiulcer, sweetening Agent,
for masking undesired flavour.

variety and allied -

① Russian Licuorice root (*Glycyrrhiza glabra*
var. *glandulifera*).

* large pieces often split longitudinally,
texture is coarser and more fibrous.

② Russian Licuorice root (*Glycyrrhiza glabra*
var. *violacea*) → usually unpeeled and

occurs in large coarse pieces resembling
unpeeled Russian root.

③ Manchurian Licuorice root (*Glycyrrhiza*
uralensis) → medullary rays ar
curves or wavy.

Adulterant →

Indian Licorice → Ap. (Abrus precatorius)
Morphologically similar but with diff
chemical constituent

DIOSCOREA ⇒

BIS ⇒ It consist of dried tubers of the
Plant Dioscorea deltoidea family
Dioscoreaceae.

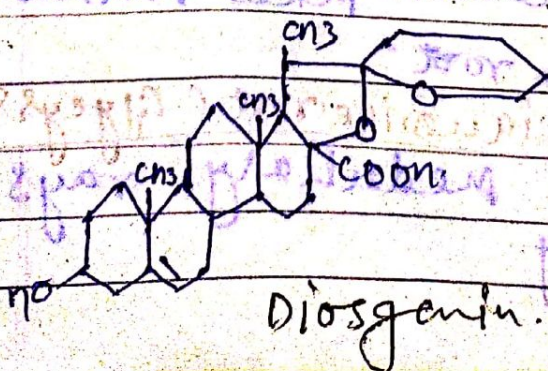
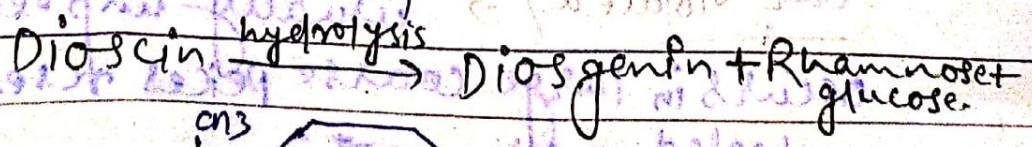
Macroscopy ⇒ Slightly brown, odourless
bitter saponins.

Microscopy ⇒ Epidermis absent, Cork few
layers cortex is made up of Parenchyma-
tus tissue, stolons is formed at the major
part of drug.

• Endodermis and pericycle are indistingui-
shed.

Chemical constituents ⇒ The chief consti-
-tuent are Diosgenin.

• The major components ⇒



uses → used in synthesis of corticosteroids
• used in Rheumatic arthritis.

varieties →

D. fluoricunda.

D. villosa.

D. bulbifera.

Substituents →

• Costus speciosus.

• Trigonella foenum.

COLEUS →

SYN → forskolin.

B.P.S → forskolin consist of the dried root of Coleus forskohlii, family. Labitae.

Geographical source → The plant is grown in India, Himalaya, Garhwal, Bihar, * Pakistan, Sri Lanka, Brazil and tropical East Asia.

Macroscopy →

Colour - Brown.

Odour - Aromatic & characteristics.

Taste - Pungent slightly.

Chemical constituent → Diterpenoids -

forskolin (Coleonol), 1,9 dideoxyforskolin,

9-deoxyforskolin.

White Ginseng → Sun drying of the roots after removal of the outer layer produces white Ginseng.

Red Ginseng → By steaming the root followed by artificial drying and then sun drying produces red Ginseng.

Scraping of the roots → Before drying would appear to be disadvantageous b/c histochemical test and GLC analysis so the active constituents (saponins) to be located outside the root cell wall.

Constituents →

Ginsenoside → It gives around 50 ginsenoside according to Rf value.

Panaxosides → on hydrolysis, it gives oleonic acid, panaxadiols, panaxatriol + sugar.

* Also contains high mwt Polysaccharide panaxan.

* The minor components are sterols, vitamin flavanoids, amino acids.

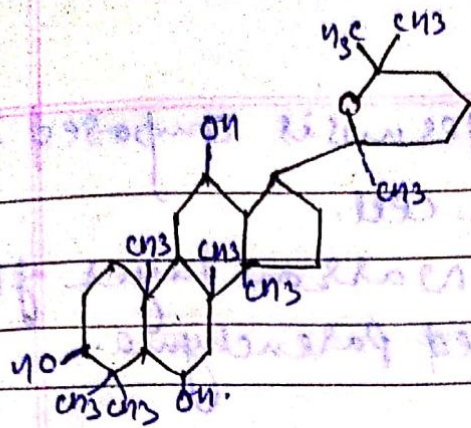
uses → Adaptogen - which changes the resistance stimulants and sedative in gastritis in Anaemia.

Note → Ginseng shows low toxicity but long term used leads to poisoning similar to that of corticosteroids.

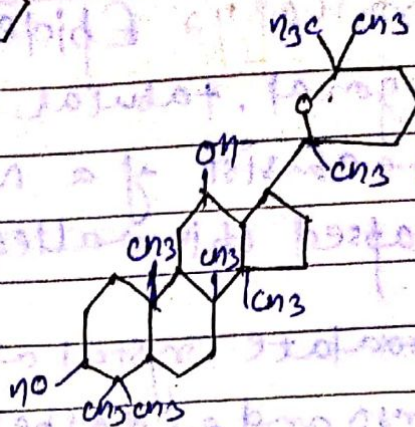
Adulterants → Panax Pseudoginseng also k/a Himalayan ginsengs.

* Root contains saponins and ginsenosides.

* Panax Notoginseng (Sandi Ginseng)
Panax Japonicum contains ginsenosides and glucose.



Oleanolic acid



Panaxadiol

CARDIAC GLYCOSIDES →

STROPANTHUS →

B.S → Dried seed of Stropanthus Rombe family Apocynaceae.

Morphology → Seeds all lensiolate

• Testa as prolonged at the apex into a cylinder thread like awn which terminates in a plume of ^{→ silky} sticky hairs.

- Seeds are grayish green.
- The Testa bears trichomes which gives its silky appearance.
- Embryo and endosperm are very oily fracture short.
- Odour - unpleasant.
- Taste - Bitter.

Wt of 100 seed is about 3-4 gm

Microscopy \rightarrow Epidermis composed of polygonal, tabular cell.

- Testa consist of a narrow layer of dense collapsed thin walled parenchyma.
- Ca-oxalate crystals are rare.
- Embryo and endosperm consist of parenchyma containing abundant fixed oil, and allurones grains (reserved protein food).

Collection \rightarrow The plants are large climber

• Fruits are many seeded and are collected in June to July.

• Epicalp and mesocalp are separated and seeds are removed then washed and dried.

Chemical

Chemical constituent \rightarrow It contains 8 to 10% a mix. of glycosides K/a K-stropanthin.

• It also contains

K-stropanthoyte.

K-stropanthone- β -cymarincymarol.

• It also contains mucilage, resins, trigonelline, choline and 30% fixed oil.

Chemical Test \rightarrow

powder + H_2SO_4 (80%) \rightarrow Coloured deep green.

Note → The drug is given by Parenteral routes due to the poor absorption by oral routes.

uses → Increased blood pressure.

- Diuretics.
- Cardiotonics.

Adulterants → ① Stropanthus hispidus →

• Seeds are small, brown with no Ca oxalate crystal and contains h-stropanthin.

② Stropanthus Courmouffii → Small and lensiolate red to violet.

• Ca. oxalate is present.

Stropanthus Gratus →

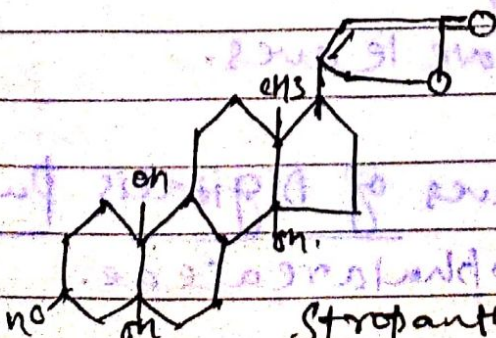
Brown glabrous, no Ca. oxalate contain

g-stropanthin.

Stropanthus sarnenifolius → Contains cluster

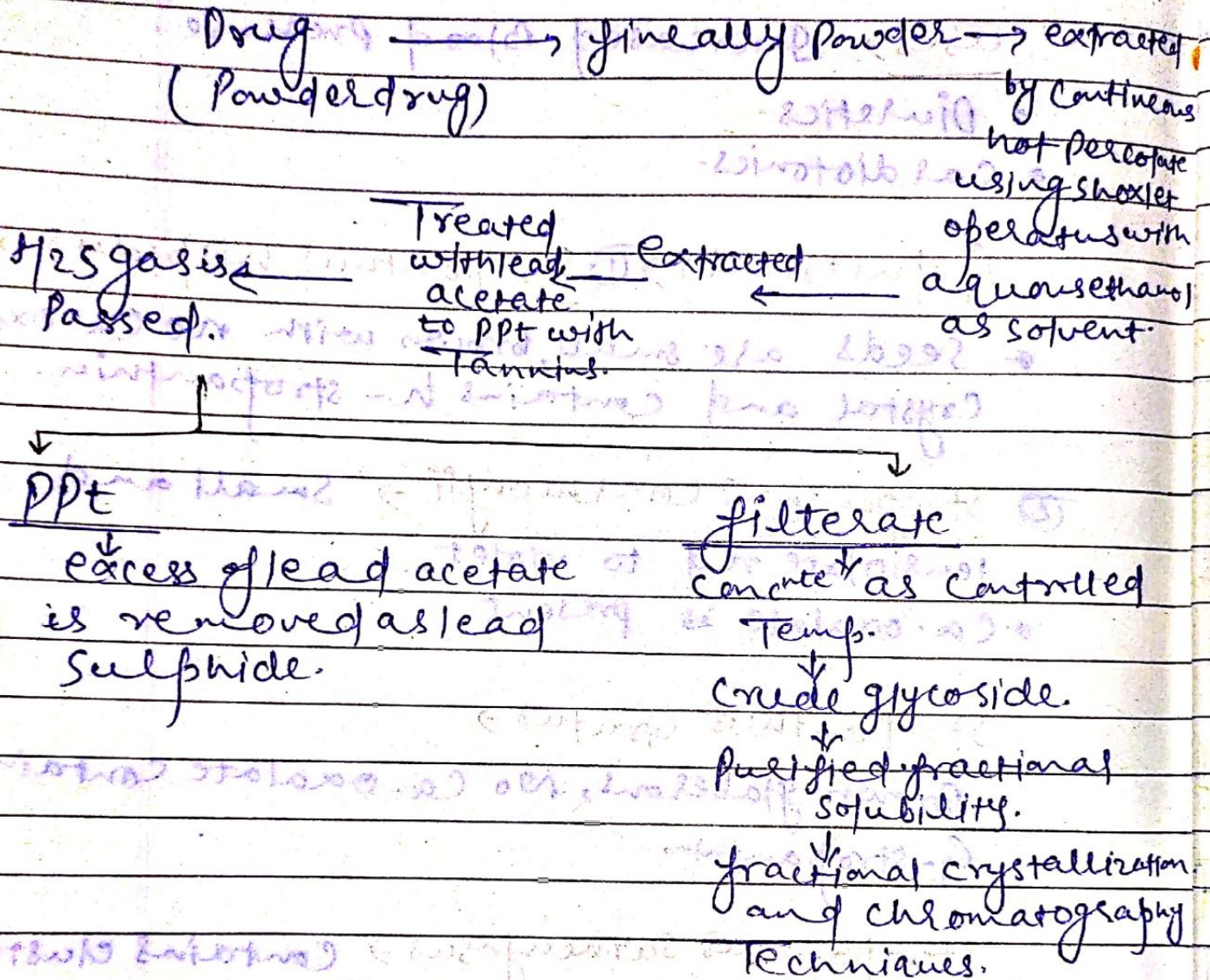
and prism of Ca oxalate crystal are abundant pale yellow rose red colour.

Note → Seed should best disinfected by the use of methyl bromide.



Stropanthidine.

General method for the Isolation of Glycosides (Stasotto method) ⇒



DIGITALIS ⇒

Digitus ⇒ finger like str. of corolla
Purpurea purple flower.

Syn ⇒ fox glove leaves.

B.S ⇒ Dried leaves of Digitalis purpurea
family. Scrophulariaceae.

The drug is required to contain not less than 0.3% of total Cardinolites Calculated as Digitoxin.

Morphology → The leaves is Dorsiventral Pubescent, Pinnate veniscent leaves are Dark gray green slight order Bitter Taste ovate lanceolate, serrate occasionally Dentate margin, webby epidermis

Microscopy → It is Dorsiventral leaves.

- * Anomositic stomata on Both surface.
- * Trichomes are uniseriate Multicellular glandular Trichomes are also present over the vein and presence of covering Trichomes are characteristics of Digitalis.
- * Ca oxalate crystals absent, Sclerenchyma absent.
- * Starch grain absent Present in endodermis
- * Chlorenchyma Present at 3 Place -
 - ① At lower epidermis.
 - ② At upper epidermis
 - ③ pericycle.

Collection → The leaves are collected in Dry weather and are Dried as soon as possible at fairly at low Temp. b/c in Drying above 60°C Potency is lossed due to the Chemical degradation.

- Digitoxin

morphology → The leaves are dorsiventral, pubescent, pinnate venation. Leaves are dark gray green, slight or bitter taste, ovate lanceolate, serrate or occasionally dentate margin, very epidermis.

Microscopy → It is dorsiventral leaves.

* Anomalous stomata ~~found~~ on both surface.

* Trichomes are uniseriate multicellular, glandular. Trichomes are also present over the vein and presence of covering trichomes are characteristics of Digitalis.

Ca oxalate crystal absent, Sclerenchyma absent. Starch green present in endodermis.

Chlorenchyma present at 3 places

① At lower epidermis

② upper

③ Pericycle

Collection →

The leaves are collected in dry weather and are dried as soon as possible, at fairly low temp. b/c on drying above 60°C potency is lost due to the chemical degradation.

The moisture content should not be more than 6% b/c presence of moisture gives Deterioration of glycosides.

Chemical constituent →

Purpurea glycoside A

↓ enzymatic hydrolysis
Digitoxin + glucose

↓ hydrolysis
Digitoxigenin + 3 sugar
(Digitoxose)

Purpurea glycoside B

↓ enzymatic hydrolysis
gitaloxin + glucose

↓ hydrolysis
gitaloxigenin + 3 digitoxose

odorrside H $\xrightarrow{\text{hydrolysis}}$ Digitoxigenin +

Digitaloxin $\xrightarrow{\text{hydrolysis}}$ 1 molecule of Digitoxose + gitaloxigenin + sugar

Glyco digitaloxin $\xrightarrow{\text{hydrolysis}}$ gitaloxigenin + glucose


Notes) Digitoxin → It is colorless odorless bitter crystalline, insoluble in water, most toxic active constituent gives Killian Test

② Digitoxose → It is DESO
i.e. Deoxysugar.

③ Digitalose → It is 3 Methoxy
6 Desoxy D Galactose.

④ Prepared Digitalis → It is Standardised Powder of the BP 1989.

It is adjusted to strength with weaker powder Digitalis or Panda grass.

 Active Allide drug → ① Digitalis
lutea → (Straw Foxglove) → Some
flower yellow corolla margin
dentate or serrate Ca oxalate
absent.

② Digitalis lanata → resemble to
Digitalis Purpurea shape of corolla
is different margin entire,
Ca oxalate absent.

③ Digitalis thapsi (Spanish foxglove)

• Dark yellowish green, lensiolate.
irregular, serrate or dentate
margin, both surface are densely
covered with long uniseriate
and glandular trichomes,
cuticles strongly straighted, non
glandular trichomes are absent.

Ca oxalate crystal all present
Throughout the mesophyll

④ Herba adanidis → It contains
Areal part of Adonis vernalis
family - Ranunculaceae. flower
Bright yellow colour.

Adulterants (uncounted
substances
found in
at 21.08.18)

① Mullein leaves → Buggy branches
Trichomes, Node as Candelabra
B.S. → Verbascum thapsus family
Scrophulariaceae.

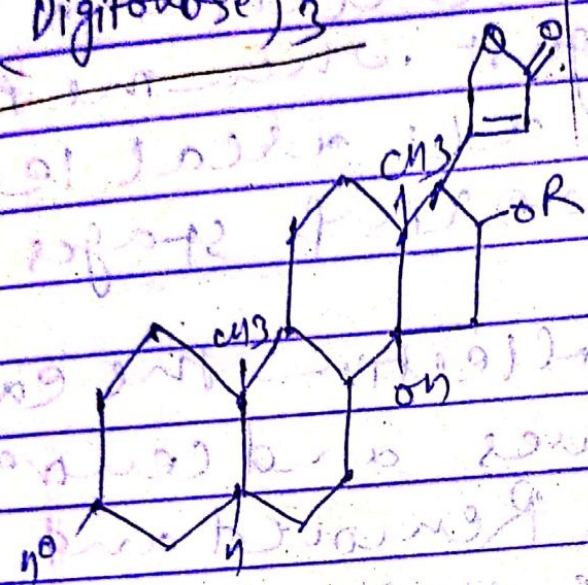
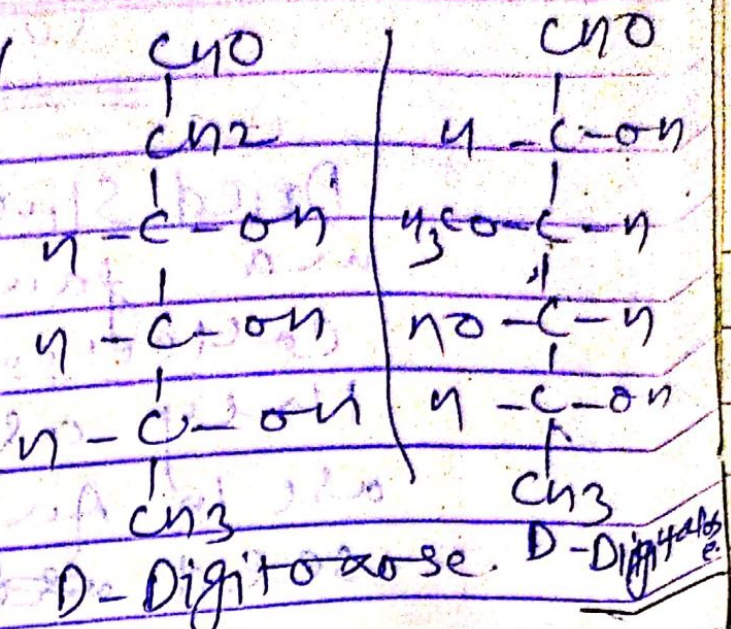
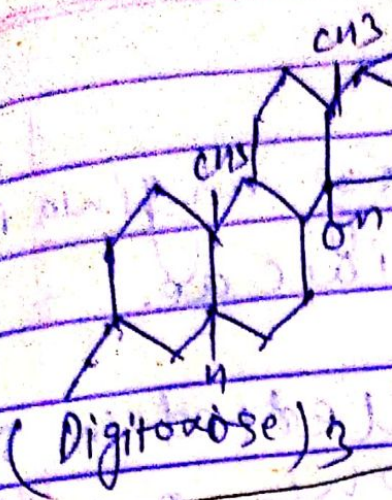
② Complex leaves → Symphytum officinale
family → Boraginaceae.
It contains Isolated unicellular
Trichomes. Many of them
present at apex.

③ Primrose leaves →
B.S. → Primula vulgaris family -
Primulaceae.

Trichomes are unicellular.

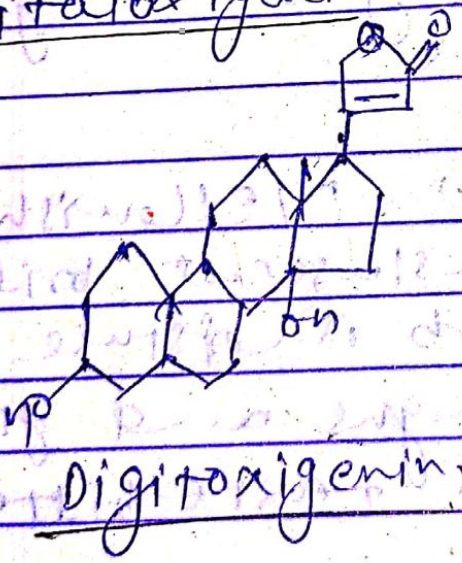
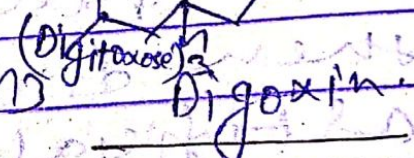
uses → used as cardiolytes

Chemical str. →



Gitoxigenin R=H

Gitoxigenin R=CH₃



Squills

B.S →

Dried slices bulbes of *Scilla maritima* family Liliaceae.

Collection →

They are collected in spring or in August when the plant seed ~~and~~ all aerial leaves and flowering stages are collected.

After collection the external thin scaly leaves and central portion are removed and remaining fleshy part is cut into transverse ^{slices} and then dried by sun rays or artificially.

Morphology → Yellowish white colour, translucent brittle on drying absorb moisture and becomes tough and flexible odour slight taste bitter.

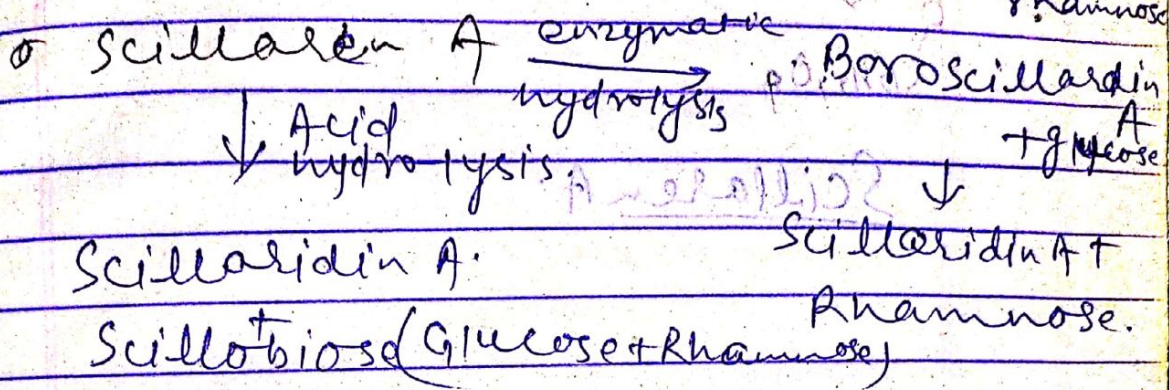
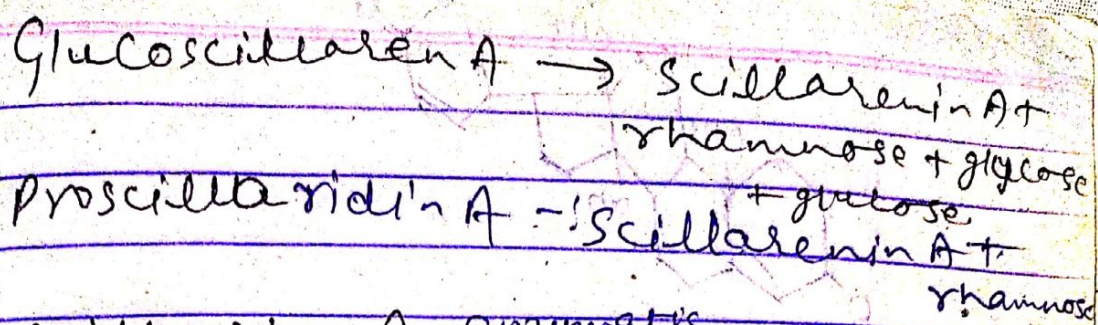
C.C → Squill contains the cardiac glycosides ~~are~~ bufadienolides types.

Scillaren A

↓
Crystalline

Scillaren B

↓
Amorphous
glycosides.



Allides drugs

① Indian squills \rightarrow obtain from dried Bulbs of *Urginea Indica* family Liliaceae.

② Red squills \rightarrow This is a variety of *Urginea Maritima* family Liliaceae.

The red colour is due to red Anthocyanin pigment present in mesophyll cells of squills.

Red squills contains glycoside called Scilliroside & Scilliosides. It is used as Rat poison.

uses

It is a cardio tonic without cumulative effect. It is also used in chronic bronchitis as an expectorant in small dosage while high dosage causes emesis.

THEVETIA →

SYN. → Yellow ~~Camander~~ ^{oleander}, Trumpet flower,
lucky nut tree.

B-S →

Dried seed of Thevetia Peruviana family
Apocynaceae.

Geographical source → west India, Florida,
America and also found around India.

Cultivation →

~~Characteristics~~ Thevetia is cultivated as an
ornamental plant and planted as
large flowering shrub or small orna-
mental tree standard in gardens and
parks in temperate climates.

* The winter season brought inside a green
house or as a house plant.

Macroscopy → Green house The plant
is large ever green shrub 4 to 6 m
tall. leaf 10 to 15 cm long linear
lanceolate acute apex opposite margin
entire.

* Leaves surface was smooth thick
dark shiny above and light green
yellow.

* Characteristic odour and bitter taste.

Microscopy \rightarrow T.S of leaves shows single layer of upper and lower epidermis covered externally by thick cuticle.

* Mesophyll differentiated into single layer of Palisade cells, elongated and compact with a few chloroplast, spongy Parenchyma 5 to 8 layer.

* Midrib was having conjoint, collateral vascular bundles.

* Paracytic Stomata are present.

C.C \rightarrow Thevetin is major active constituent of Thevetia. which is a mixture of two triside i.e Thevetin - A and cerberoside (Thevetin B).

* The Monocycle separated from Thevetia seeds are cerberin, Nerifolin, Peruvoside, Thevenosin (ruvoside) and Peruvoside acid (Peruvositin).

Adulterants \rightarrow Cardiac glycoside are present in several other genera of Apocynaceae e.g. cerebera and Stropanthus.

* Cerberoside (Thevetin B) is found in Serebra Odallam.

* In current medicine Cardiac glycosides are special form of heart beat disease.

* In the western world, the drug of choice is in general digoxin from digitalis lanata or in situation strophanthus (eg. Ouabain). from strophanthus species.

uses → Entire thevetia plant is very poisonous and seed are most poisonous.

* Peruvside is used in treatment of mild cardiac insufficiency and weak heart.

* Tincture is cathartic, emetic and laborifuge.

* seeds are used as Purgative in Rheumatism and dropsy.

Aloe ⇒

* It contains 4 variety of Aloe:

B.S ⇒ ① Curacao Aloe - Dried Juice of the leaves of Aloe Barbadosis.

② Cape Aloe ⇒ Dried Resin of Aloe Jerox.

③ Scotrine and Zingiber →

Aloe Perryi family - Liliaceae.

Characteristics →

Scotrine → It is Pasty, semiliquid, brownish yellow colour opaque is not too viscous then separate on standing ~~down~~ into clear, dark brown, supernatant liquid and a dark yellow sediment.

* The drug contains minutes crystals of ~~yellowish~~ Aloesin and varying amount of water.

Dried at gentle heat it is hard, dark brown mass with unpleasant odour and bitter taste.

Zingiber → It is hard or soft in compact mass liver brown colour dull waxy smooth and even fracture few very small cavity, characteristics odour bitter taste.

Cape Aloe → Dark reddish brown or nearly black with greenish tinct have clean glassy fracture and splinture all transparent and of reddish brown or amber colour.

This drug exhibit no crystals under microscopes therefore glassy appearance colour is ⁽²⁰¹²⁾ sour, pale yellow color of its powder and ~~even~~ well capped under suitable condition crystal may appear.

Curacao Aloe or Barbados Aloe

~~Not~~ its is not official Aloe. Curacao is obtained from Dutch Island.

Curacao

↓
Livery

It is dull waxy, even fracture splintered shows ~~small~~ minute crystal of Aloin.

↓
Vitreous Curacao

It is opaque on keeping and slow crystallization of Aloe.

vitreous variety can be distinguished by using

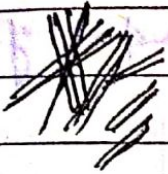
Livery variety -

- ① Transparency.
- ② Small fragment.
- ③ Gallet red colour.
- ④ Taste is bitter.
- ⑤ Odour is Penetrating.

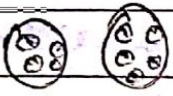
Microscopy: It is mounted as lacto-phenol.



Cape Aloe \rightarrow Transparent, Brown, irregular and angular fragment.



Cula (CaO) \rightarrow Shows fragment composed of innumerable minute cylinder prism or needles.



Zangiber \rightarrow It contains irregular lumps with embedded nodular mass.



Socotrine \rightarrow fragment composed of fairly large prisms grouped irregularly into masses.

Constituent \rightarrow Pale yellow crystalline substances Barbaloin.

* In Cula (CaO) Barbaloin is accompanied by Iso barbaloin which is crystalline and isomeric with barbaloin.

* Socotrine and Zangiber contains No Iso barbaloin.

* Cape of Aloe contains traces of Iso-barbaloin.

β -Barbaloin It is Amorphous Aloe in and it is obtained by heating barbaloin for 3 hours at 160 to 165°C

- * β Barbaloin is abundant in Cape Aloe.
- * Resin contain Aloe emodin which is hydrolytic decomposition of product of barbaloin.

Isolation of Aloe in

- * Aloe in 10 times wt of boiling water
Acidify with $\text{H}_2\text{SO}_4 \rightarrow$ PPT \rightarrow cool \rightarrow filter \rightarrow Neutralized \rightarrow evaporate (under reduced pressure) \rightarrow cool \rightarrow at a few crystal of Aloe \rightarrow set a side \rightarrow filter the crystalline Aloe \rightarrow wash with dilute alcohol \rightarrow finally 10 to 20% of total wt of Aloe.

Chemical Test

Borax Test \rightarrow 1% solⁿ of Aloe in boiling water \rightarrow cool and clear with Keshighur \rightarrow filter \rightarrow Add 0.25 gm of Borax \rightarrow heat \rightarrow Pale dark fluid in fluid gives green fluorescence.

Bromine Test \rightarrow Clear solⁿ of Aloe + equal volume of saturated Bromine solⁿ \rightarrow gives yellow PPT.

Nitric acid Test \rightarrow 5ml 1% solⁿ of drug \rightarrow 2ml HNO_3 .

↓	↓	↓	↓
Cape Aloe.	Curacao.	Socotrin	Zangiber.
↓	↓	↓	↓
Green colour.	Deep brownish red colour.	pale brownish yellow colour.	Yellowish brown colour.

Born trager test \rightarrow

Cuprillon test for Iso-barbaloin \rightarrow

10 ml 0.1% Aloein in water + 1 drop of 5% solⁿ of copper acetate + 0.5 ml of saturated NaCl solⁿ + 1 ml alcohol warmed.

↓	↓	↓	↓
Cape Aloe	Curacao.	Socotrine.	Zangiber.
↓	↓	↓	↓
Pale red colour.	wine red colour.	No colour.	No colour.

uses \rightarrow Purgative.

Adulterants \rightarrow Natal Aloe \rightarrow Contains Nataloin and Homonataloin.

* It does not give Borax test and give a deep blue colour with little H_2SO_4 followed by vapours of HNO_3 .

• Colour is green black.

② Moche Aloe → It is black, brittle black glassy Aloe of very strong odour.

③ Tafferabad Aloe → It is also nearly black

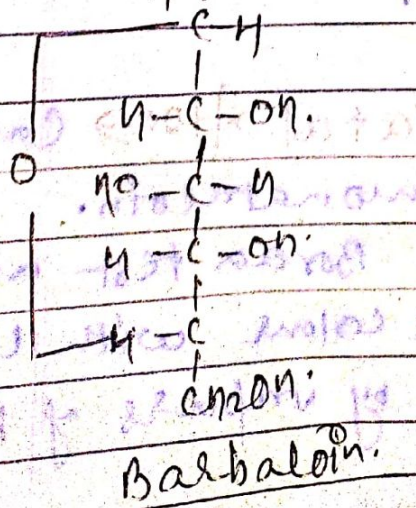
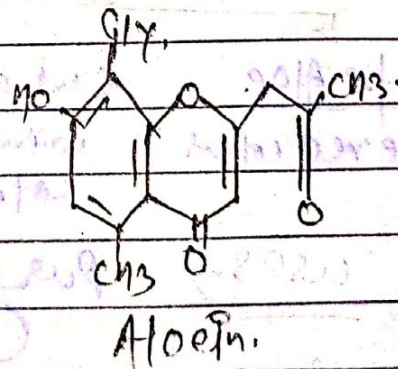
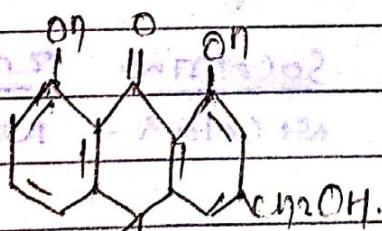
Note → Two variety of Aloe.

① Crystalline → Insoluble in cresol and give positive test for curacao Aloe.

② Amorphous → Dissolve in cresol and give the positive test for Cape Aloe.

• It has one third Potency than that of crystalline variety.

Chemical structure →



Barbaloin

SENNA →

Indian senna

Syn → Tinnevely senna.

B.S → Dried leaflets of *Cassia angustifolia* family - leguminosae.

Collection

Collected mainly in September from both wild and cultivated plants. After collection, the leaflets are dried under shade or indoors by spreading them in thin layer.

• Drying takes place within 7 to 10 days and leaves show yellowish green colour.

Macroscopical characters

Colour - yellowish green.

Odour - slight.

Taste - mucilaginous, bitter and characteristic.

Shape - leaves are lens like entire apex is acute with spine at the top.

Alexandria Senna.

Syn → Cassia senna, Egyptian senna.

Dried leaves of *Casia acutifolia* family - leguminosae.

Collection

The collection of leaflets along with broches with done when plant are bearing unripe fruit and dried under sunlight.

The leaves are clean and graded into entire leaves, entire and broken leaves, shifting and spot.

Macroscopical characters

Colour - grayish green.

Odour - slight.

Taste - mucilaginous, bitter, characteristic.

Size - 2 to 4 cm long.

2 to 12 mm width.

Shape - ovate, lanceolate, margin is entire and

Size - 7 to 8 mm in width
and 25 to 60 mm in length.

curved spine.

Microscopy →

Isobilateral leaves.

Epidermis show presence
of unicellular conical,
thick walled, hooky trichome

• Paracytic or $\hat{\alpha}$ tubicous
stomata are present
on epidermal surface.

• Trichomes are slightly
curved.

• Palisade Tissue is present
on both side consist of
rectangular cell, clusters
crystal of calcium oxalate.

• Sclerenchyma & xylem
present.

cluster sheath and cho-
-lenchyma present.

Microscopy →

Both are very much
identical in their
histological characters.

① Veinlet No. - 19.5 to 22.5.

② Stomatal Index - 17 to 20

③ Palisade ratio.

7.5 (upper
epidermis)

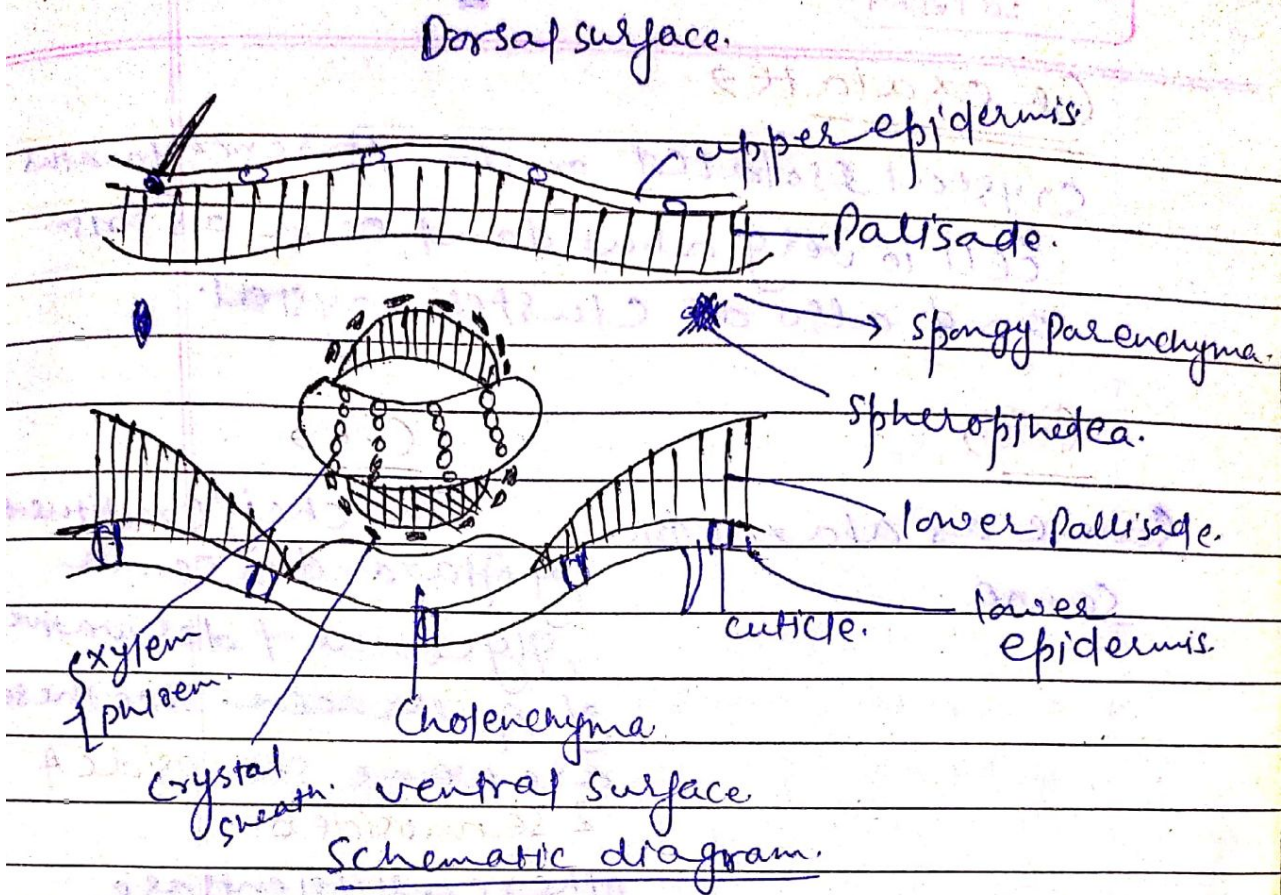
5.1 (lower
epidermis)

① Veinlet No. - 25 to 29.5

② Stomatal Index - 11.4 to 12.2
to 13.3.

③ Palisade ratio - 4.5 to 9.5 - 19

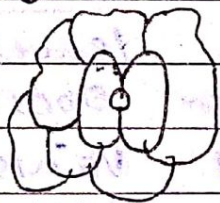
(upper epidermis)
3.5 - 7.0 - 14.5
(lower epidermis)



Microscopical characteristics

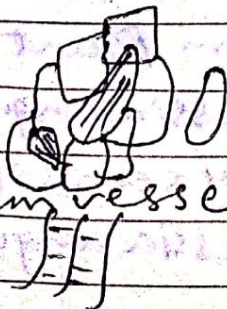
of powdered drug →

- (a) Epidermal cell → Polygonal straight walled epidermal cell with paracytic stomata.
- (b) Paracytic stomata → Rubaceous or Parallel cell.



Stomata with 2 subsidiary cell around guard cells.

- (c) Covering trichomes - unicellular, thick, warty walls acute apex, narrow lumen, conical shape.



length - 70 to 260 μ

width - 12 to 18 → 25 μ.

- (d) Xylem vessels → Angular thickening, lignified

Ca oxalate

Crystal isolated or in Parenchymatus cell in very abundant, occur as Prism and also as cluster crystal.

C.C.

Same as alexandrian Senna.

C.C.

The chief constituent of Alexandrian Senna glycoside of derivative of Anthracene. Two these are name sennoside A & sennoside B.

Other constituents are Kaempferol, myricyl alcohol, phytoosterolin, mucilage, Ca oxalate.

Adulterant & substitutes

Adulterant

Theyvelly senna or Indian Senna is usually free from

D* Cassia obovata leaves broadly obovate, apex, varicose pinnate, distinct.

Senna has been adulterated with Palthe Senna,

The leaflets are Cassia - auriculata

① Arabian Senna It is obtained from plant of Cassia angustifolia

② Mica or Bombay Senna obtain from Cassia angustifolia

① *Cassia auriculata* →
Small oblong, ovate,
thick walled, unicellular
- lateral trichomes.

② *Cassia holosericea* →
smaller hairy

③ *Cassia montana* →
Darker, rounded
apex

uses →

Purgative.

uses →

Purgative.

Chemical Test →

Bornträger test
for Anthraquinone →

Boil the leaves with dil.

H₂SO₄ (hydrolysis).

filter & cool the filtrate.

add immiscible organic
solvent (benzene or CCl₄)
to it.

Shake the Test tube and

separate upper organic

solvent layer in another

test tube. Add strong

ammonia solⁿ, shake slightly

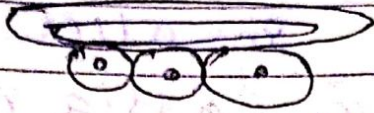
and keep the test tube aside,

lower ammoniacal layer

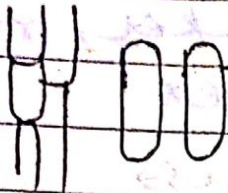
shows pink / Red colour.

Liquorice

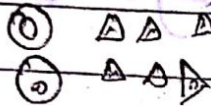
Microscopical powder drug



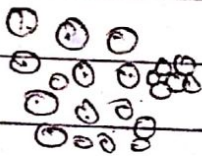
Fiber - Lignified, thick and yellow walls, subbundles about 10 to 45 with crystal sheath of parenchymatous cell each containing single prism of calcium oxalate



xylem vessels - large with numerous bordered pits, surface is lignified



Calcium oxalate crystal - individual prism shape, 10 to 15 to 25 to 35 μ long. Present in parenchymatous cell and mainly many are scattered in the powder.



Starch grains - Most are simple, oval, or rounded, about 2 to 4 to 10 to 20 μ long.

CASCARA

Syno.

B.S. -> Dried barks of Rhamnus purshiana family Rhamnaceae.

Collection -> The drug is collected in season from April to end of August. Most epiphyde is removed from tree by scrapping.

Bark collected in raining season may
Cause darkening or blackening.

Morphology → occur in single whitts and
in curved or channeled pieces.

* The outer surface smooth dark, purple
brown.

* The bark is more or less completely covered
with silver gray patches of lichens
giving the drug greenish white colour.

* Inner surface yellow to reddish brown.

Fracture - Short.

Odour - Characteristics.

Taste - Bitter.

Notes → Bitter taste is due to the presence
of lactone which can be converted
into less bitter by alkali but this
causes loss of activity.

Microscopy → A transverse section
shows -

① * Cork of thin walled Parenchymatous
cells arranged in radial rows
with yellowish brown cell content

② Cortex → outer part of about 6 layers
of Parenchymatous cells. Inner part
of thin walled cellulosic Parenchyma

(iii) cluster crystal of Ca. oxalate the parenchyma.

(iv) Scleride with thick striate walled and numerous.

o Occasional multilage cavity in the cortex.

o Minutes starch grains.

o 1^o Phloem showing a few fibers and collapsed and sieve tubes.

o Medullary rays crossing 2^o Phloem 3 to 5 seriate, wavy converging towards the cork.

o Phloem with well developed sieve areas Companion cell.

o Lignified Phloem fiber is tangential band and crystal sheath.

o Phloem, parenchyma present.

Powder character

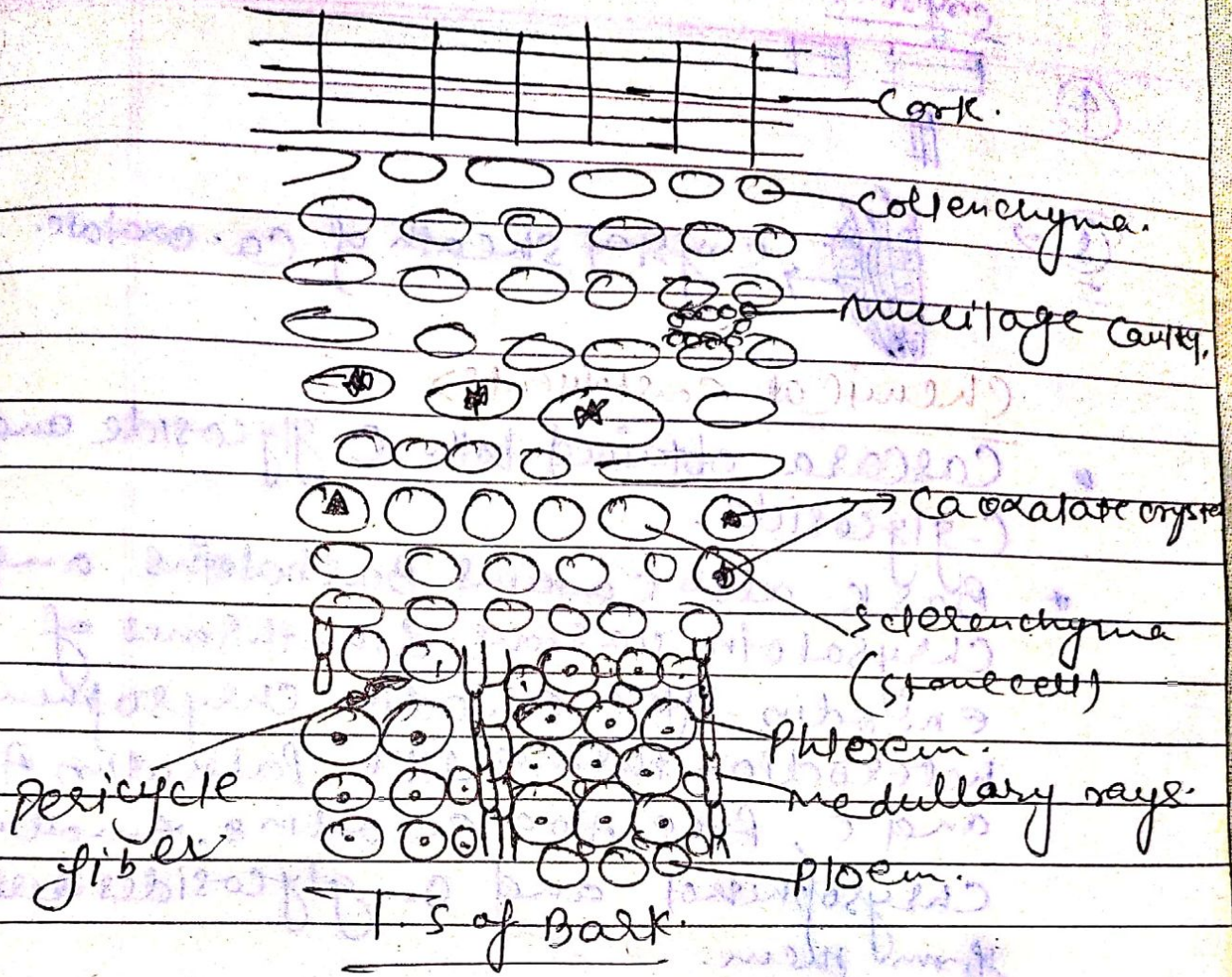
o Prism of Ca oxalate.

o Cork cell.

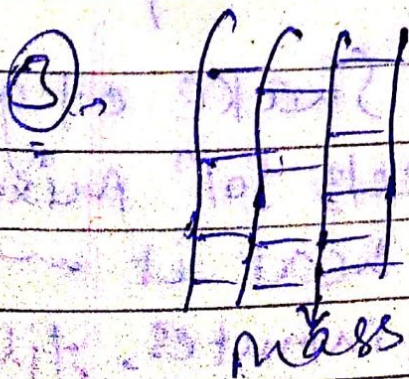
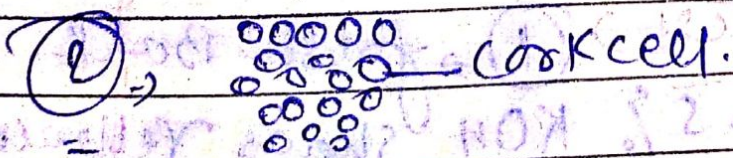
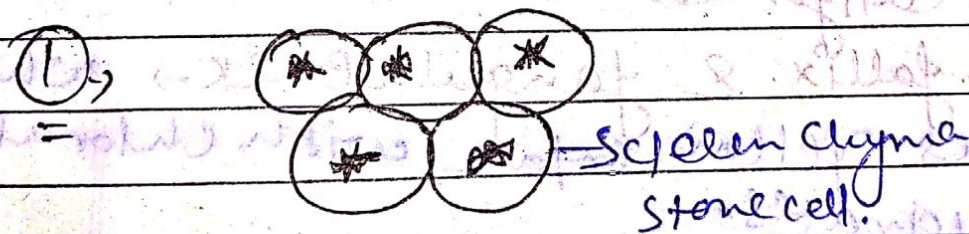
o Phloem fiber.

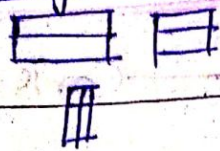
o Stone cells.


o Parenchymatus Phloem fiber cell.



Power study



crystal.
④ 

⑤  crystal sheath of Ca. oxalate.

Chemical Constituents →

- Cascara obtained both O-glycoside and C-glycoside.
- Bark also contains Barbaloin and Chrysaloin various dianthrone of emodin Aloe emodin Chrysophenol heterodianthrone like palmidin A, B and C, free Aloe emodins, emodin Chrysophenol and O-glycosides derived from them.

Adulterants →

- ① R. California.
- ② R. fallix. & Jangula Bark → which gives yellow color with chloral hydrates.

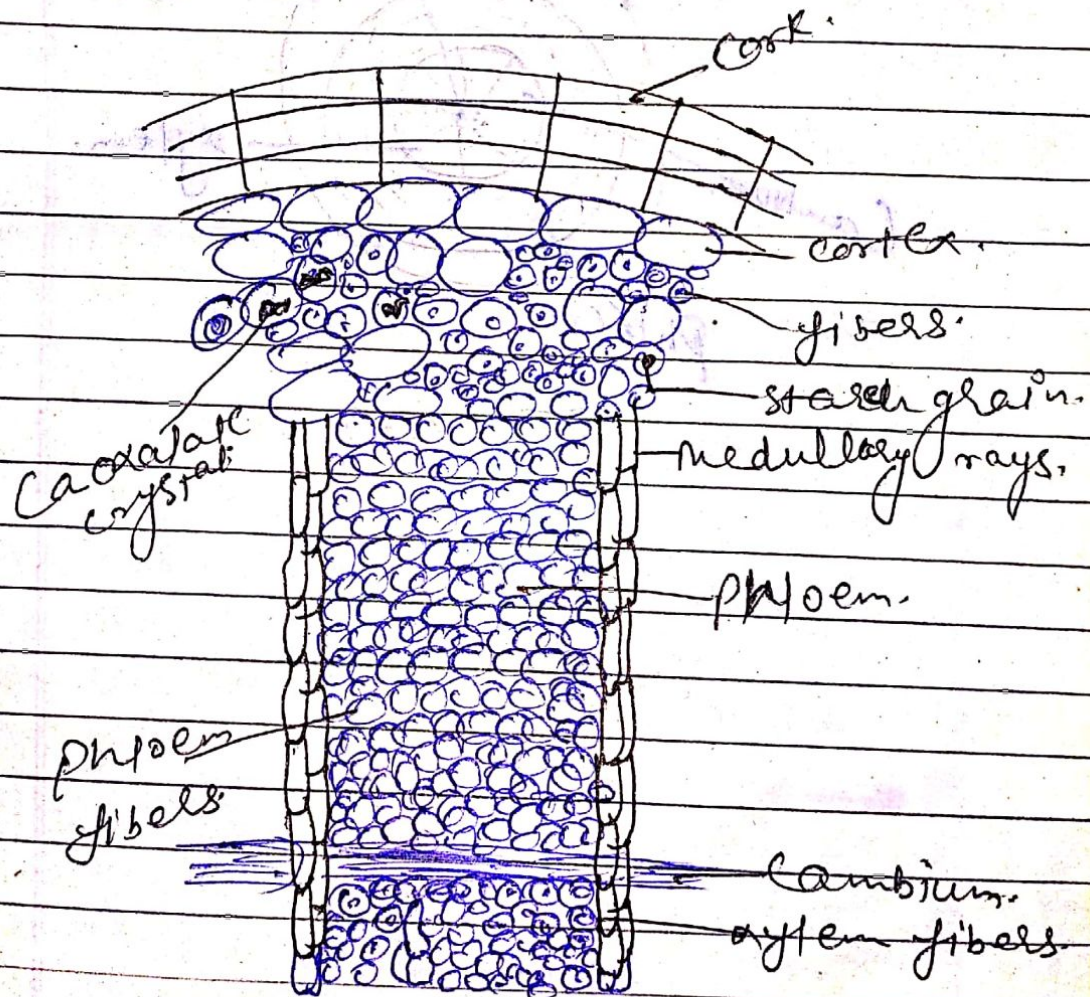
Chemical Test → ① → fresh Bark treated with 5% KOH shows yellow color

- ② Born-Tragger's test → Shake 0.1 gm of powder with 5ml FeCl₃ solⁿ mixed with 2.5 ml of HCl. heat it on water bath for 10 minutes, filter cool and extract the filtrate with

Sol of CCl_4 , and extract the separate
the organic layers and treat with
sol dil. NH_3 solⁿ. Ammonical layers
requires Rose pink yellow colour.

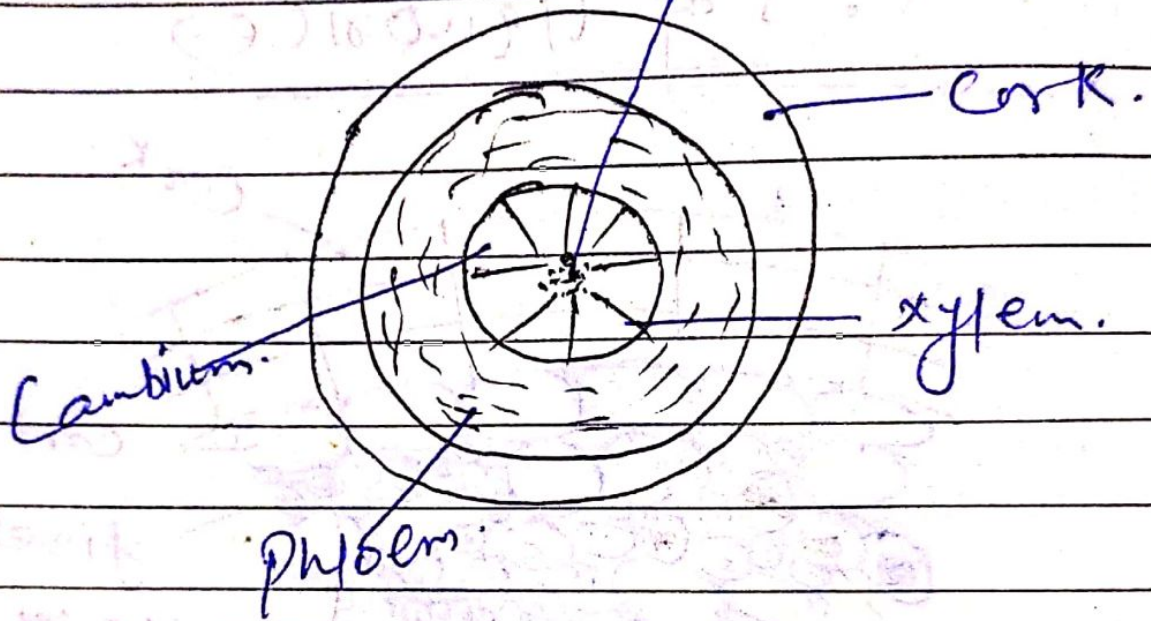
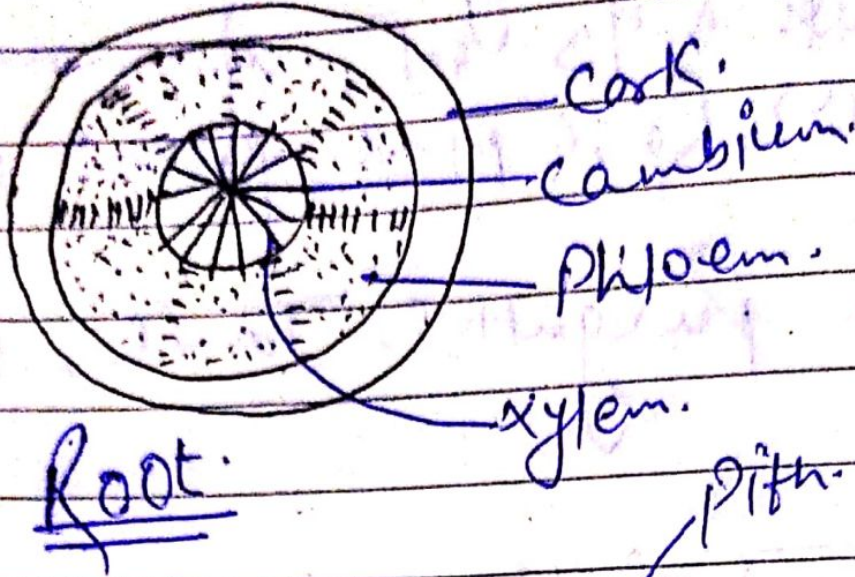
uses, Purgative, Tonic, Stomachic.

Tip of liquorice



Tip of Root.

T.S of Root & Stolon →



STOLON