

Pharmacognosy

PHG 112
PG 102

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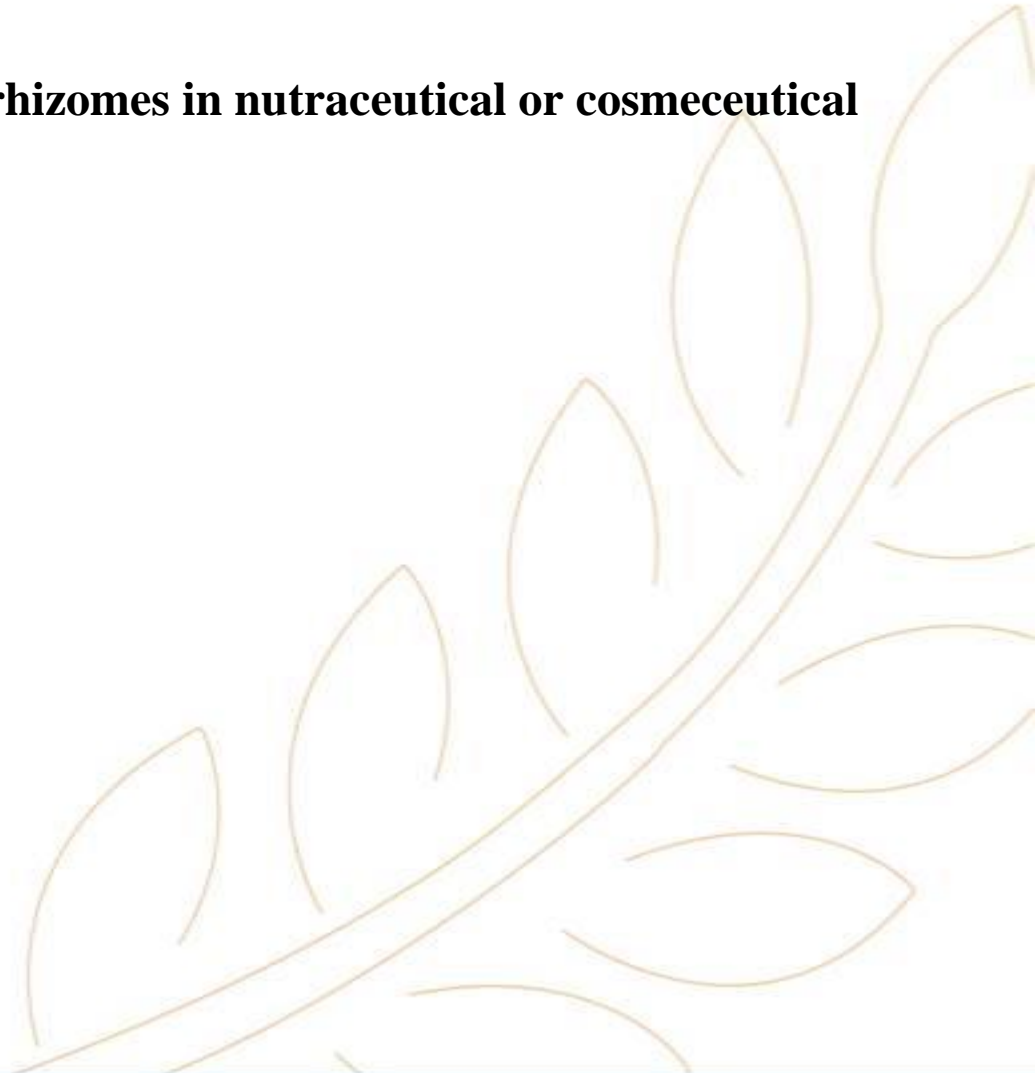
Spring 2025

Lecture 10



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

- **Morphological & Microscopical characters of rhubarb**
- Uses, contraindications of some important plants used as roots or rhizomes in nutraceutical or cosmeceutical**



SUBTERRANEAN ORGANS (UNDERGROUND ORGANS)

(Cont.)





Subterraneans Having Nutraceutical Applications



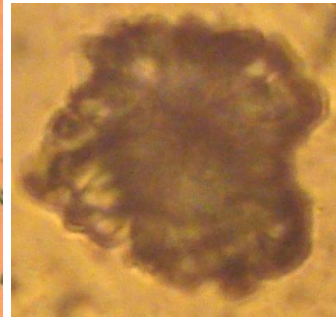
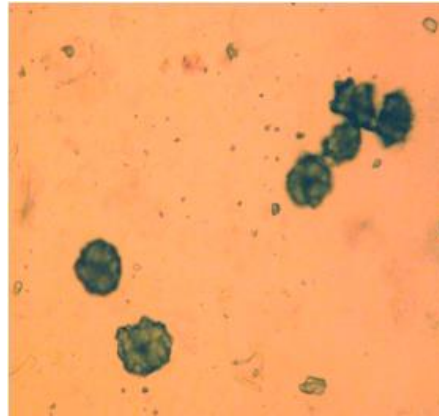
Rhubarb

Is the dried rhizome and big roots of *Rheum palmatum* and *Rheum officinale* and other species of Rheum except *Rheum rhaponticum* family Polygonaceae. Deprived of most of its bark.

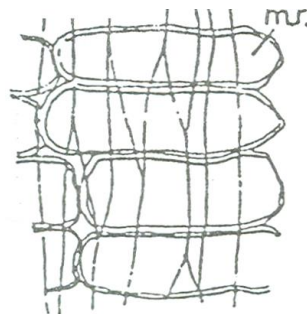


Powder

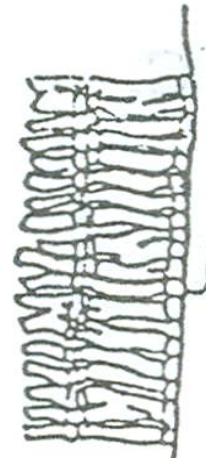
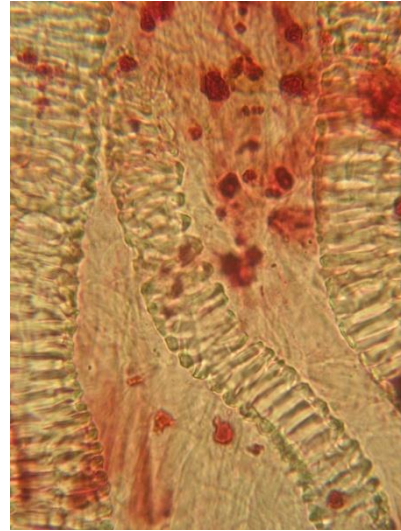
1- Very large cluster crystals of calcium oxalate.



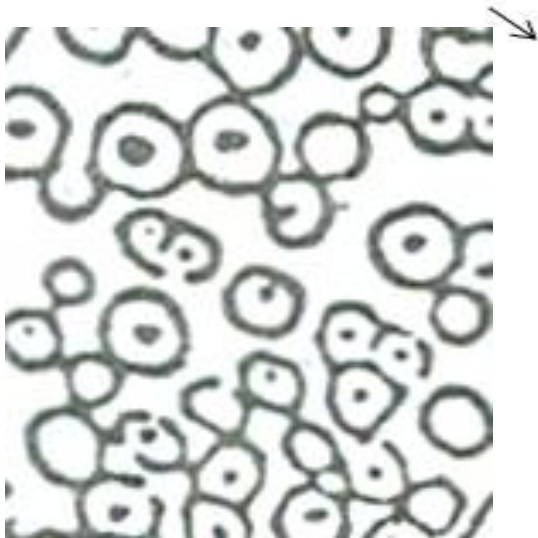
↙
2- Medullary ray cells with brownish contents.



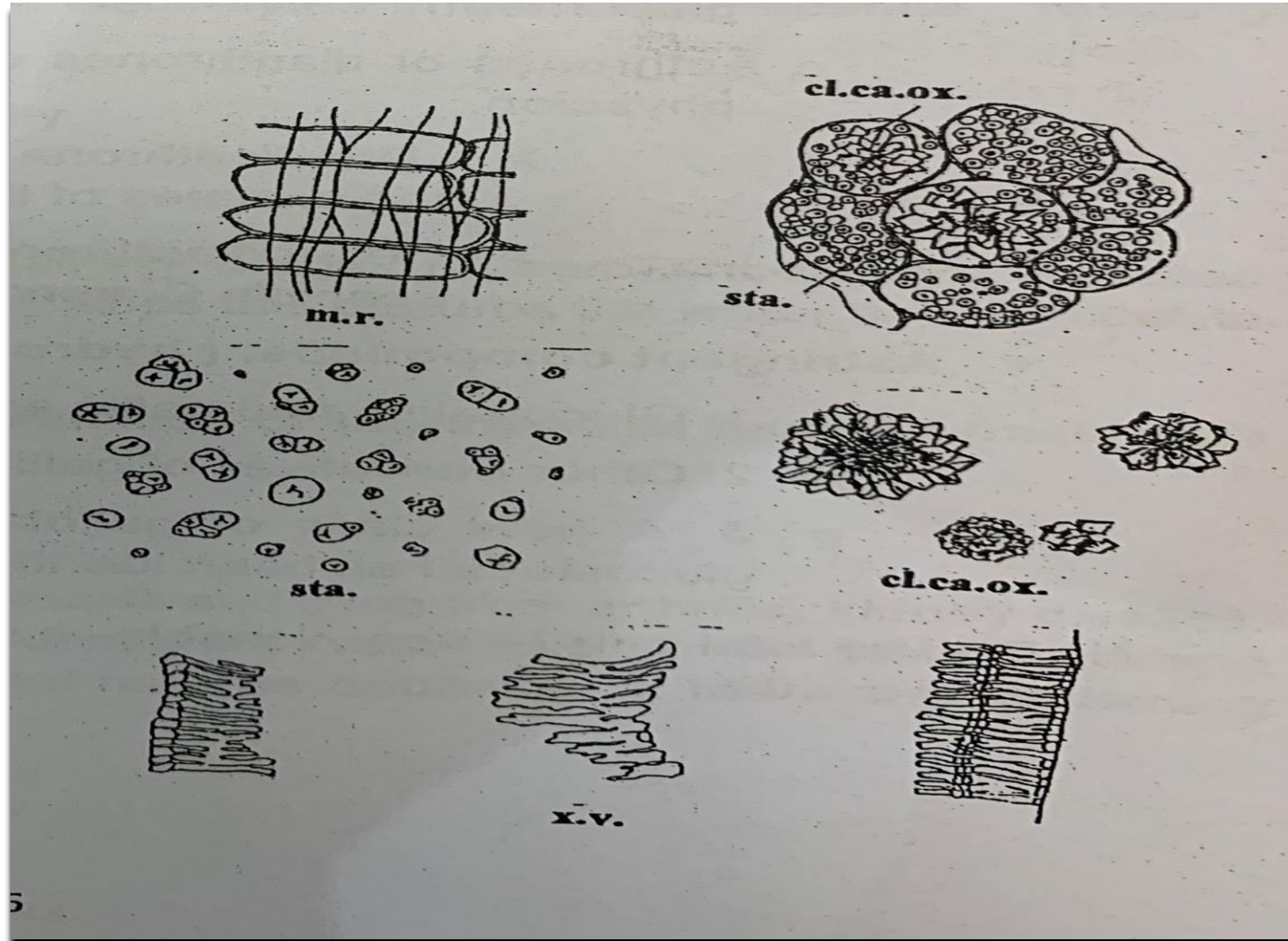
3- Non lignified xylem vessels.



4- Starch granules; simple or compounds (Muller-shaped)



Powder Rhubarb



ACTIVE CONSTITUENTS

1- Anthraquinones derivatives

**a- Free
(aglycone) e.g.
emodin, aloe-
emodin,
chrysophanol,
palmidin A, B, C
and rhein**

**b- The glycoside
derivatives of the
above compounds
e.g. glucoaloe-
emodin and
chrysophanein**

**c- Sennosides
glycosides A, B,
C and D.**

**2-
Tannins,
e.g.
gallic
acid and
catechin**

USES AND ACTIONS

**1- Laxative
(in small dose)**

**2- In large dose
purgation followed
by astringent effect
due to tannins.**

3- Bitter stomachic.

Why *Rheum rhaponticum* is not official?

Because it contains rhaponticin glycoside that may cause :

- **Gastrointestinal symptoms: Diarrhea, nausea, cramps, abdominal pain, bloating.**
- **Symptoms of the nervous system: Headache**
- **Hypersensitivity/rash: Rash, itching, skin irritation**

CHEMICAL TESTS:

1- Test for anthraquinone glycosides:

- Boil with Acid (H_2SO_4)
- Extract with organic solvent (ether or benzene)
- Add NH_4OH → a rose red colour in ammoniacal layer.

↓
2- Powder rhubarb $\xrightarrow{\text{sublimation}}$ gives yellow needle-shaped, add $\text{KOH} \longrightarrow$ reddish colour.

Ashwangda

Origin : dried roots of *Withania somnifera* (Ashawagandha) F. Solanaceae

Geographical origin : The Nile region, Mediterranean coastal strip as well as all the deserts of the country including that of Sinai.

Ashwagandha is used as a household remedy by Indians, who consider it as the best tonic for old people and children. It is one of the best nervine tonics of Ayurveda,
the most ancient system of Medical Sciences



Major chemical constituents

- Steroidal lactones: Withanolides (as withaferin A, B, D)
- Alkaloids : Withanine, somniferine, somnine, withanmine, pseudowithamine, and withanamine , tropine, choline, pseudotropine, dl-isopelletierine, cuscohygrine, anahygrine, and anaferine .
- Others: terpenoids, saponins, phenolics, flavonoids, phytophenols, and glycosides.

Traditional Medicinal Uses

A. As a sleep aid

B. Memory enhancement

C. An adaptogen to help increase energy and resistance to stress (e.g., in case of mental and physical fatigue related to stress).

Herbal preparations correlated to medicinal use

1. Comminuted herbal substances are added to water as herbal tea in the form of decoction or infusion.
2. Powdered drug
3. Ethanolic extracts (dry extract, fluid extract, tincture)

Contraindications

- Hypersensitivity to the active substances and to other plants of the same family.
- Due to its immunomodulatory effects, it has been suggested that Ashwagandha should be avoided in autoimmune diseases such as lupus and multiple sclerosis .





Subterraneans Having Nutraceutical and Cosmeceutical Applications



Potato

Origin : the tubers of *Solanum tuberosum* F. Solanaceae.

-Potato juice offers a wealth of nutrients, including vitamin C, potassium, various B vitamins, calcium, iron, phosphorus, copper, and sulfur, among other phytonutrients and organic compounds.

-Interestingly enough, most of the nutrients in a potato are in the skin, so it is important that you do not peel potatoes when making your juice at home.



- **Benefits of Potato Juice**

- o **Prevents Aging**

- o Boosts Energy Levels

- o **Improves Digestion**

- o **Treats Ulcers**

- o Improves Heart Health

- o Boosts Immunity

- o **Speeds up Wound Healing**

- o Improves Circulation

- o Improves Hormone Production

- o Detoxifies Liver & Gallbladder



Cosmeceutical applications of Potato Juice

Prevents Aging

Research has shown that potato juice is able to moisturize the skin and deliver antioxidants to the surface of the skin, which can help reduce the appearance of wrinkles and age spots, while also protecting against inflammation and skin infections.

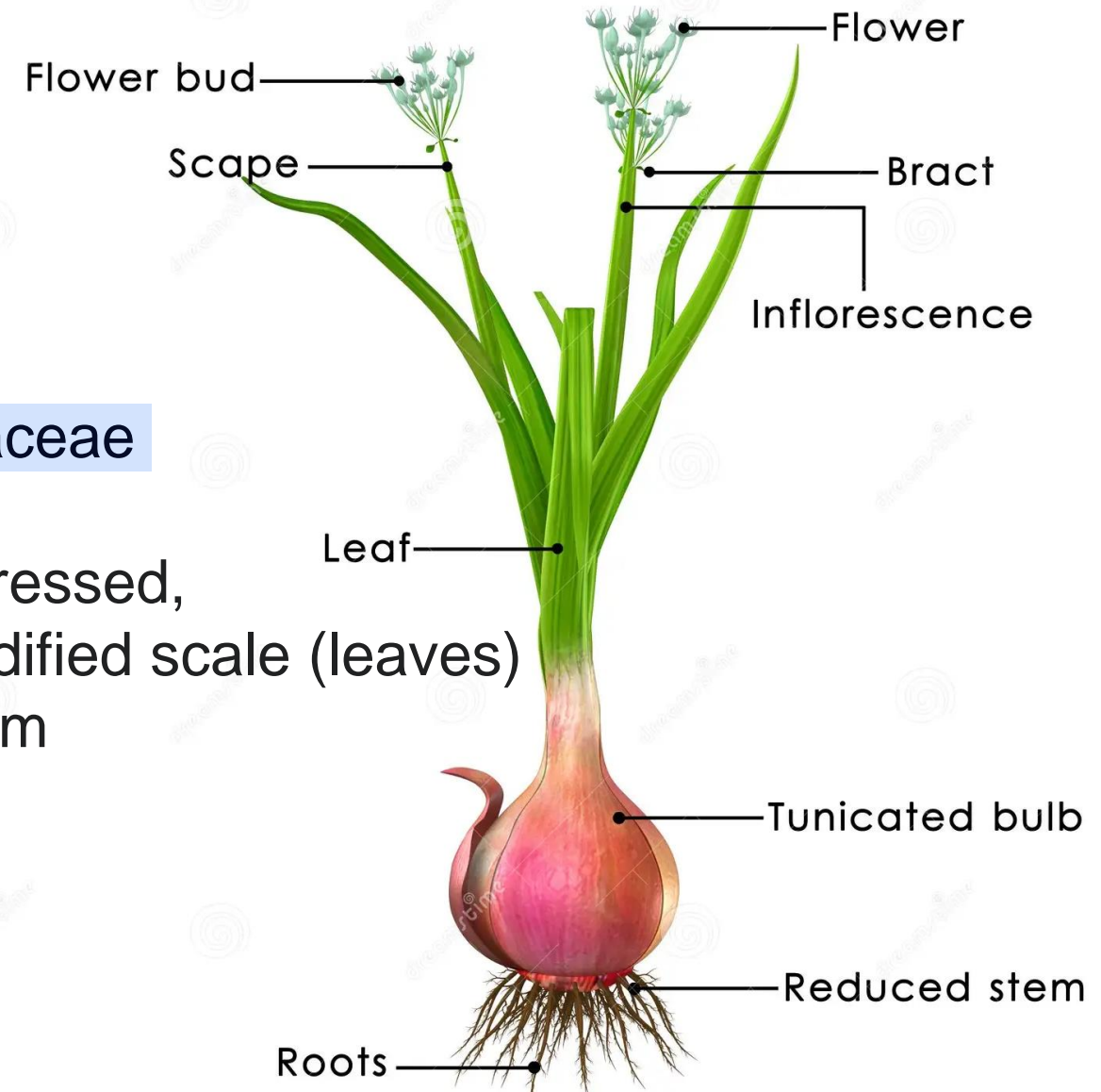


Onion



Origin: the bulbs of *Allium cepa* F. **Amaryllidaceae**

The bulbs are composed of shortened, compressed, underground stems surrounded by fleshy modified scale (leaves) that envelop a central bud at the tip of the stem



Active constituents

Onion is characterized by the sulfur compounds.

-Organic sulfur compounds: thiosulfinates, thiosulfonates, cepaenes, S-oxides, S,S-dioxides, monosulfides, disulfides, trisulfides.

Biological effects

- Hypoglycemic.
- Antibacterial.
- Inhibition of platelet aggregation.
- Antihyperlipidaemic.
- Antiallergic and anti-inflammatory.



Cosmeceutical applications of Onion

Onion for hair loss

- Stimulate hair growth as being rich in vitamins (A and C), minerals (potassium, calcium, magnesium) and sulfur which is already naturally present in the composition of the keratin which constitutes our hair, our skin and our nails.
- Onion oil helps fight dandruff and cleanse the scalp due to purifying and sanitizing properties
- Onion oil will also fight breakage and hair loss.



Onion for skin and nail care

- 1- Purify skin with imperfections due to its antibacterial and purifying properties
- 2- Strengthen soft and fragile nails





Subterraneans Having Cosmeceutical Applications



Chinese knotweed

Origin : the roots of *Polygonum multiflorum* Thunb. (PM) F. Polygonaceae .
is a commonly used and ancient Chinese herbal remedy prepared from the root of
the tuber



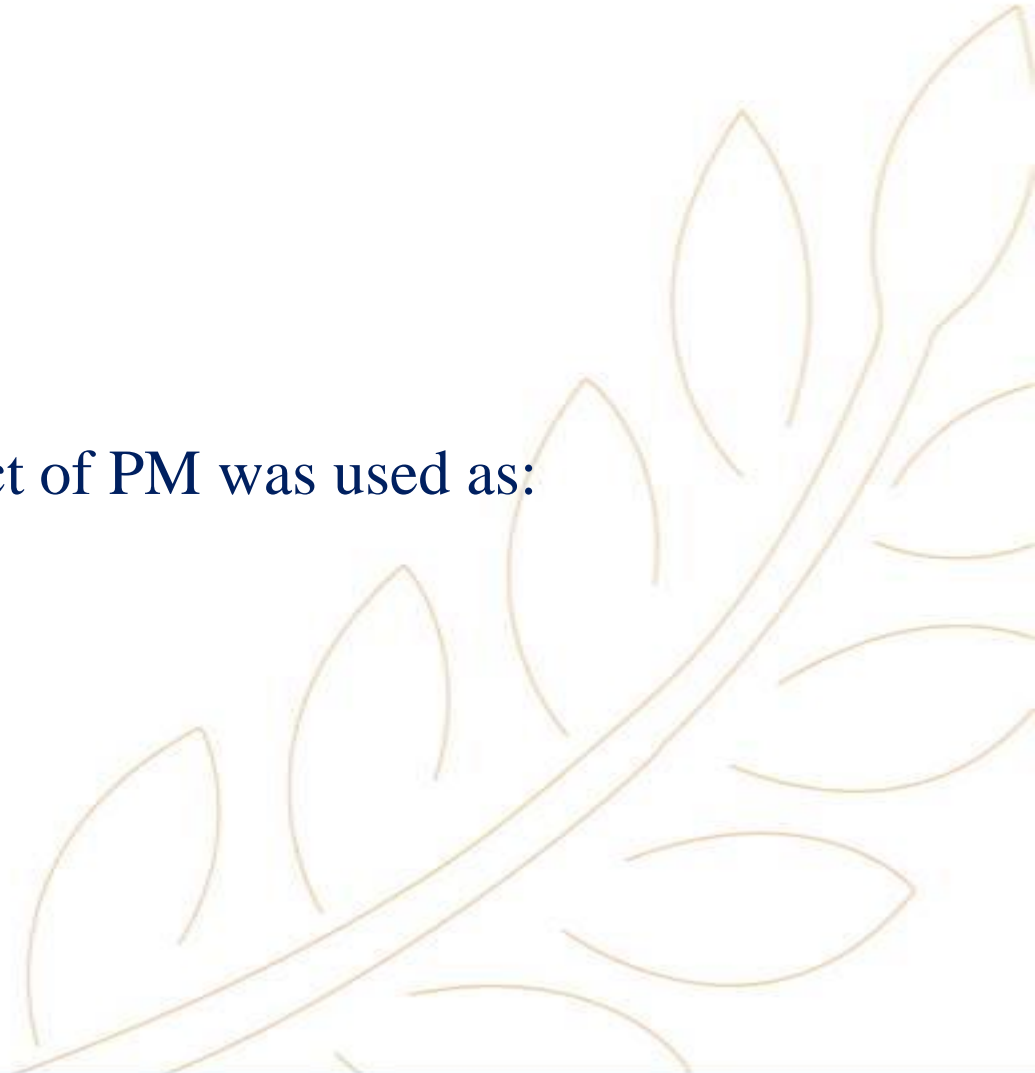
Active constituents

- Anthraquinone derivatives are the major characteristic constituents
- Stilbenes
- Flavonoids and phenolic acids

Uses

In traditional Chinese medicine (TCM), the root extract of PM was used as:

- A tonic to strengthen liver and kidney functions.
- Anti-tumor, anti-oxidant
- Anti-bacterial
- Anti-hyperlipidemia



The plant has long been used as a component for anti-hair loss and anti-hair greying treatment prescriptions

The extract promotes hair growth by inducing anagen phase in resting hair follicles.

For its antioxidant properties, this extract helps combat free radicals, reducing oxidative stress and promoting skin health.





Home work

- Mr Mahmoud is a 50-year-old occasional smoker who started smoking at a young age, with a history of hypertension for three years. He also suffers from hair falling.

I- Recommend a herbal drug to **control his hypertension.** (Mention the drug name, active constituents, one other use and the chemical test)

II-Suggest a mixture of **two crude drugs** that can be used to treat his boldness.



Faculty of Pharmacy





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Thank You!

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