

Pharmacognosy

PHG 112
PG 102

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Faculty of Pharmacy

Lecture 9



Interactive teaching methods & activities

https://www.youtube.com/watch?v=_6u9wZ83mkE

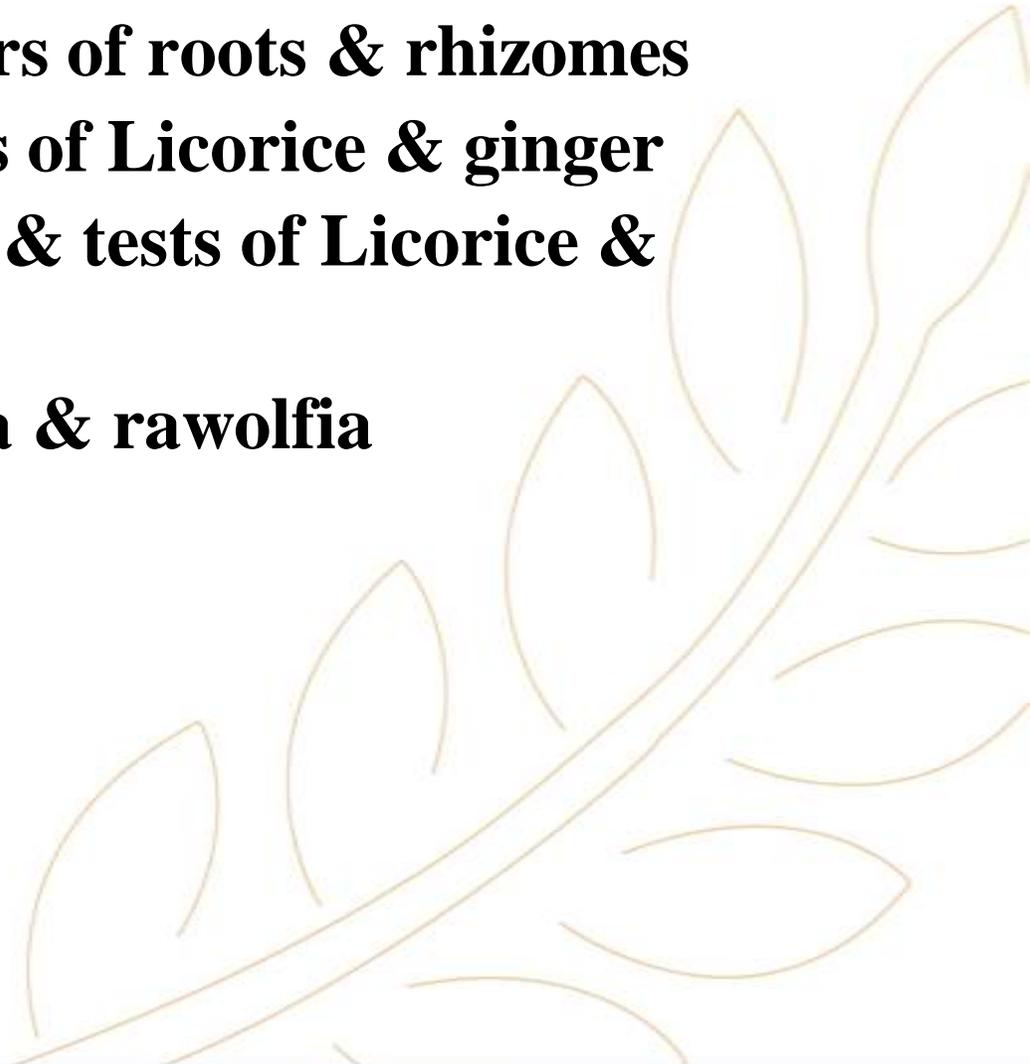
<https://www.youtube.com/watch?v=9TUs--aV6l8>

Quizziz

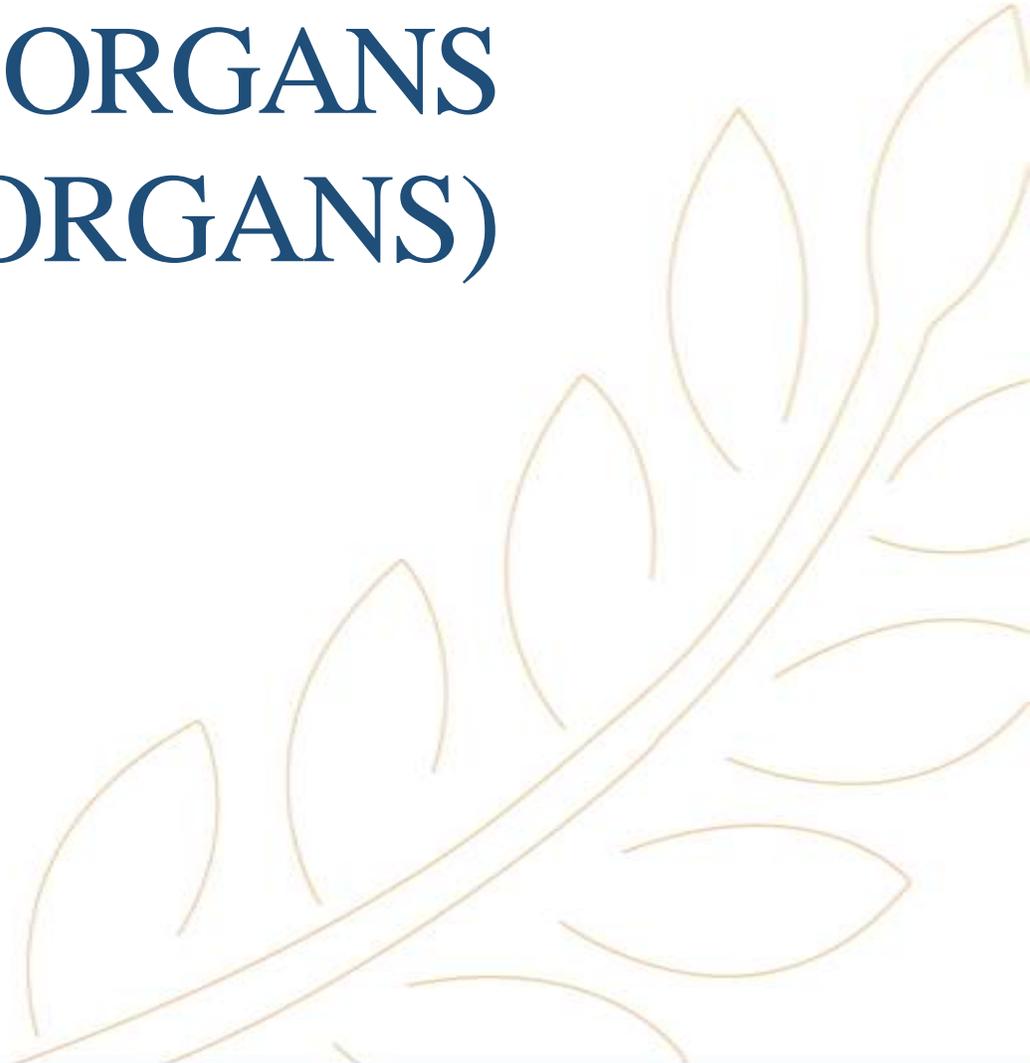


By the end of the lecture, students should be able to demonstrate knowledge of:

- **Morphological & Microscopical characters of roots & rhizomes**
- Morphological & Microscopical characters of Licorice & ginger**
- Active constituents, uses, contraindication & tests of Licorice & ginger**
- Active constituents, uses & tests of curcuma & rawolfia**



SUBTERRANEAN ORGANS (UNDERGROUND ORGANS)



-These organs are collected from perennial plants to allow storage of the 2ry metabolites in these organs.

- Subterranean drugs are from

*** root origin**

***rhizome origin**

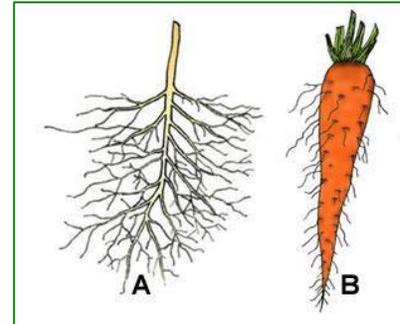
***root and rhizomes.**



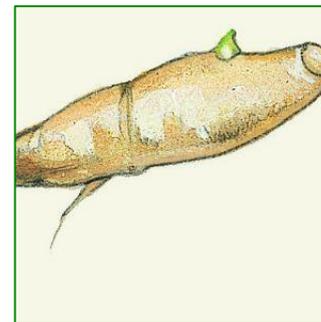
THE SUBTERRANEAN ORGANS

1- Stem origin

Rhizome
Corms Bulbs
Tubers



2- Root origin



Roots Tubers
roots

1- Stem origin

Rhizome

Underground horizontal stem with stored foods



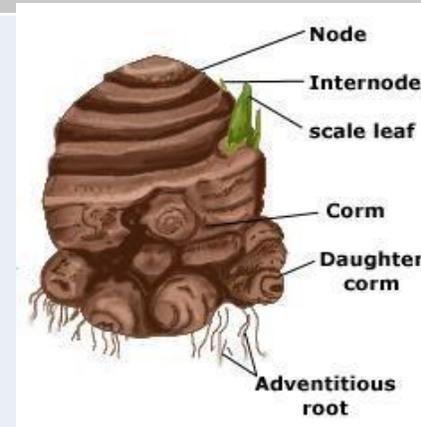
Bulb

Short stem with fleshy leaves



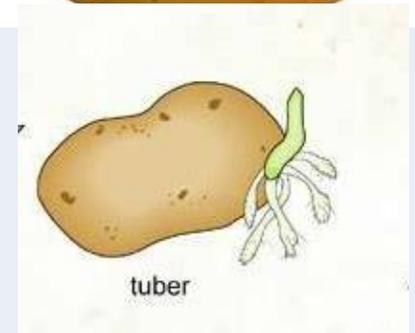
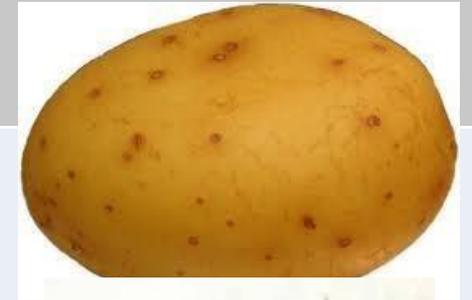
Corm

Short, vertical, swollen underground plant stem that serves as a storage organ



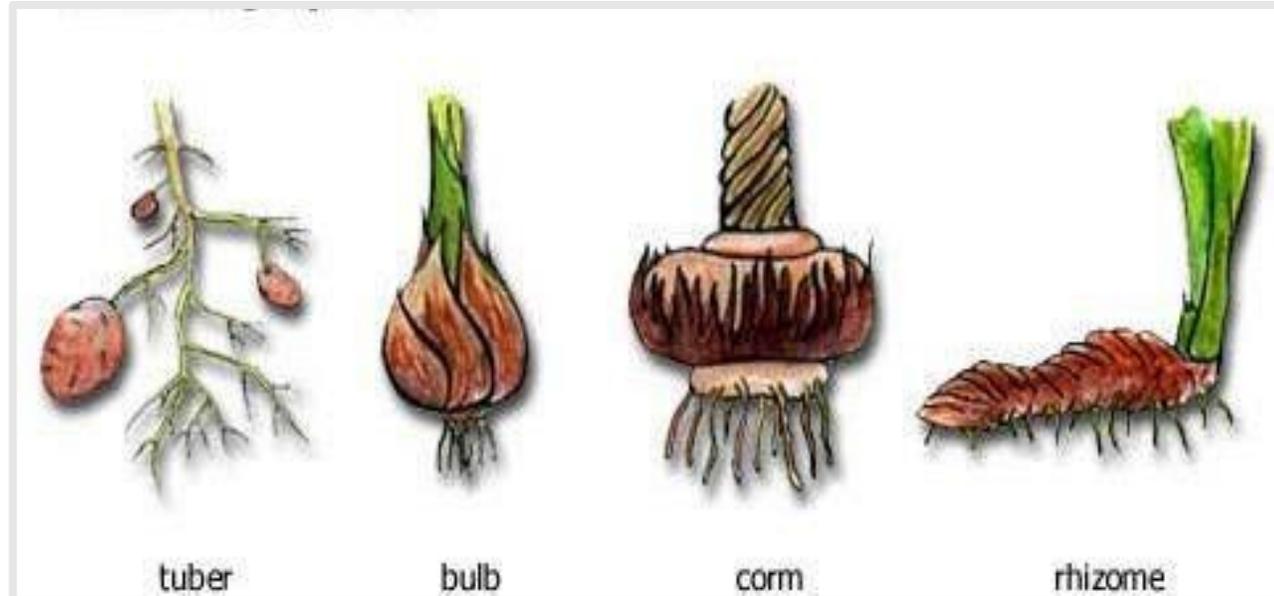
Tuber

Tubers are various types of modified plant structures that are enlarged to store nutrients



Subterranean stem differs from the aerial stem in the following

- 1 It bears scale leaves (not foliage)**
- 2 Bears adventitious roots arise from the nodes.**



What is the difference between root and rhizome?

The root:

- *It is derived from the radical and grows towards the soil and water
- *It has no leaves
- *No nodes and internodes
- *No buds
- *No chlorophyll
- *Apical growing point called root-cap.

The rhizome:

- It has nodes and internodes
- The growing point covered with scaly leaves and not root cap.



**Subterraneans Having
Nutraceutical and Cosmeceutical
Applications**



LIQUORICE

Is the dried peeled or unpeeled root and rhizome (stolon) of *Glycyrrhiza glabra* var. *typica* (Spanish liquorice) or *Glycyrrhiza glabra* var. *glandulifera* (Russian liquorice) Family Leguminosae

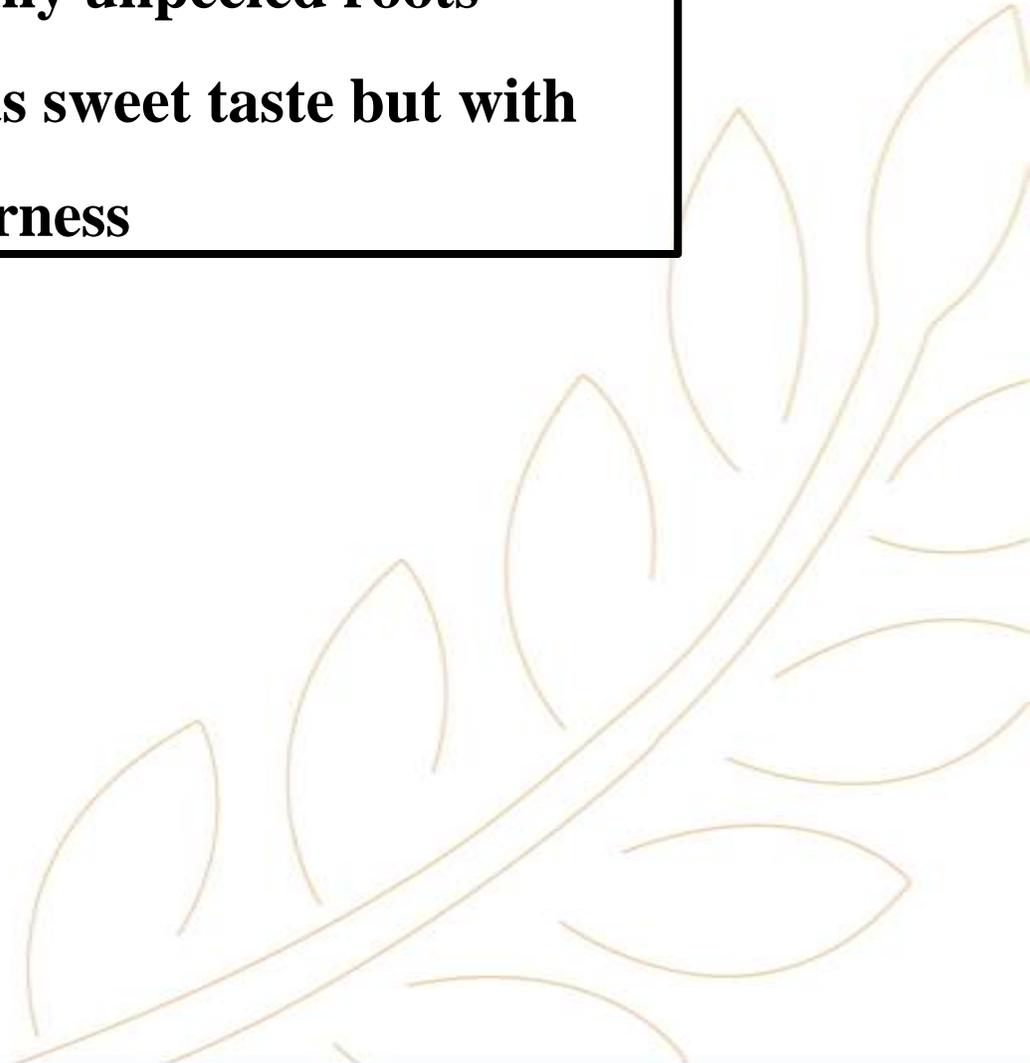


Spanish liquorice

- It is mainly peeled stolon (rhizome) and few root.**
- The stolon bears scale leaves, buds and root scars and microscopically has central pith.**
- It has a sweet taste free from any bitterness.**

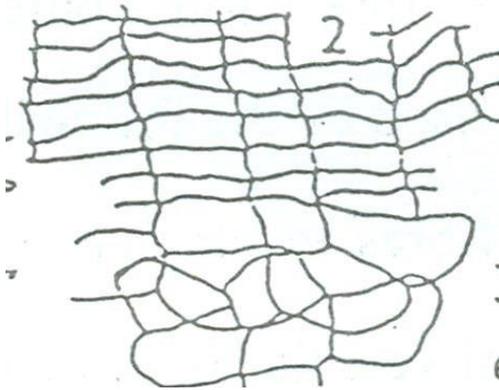
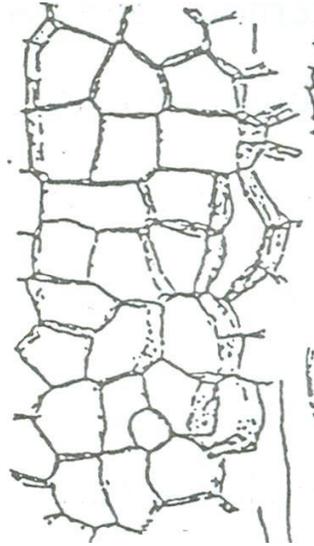
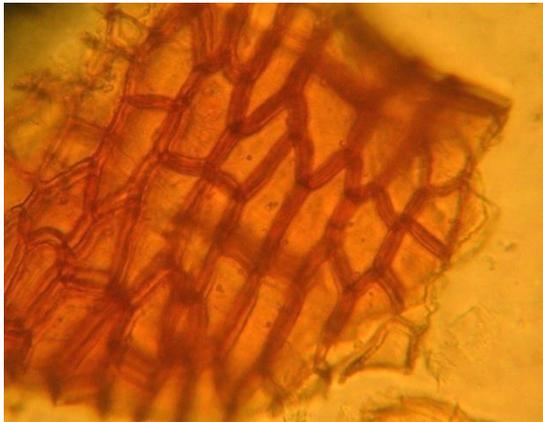
Russian liquorice

- Mainly unpeeled roots**
- It has sweet taste but with bitterness**

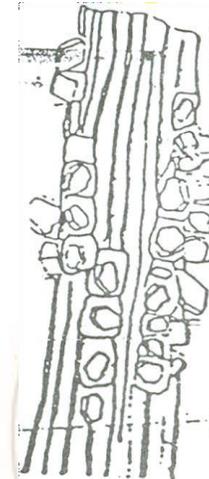


Powdered Liquorice

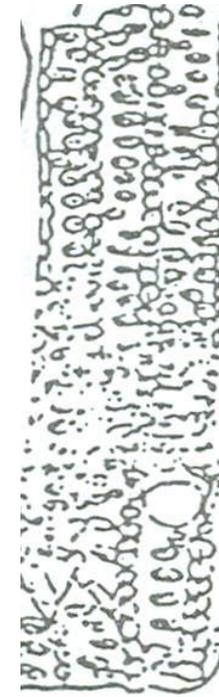
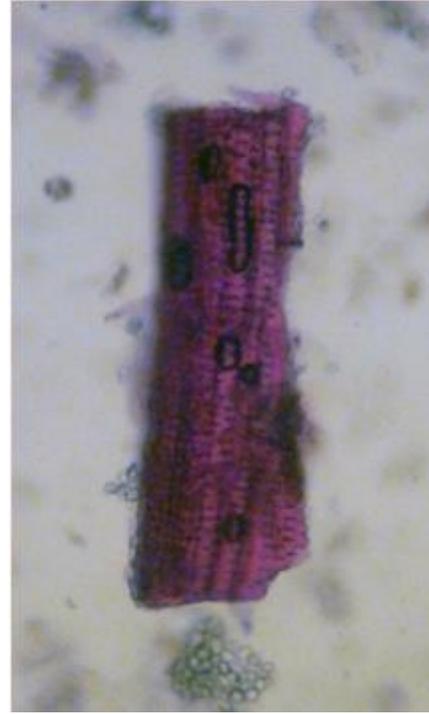
1- Cork cells



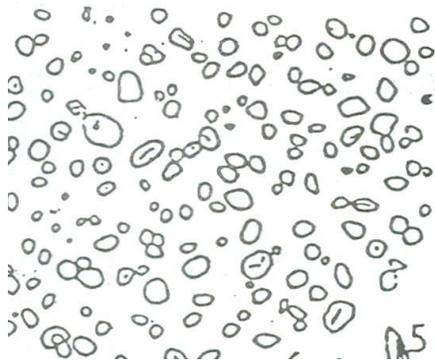
2- Crystal sheath



**3- Xylem vessels
lignified, showing
bordered pits**



4- Starch granules



5- Prisms of Ca oxalate



**1- Sweet principle
glycyrrhizin
(triterpenoid saponin)**

**2- Flavonoids,
liquiritin,
isoliquirtin**

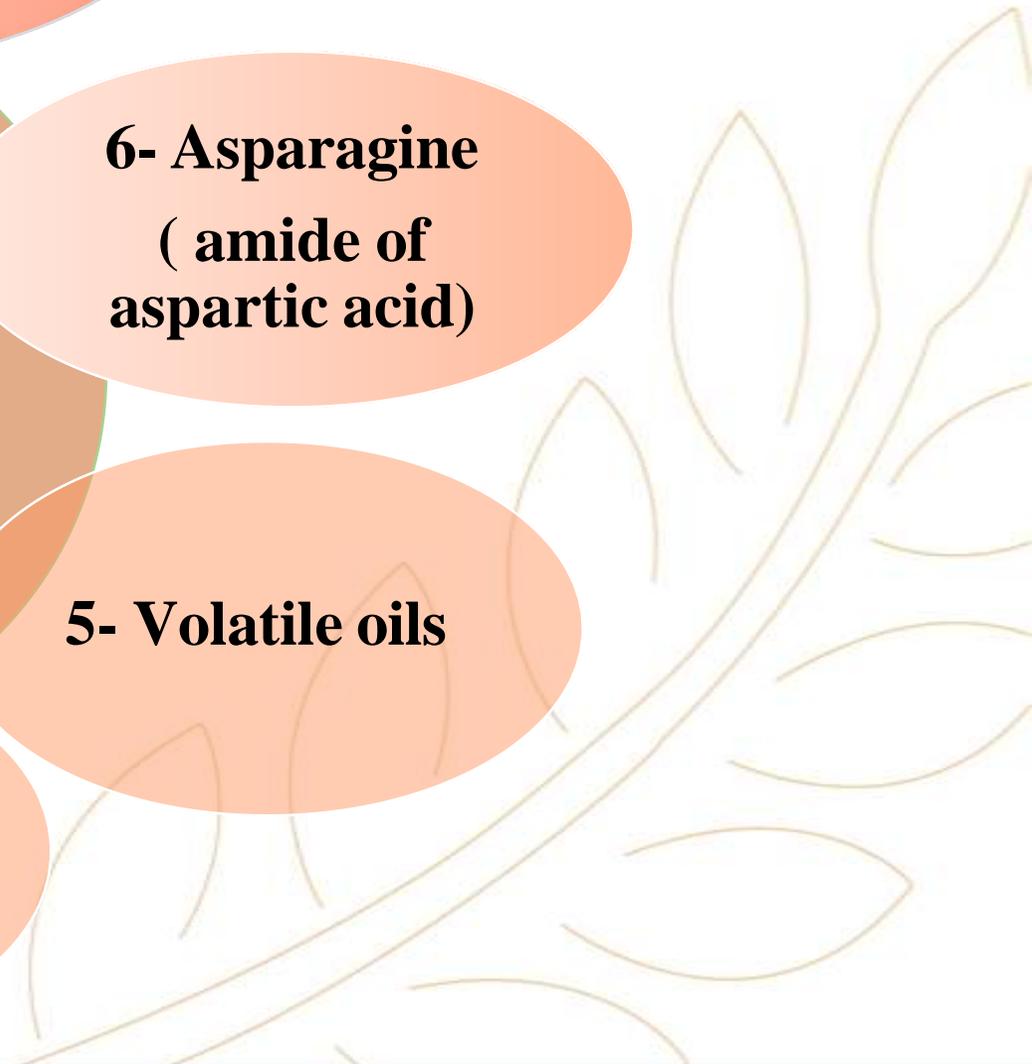
**3- Coumarins
(liqcoumarin) &
bitter principle (
glycyramarin)**

**4- Starch,
sugar , β -
sitosterol and
protein**

**6- Asparagine
(amide of
aspartic acid)**

5- Volatile oils

**ACTIVE
CONSTITUENTS:**



USES AND ACTIONS:

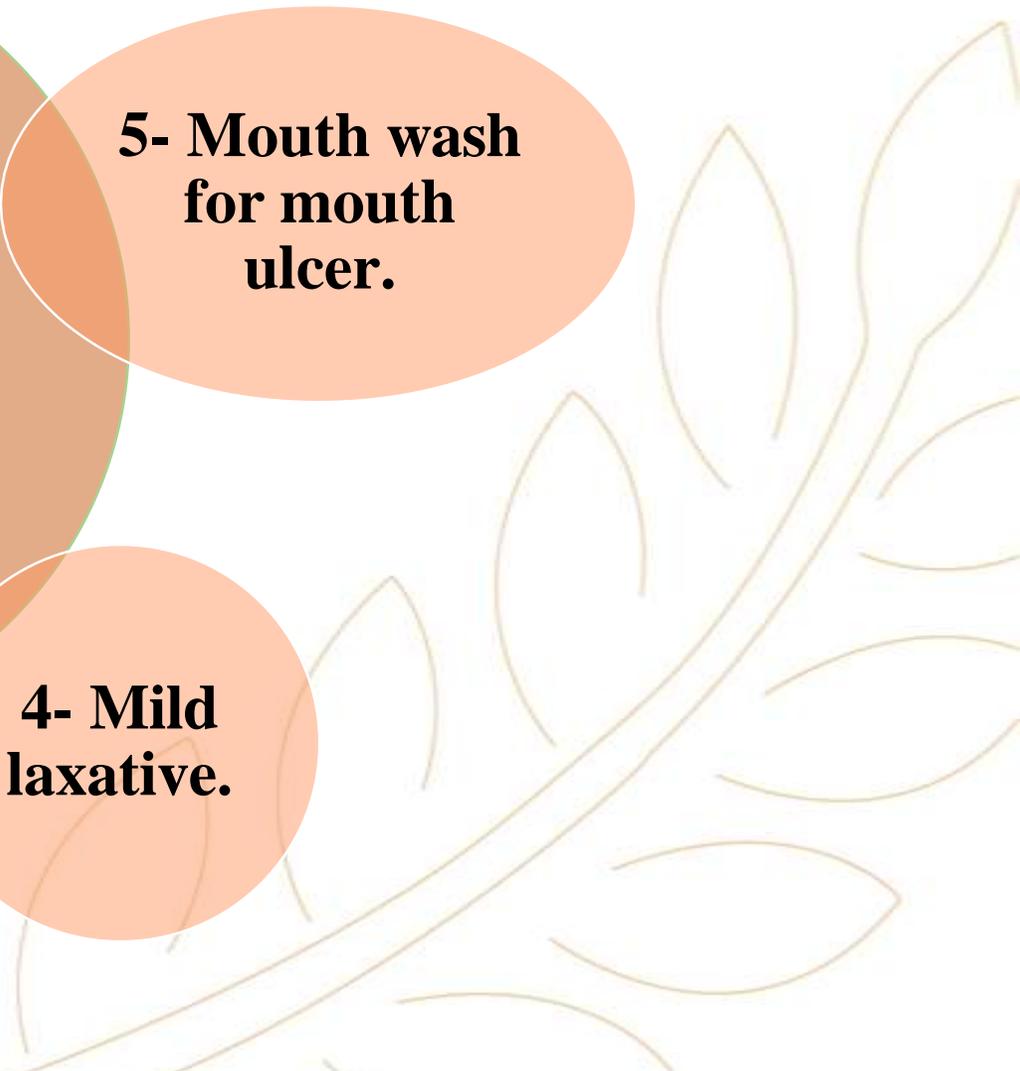
**1- Demulcent
and mild
expectorant**

**2- Sweetening
agent**

**5- Mouth wash
for mouth
ulcer.**

**3- Anti-inflammatory for
gastric and duodenal
ulcer and rheumatoid
arthritis (due to
presence of cortisone like
compounds)**

**4- Mild
laxative.**



Cosmeceutical applications

Skin whitening, brightening, clears hyperpigmentation, anti-aging, sun protection and acne management.



licorice irritation
root redness



hyperpigmentation



post acne marks



LICORICE ROOT



- OIL CONTROL
- CLEAR DARK SPOTS
- GLOW AND SHINE



It also promote hair growth but also leave your hair feeling soft and silky.

- **Strengthens hair roots preventing hair breakage and promoting overall hair health.**
- **Promotes hair growth, stimulates the scalp and encourages hair growth.**

The glycyrrhizic acid helps in the proliferation of hair follicles, leading to thicker and fuller hair over time.

- **Prevents Hair Loss**
- **Reduces Dandruff and Scalp Issues:** has anti-inflammatory and anti-microbial properties, making it effective in reducing dandruff and soothing various scalp issues.

It helps maintain a healthy scalp environment for hair growth.



CHEMICAL TEST:

1-Froth test:

Powder + Water in a test tube and shake well, Persistent froth stable for more than 1 min. (saponin)



2- Powder + 66% H_2SO_4 → orange red colour

Deglycyrrhizinated licorice, or DGL, is an herbal supplement typically used in the treatment of gastric and duodenal ulcers.

It is made from licorice from which the glycyrrhizin has been removed.

Glycyrrhizin is known to cause negative side effects, such as hypertension and edema; removing the glycyrrhizin is meant to avoid these symptoms





Subterraneans Having Nutraceutical Applications



GINGER

Is the fresh or dried rhizomes of
Zingiber officinale

F. Zingiberaceae.



To avoid insect attack ginger undergo:

Decorticated, peeled (unbleached)

Limed ginger (with calcium carbonate)

Ginger is an example for monocot rhizome

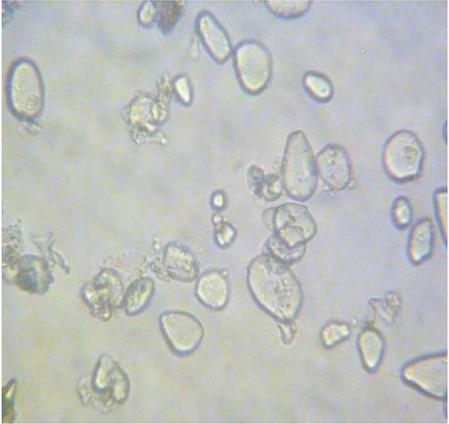
The drug has aromatic odour and pungent aromatic taste.

The **pungency is destroyed** by boiling with KOH solution
(c.f. capsicum).

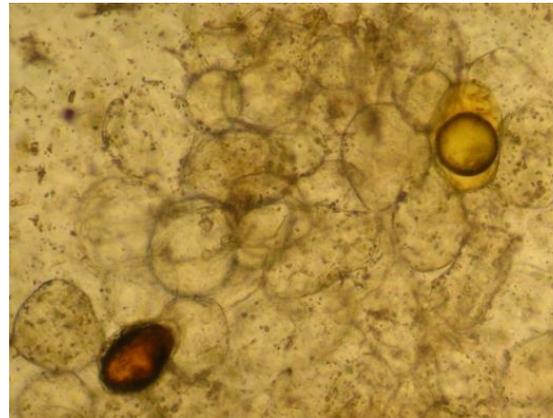
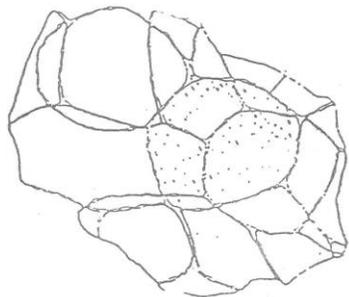


Powder

1- Large scitamineous starch granules



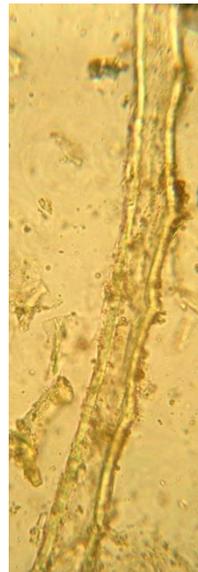
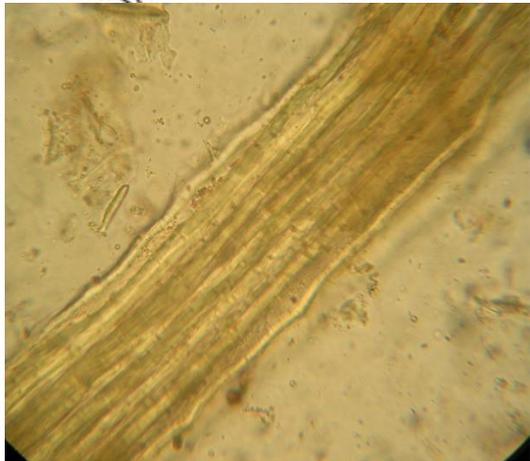
2- Parenchyma contains oleo-resin cells.



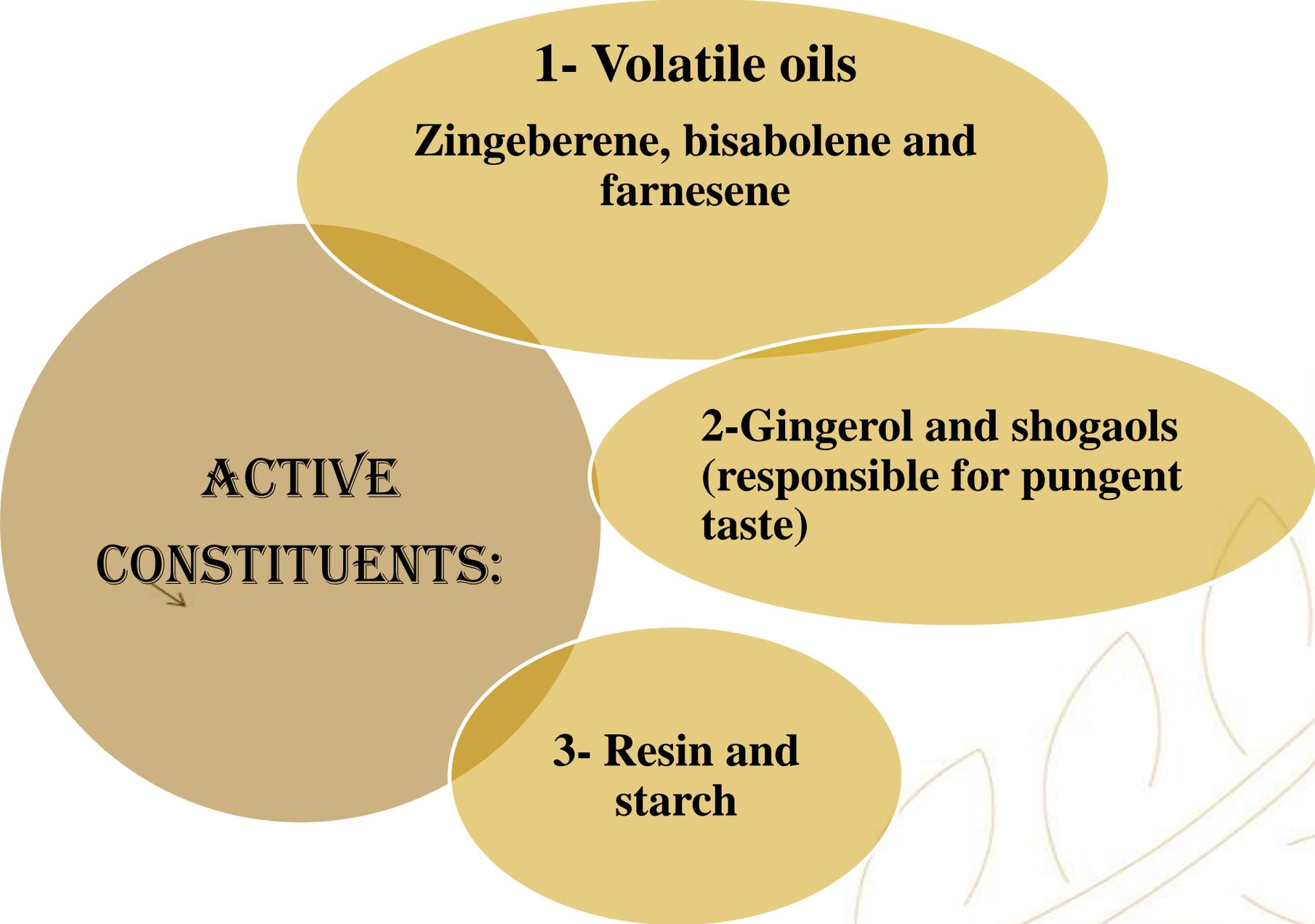
3- Non lignified xylem vessels.



4- Non lignified septate fibers with dentate margin and transverse pectosic septa



**ACTIVE
CONSTITUENTS:**



1- Volatile oils

**Zingerberene, bisabolene and
farnesene**

**2- Gingerol and shogaols
(responsible for pungent
taste)**

**3- Resin and
starch**



**2- Carminative
&
flavouring
agent**

**3- Reduce high
cholesterol level
in blood**

**4- Improve circulation
and antihypertensive**

USES

**1- Powerful
anti-emetic.
In motion
sickness.**



**7- Cough
mixtures**

6- Antioxidant

**5- Anti-
inflammatory and
in rheumatic pain.**



Some important subterranean drugs

Name	Origin	Active constituents	Uses
<p>Curcuma or Turmeric</p>	<p>Is the dried prepared rhizome of <i>Curcuma domestica</i> or <i>Curcuma longa</i> F. Zingiberaceae</p> <p style="text-align: center;">↙</p>	<p>1- <u>Volatile oils; turmerone, zingiberene</u></p> <p>2- <u>Curcumin (a yellow polyphenol)</u></p> <p>3- Resin, starch (gelatinized) and sugar.</p>	<p>1- <u>Antiinflammatory, antioxidant and antihepatotoxic</u></p> <p>2- Colouring agent, and carminative</p>



Name	Origin	Active constituents	Uses
<p data-bbox="84 344 366 396">Rauwolfia</p> 	<p data-bbox="537 344 907 725">Is the dried root and rhizome of Rauwolfia serpentina</p> <p data-bbox="537 753 945 893">F. Apocyanaceae.</p> 	<p data-bbox="988 344 1717 648">Mainly <u>alkaloids</u> (<u>Reserpine</u>, rescinnamine, <u>ajmaline</u>, ajmalinine and serpentine.)</p> 	<p data-bbox="1768 344 2313 558">1-Reserpine used as <u>powerful antihypertensive.</u></p>  <p data-bbox="1768 953 2308 1090">2-<u>In insomnia and psycatric disorders.</u></p>



Established by Dr.Nawal El Degwi
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جامعة أكتوبر للعلوم الحديثة والآداب

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Thank You!

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