

Pharmacognosy

Morphology of different parts of medicinal plants

Dr. Rand Shahin

References:

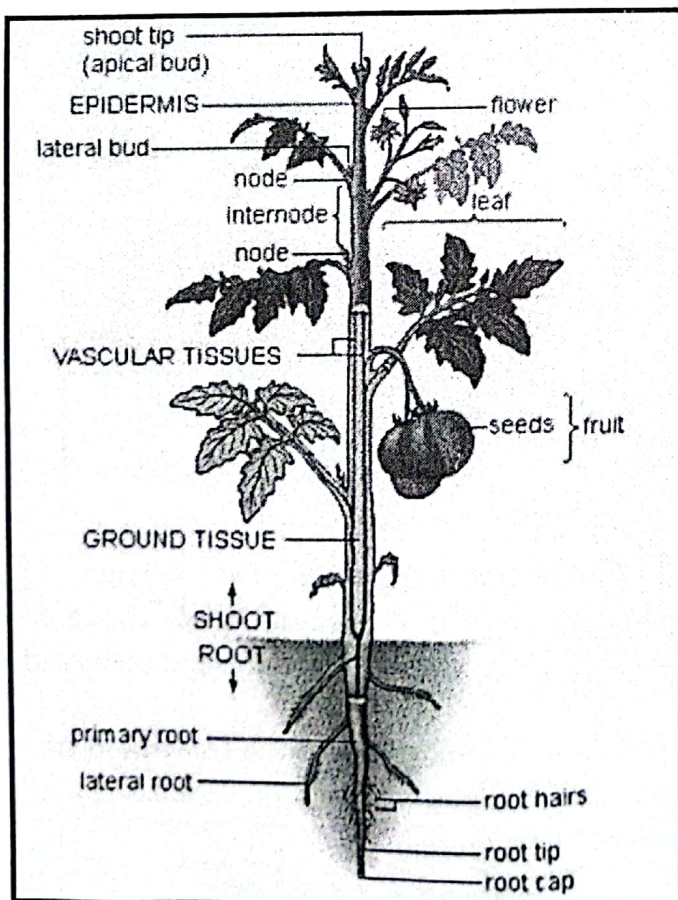
Prof. Madiha AminHassan

Prof. Talal Abu rujai

Dr. Jamila Dibbas

28:30

A flowering plant



Epidermis: The epidermis consists of a single layer of cells covering the whole plant. Epidermal cells show great variety in form, giving characteristic patterns when seen in surface view (straight, wavy, beaded,... walls).

- A tissue is an aggregation of cells of common source, structure and function in intimate union
- Classification of plant tissues:
- Tissues may be classified into

A. Simple plant tissue

- Those composed of one kind of cell only. E.g. parenchyma and collenchyma.

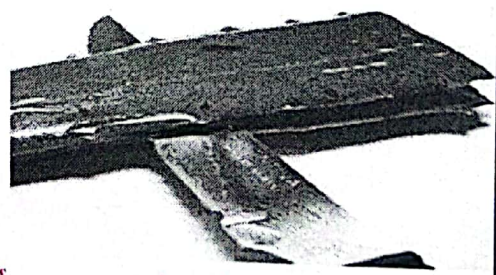
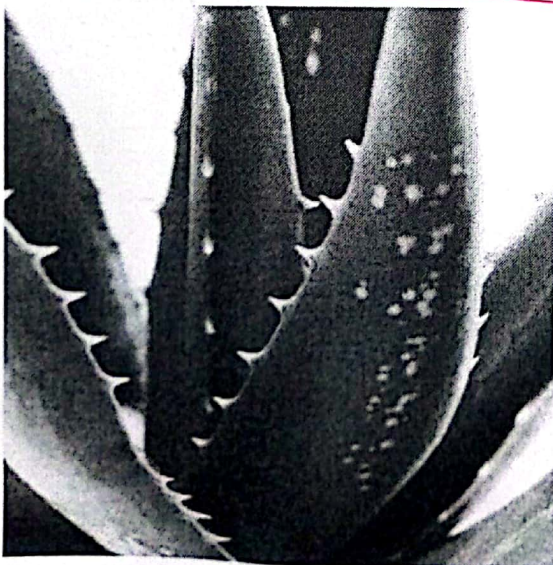
B. Complex plant tissue

- Those made up of two or more kinds of cells. E.g. xylem and phloem.

ينقل الماء
← ينقل الغذاء

A) Leaves

- •Aloe : (الصبار) Aloe vera
- Family: Xanthorrhoeaceae



في
active constituent

The juice of Aloes contained in the large pericyclic cells of the leaves. When the leaf base is cut, the juice flows out and collected

Aloe is recommended for the treatment of atonic constipation and suppressed menstruation.

hydration

← يحسن البراء قاسم

A) Leaves

Tea (Black/Green) الشاي

• *Camellia sinensis* F. Theaceae.

Latine name

• black tea-fully fermented leaves that are roasted (40mg caffeine/cup).

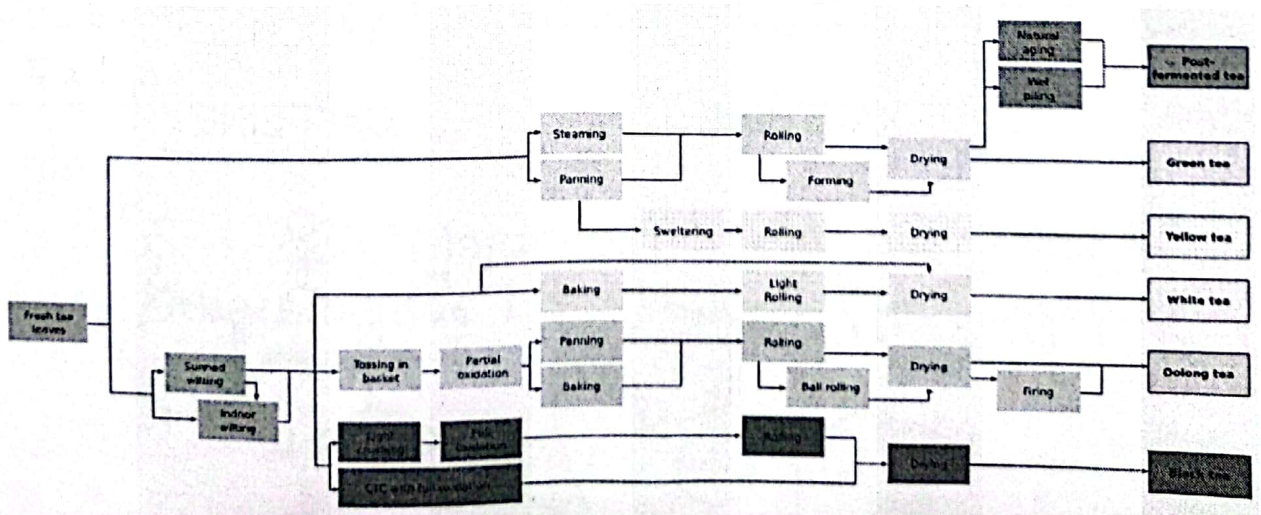
• green tea-steamed, dried, non fermented leaves (20mg/cup).

green tea contains higher concentrations of the active catechin constituents compared to black tea.

↓
tannine
antioxidant
↓
يفضل الحار
البارد



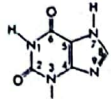
Tea preparation



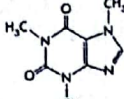
A) Leaves

Tea (Black/Green) الشاي

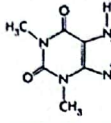
Camellia sinensis F. Theaceae.



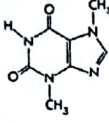
XANTHINE



CAFFEINE



THEOPHYLLINE



THEOBROMINE

PHARMACOLOGICAL ACTIONS

• **BLACK TEA:** Claimed to protect against ischemic heart disease.

• **GREEN TEA:** Antioxidant capacity; decreases serum concentrations of total cholesterol, triglyceride

• Standardized Preparations: Activate thermogenesis and fat oxidation.

• Black and green tea: Increase plasma antioxidant capacity;

• Active constituents:

1. Polyphenols (Tannins: Catechins) epicatechin, epigallocatechin

2. Alkaloids purine group

(Xanthine derivatives):

1) Caffeine 2-4% – CNS stimulant.

2) Theophylline – bronchodilator.

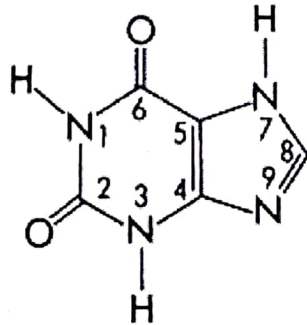
3) Theobromine – diuretic.

3. Inorganic Ions: fluoride (130-160 mg/kg), potassium, aluminum

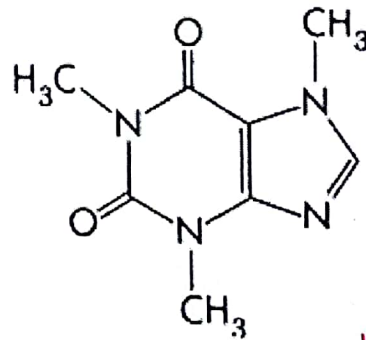
4. Other Ingredients: flavonoids, caffeic acid derivatives

هذه هي المركبات الحلقية heterocyclic

pyrimidine + imidazole

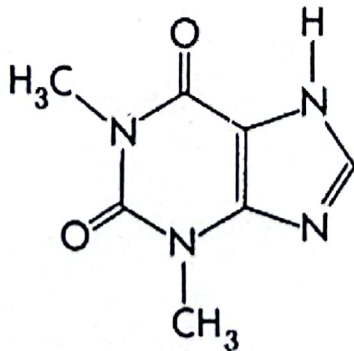


XANTHINE



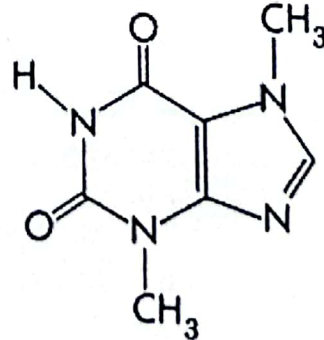
CAFFEINE

1,3,7 - substituted methyl group



THEOPHYLLINE

1,3



THEOBROMINE

3,7

Tannins

- Are astringent and bitter-tasting plant polyphenols that bind and precipitate proteins
- The term tannin refers to the source of tannins used in tanning animal hides into leather.
- However, the term is widely applied to any large polyphenolic compound containing sufficient hydroxyls and other suitable groups (such as carboxyls) to form strong complexes with proteins and other macromolecules. Tannins have molecular weights ranging from 500 to over 3000.

A) Leaves

english name

Sage.



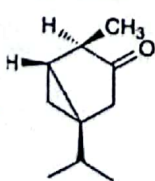
- Latine name
- Salvia officinalis L. Family: (Labiatae/Lamiaceae)

Constituents

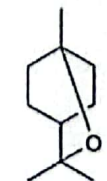
- Acids: Phenolic – caffeic, chlorogenic, and rosmarinic.
- Flavonoids.
- Tannins
- Volatile oil: 1–2.8%. Major components are α - and β -thujones. Others include 1,8-cineole, borneol, camphor.

anti bacterial
microbial
antispasmodic
analgesic

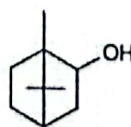
Monoterpenes



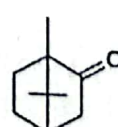
α -thujone
(-)-thujone



1,8-cineole



borneol



camphor

- **Pharmacological Actions**

1) Antispasmodic activity.

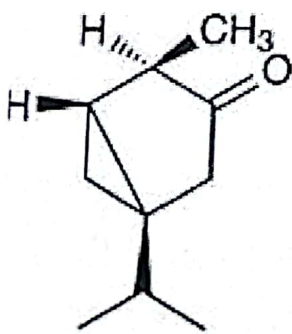
2) Anticholinesterase activity Early herbals claim that sage enhances the memory. The anticholinesterase activity of several *Salvia* species have been investigated in the search for new drugs for the treatment of **Alzheimer's disease**

3) Antimicrobial and antiviral activity Antimicrobial activity of the volatile oil has been attributed to the thujone content.

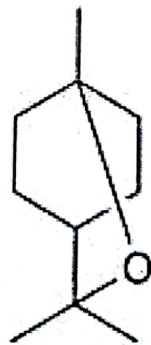
Volatile oils

Monoterpenes

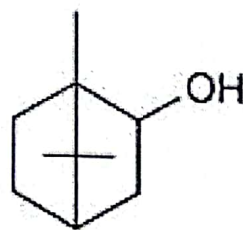
2 isoprene



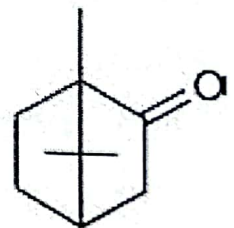
α -thujone
((-)-thujone)



1,8-cineole



borneol



camphor

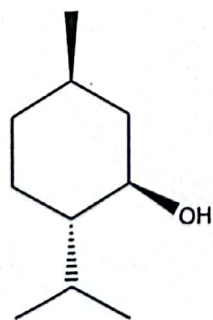
الفينع Peppermint leaf



- Origin: is the dried leaves of *Mentha x piperita*: Labiatae
- It has an initially burning taste and cool aftertaste, especially when air is drawn in through the mouth.

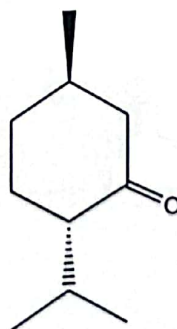
Contents

- The essential oils of the Labiatae family are synthesized in the cells of the glandular trichomes.
- Contains not less than 1.2 % V.O.
 - 44% menthol (form in nature and crystalline)
 - 15-32% menthone
 - 4.5-10% menthyl acetate esters
- 6-12% tannins, flavonoids, triterpenes and other bitter principles



(-) Menthol

alcohol



Menthone

ketone

Preparation of peppermint oil:

- Steam distillation of the fresh or dried herb to obtain a colorless to pale green liquid with a pungent odor of peppermint.

Rosemary

(*Rosmarinus officinalis*)

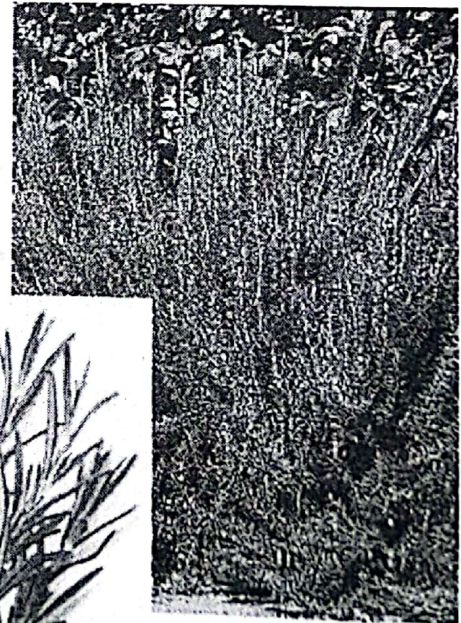
Latin name

- Small perennial evergreen shrub
- Narrow leaves have a spicy, pine-like flavor
- Not winter hardy in Illinois
 - Grow in pots
- Propagate from stem tip cuttings



شجيرة
صغيرة
رائحة
النعنع

تكاثر من
stem



Rosemary (اكليل الجبل ، حصالبان)

- A silvery evergreen shrub that originated in the Mediterranean region and is now grown worldwide.
- Rosemary (*Rosmarinus officinalis*) is known both as a culinary and healing herb.

الطبخ

Rosemary

- Uses:
- Memory aid: The herb's enduring reputation as a memory aid may in part be due to:
anti-acetylcholine esterase
 - Its high concentrations of health-promoting antioxidants. These compounds help to protect the brain and other parts of the body against unstable oxygen molecules, called free radicals, which can damage cells in the body.
 - Rosemary may also sharpen memory by helping to prevent the breakdown of neurotransmitter acetylcholine.

Rosemary

• Topical uses:

Rosemary oil, which is steam-distilled from the plant's pale blue flowers, may help soothe muscle sprains, strains, and arthritic joints. تسكين المفاصل

- The oil contains camphor a skin irritant that can increase blood circulation to the skin when applied topically. الجلد
monoterpene
 $C_{10} \rightarrow 2 \text{ isopent } C_5$ vasodilator for vein

- The aromatic oil is frequently added to hair preparations: one recent trial found that rosemary oil, when combined with thyme, and lavender oils in a neutral carrier oil (jojoba) may help to lessen a type of hair loss called alopecia areata. الثعلب
سقوط الشعر

Rosemary

• Internal uses:

- Herbalists often suggest capsules containing rosemary oil along with the essential oils of oregano and thyme for the treatment of yeast (Candida) overgrowth in the intestines.
- rosemary has apparent use as antibacterial and antifungal properties.

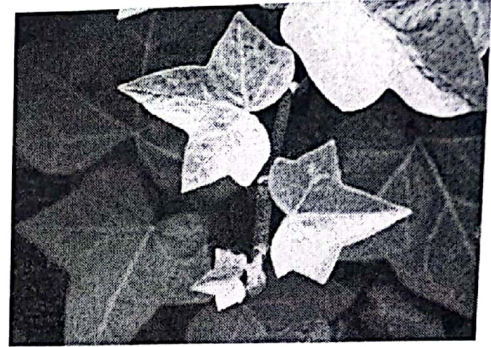
A) Leaves: Examples

Common name	Arabic name	Binomial name	Family	Main herbal use	Major constituents
<u>Ivy</u>	اللباب	Hederae folium	<u>Araliaceae</u> عصا السحرة	Expectorant antitussive Treatment of <u>chronic</u> <u>inflammatory</u> <u>bronchial</u> <u>diseases</u>	1. triterpene 2. glycosides of hederagenin: hederacoside C hederacoside D hederacoside B phenolics flavonoids, coumarins

hederagenin + sugar

Hederae folium is used for the treatment of respiratory tract diseases with intense mucous formation, respiratory tract infections and in irritating cough which stems from common cold.

The major compounds responsible for the biological activity are triterpene saponins. Ivy leaf extracts exhibit spasmolytic/antispasmodic, anti-inflammatory, antimicrobial, analgesic, anthelmintic, → كارد للديدان antitrypanosomal, antileishmanial, antitumor, antimutagenic, molluscicidal, antioxidant and antithrombin activities. يقتل الديدان



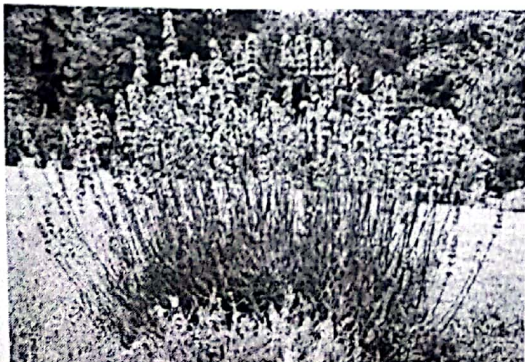
اللباب مهم جدا في علاج كل ما يتعلق بالجهاز التنفسي وامراض الصدر وامراض الجهاز الهضمي ، وهناك نوع من اللباب سام جدا عند ملامسته وهو اللباب ذات الاوراق الحمراء اما ذات الاوراق الخضراء فهو آمن .

B) Flowers:

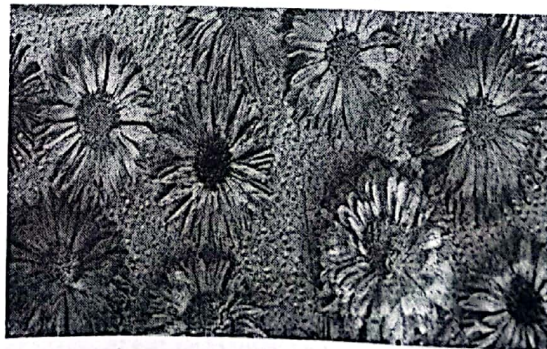
زعفران Saffron



Lavender



Calendula



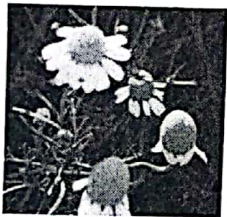
Chamomile



الحساسية الموسمية

- Explain the term, 'Hay Fever'.
- Inhalant plant allergens come in contact of the nasal and buccal mucosa during respiration. The symptom is restricted to the nasal mucosa and manifested by sneezing, lacrimation, itching and swelling of nose and eyes. This condition is known as hay fever or sinusitis.

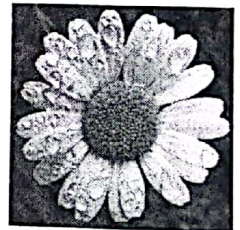
ميرال
موسمية



Roman

البابونج Chamomile

German



- According to **pharmacopoeia** we have **2** types of chamomile:

1. Roman chamomile: is used mainly in Europe, Chamaemelum nobile

Family: (Asteraceae/Compositae).

- It has thin petals and intense at the center.

2. German chamomile: Matricaria chamomilla. Family: Asteraceae/Compositae

it has wide petals and outspread from the center.

- Chamomile contain a compound called matricin that converts during distillation it to another compound called Chamazulene (chama: from chamomile, azue: from blue color).

C15 → sesquiterpene
3 isoprene

↓
blue

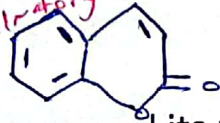
البابونج (Chamomile)(German):

- Matricaria chamomilla. Family: Asteraceae/Compositae

- Part(s) Used : Flower head

healing and anti-inflammatory properties for chamomile

Active constituents:



benzo-2-pyrone

C₆C₃ phenyl propyl derivative

- **Coumarins:** Umbelliferone and its methyl ether, henniarin.

- **Flavonoids:** Apigenin, luteolin, quercetin, and rutin. *antispasmodic and carminative effect*

- **Volatile oils:** Pharmacopoeial standard not less than 4 mg/kg blue oil. Main components are (-)-α-bisabolol (up to 50%) and chamazulene (blue) (1–15%).

- **Other constituents:** sesquiterpenes (e.g. matricarin and matricin).

- **Chamazulene** is formed from matricin during steam distillation of the oil. It varies in yield depending on the origin and age of the flowers.

isoprene 5

monoterpene 10

sesquiterpene 15

diterpene 20

sesquiterpene 25

tri 30

2 isoprene

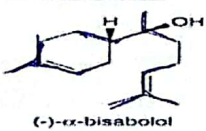
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4

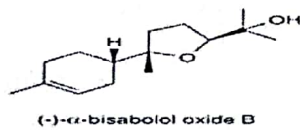
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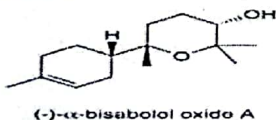
Sesquiterpenes



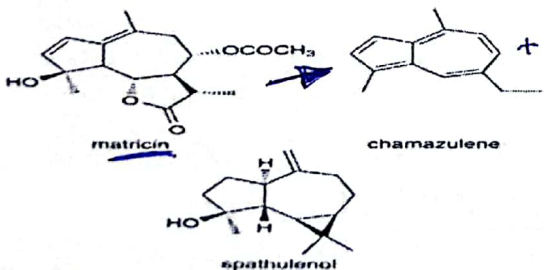
(-)-α-bisabolol



(-)-α-bisabolol oxide B



(-)-α-bisabolol oxide A



matricin

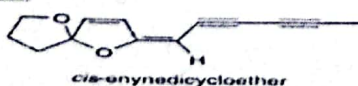
chamazulene

spathulenol

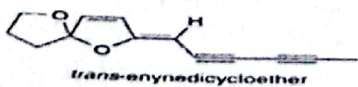
Sesquiterpenes are class of terpenes that consist of three isoprene units (15 Carbons), so we can get these compounds from many types of plant tissues, specially Asteraceae family plant tissue



Acetylenes

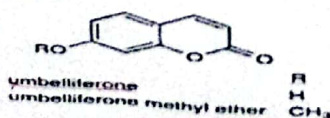


cis-enynedicycloether



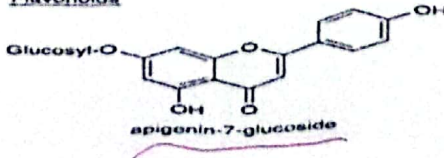
trans-enynedicycloether

Coumarins

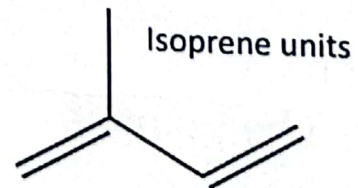


umbelliferone
umbelliferone methyl ether

Flavonoids



apigenin-7-glucoside

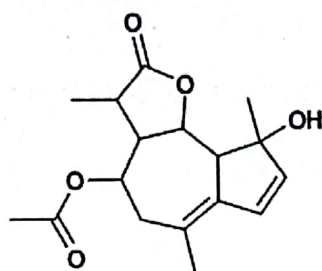


Isoprene units

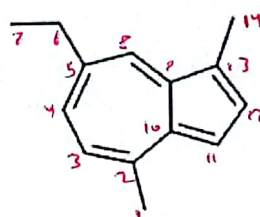
Chamomile(German): البابونج

- Matricine is a tricyclic sesquiterpenoidal compound that contain furan ring, during distillation process the furan lactone will be open due to high temperature and convert it to carboxylate called chamazulene carboxylic acid, also we remove a carbon atom in carboxylate gp in matricin, by this we have bicyclic structure contain 14 carbon, so chamazulene is not naturally compound and not a sesquiterpens.

من مسؤول
blue principles

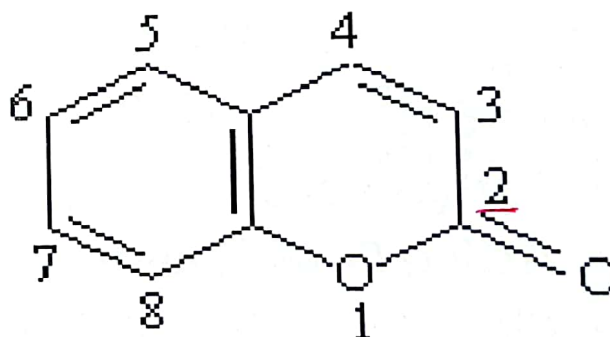


Matricine



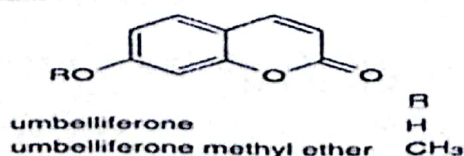
Chamazulene

- Coumarin** and the other members of the coumarin family are benzo- α -pyrones, while the other main members of the benzopyrone group, the flavonoids contain the γ -pyrone group.
- Coumarins may also be found in nature as glycosides.

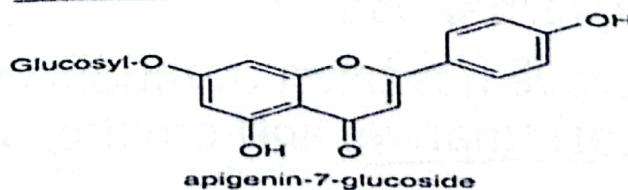


benzo - 2 - pyrone

Coumarins



Flavonoids



Pharmacological activity of Chamomile

- All these compounds are responsible for the **pharmacological activity**, so we use chamomile as antispasmodic and carminative (orally use) due to the activity of flavonoids, while topical use as anti-inflammatory, ^{healing &} ^{cumarine}
- also it's used in teething pain in pediatric, antiseptic, it has hypnotic effect so help u to sleep, also we use it as antacid. ^{علاج النوم}

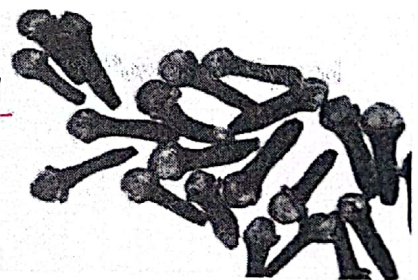


volatile oil
↑

Clove (القرنفل)

Syzygium aromaticum

Family: Myrtaceae



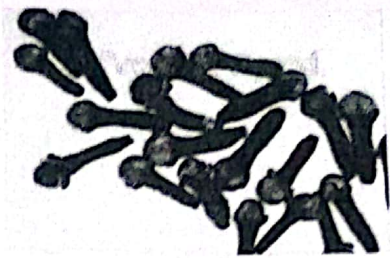
- **Part(s) Used:** dried flower bud.
- **Active Constituents:**
- Clove bud: oil containing Eugenol (90%), Eugenyl acetate, β -caryophyllene. ^{major} ^{distinctive odor} ^{مميز}
- Other components like methylsalicylate, methyleugenol and benzaldehyde.
- **Herbal Use**
- Clove has been traditionally used as a carminative, anti-emetic, ^{مطهر} ^{استفراغ}
- toothache remedy and counter-irritant.

مسكن للألم، بالاسنان

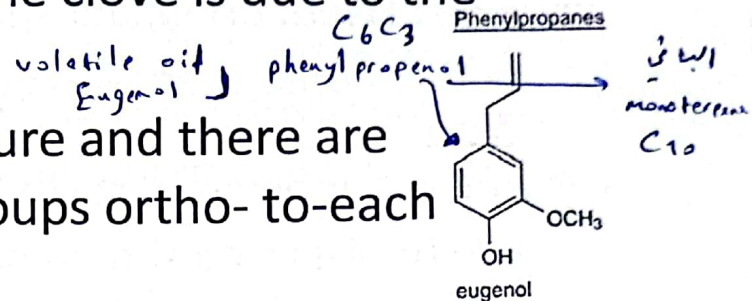


تلعبهم كما يتحول لونهم
من الأخضر إلى
البنفسجي
Clove (القرنفل)

Syzygium aromaticum
Family: Myrtaceae



- The distinctive odour of the clove is due to the presence of Eugenol
- It's phenylpropene structure and there are hydroxyl and methoxy groups ortho- to-each other.
- The problem of this plant: it mustn't be used with any anti-coagulant drug, so the dentist must be sure to use clove-free compounds if the patient use anti-coagulant drug to prevent the bleeding.



Categories of Volatile oils

- **Monoterpene-rich volatile oils** Some examples:

Peppermint oil • Lavender oil • Lemon oil •
Camphor • Thyme oil • Turpentine oil

- **Phenylpropane-rich Volatile Oils** Some examples: • Cinnamon oil • Anise oil • Fennel oil • Clove oil • Nutmeg oil • Peru balsam • Tolu balsam

الشيخ الخرساني *Artemisia cina* → worm seed

- *Artemisia cina* BERG. Family: Asteraceae/Compositae.

- **Part Used:** dried, unexpanded flower heads

- **Active Constituents**---The chief constituent of Wormseed is a crystalline bitter principle, Santonin: anthelmintic property of the drug.

- *Artemisia cina* should be collected in July and August since Santonin attains its maximum at this time of the year
- *Artemisia cina* also named as wormseed contains another bitter principle, Artemisin, and a yellow volatile oil cineol.

الشيخ الخرساني *Artemisia cina*



الشيح الخرساني Artemisia cina

- **Herbal action and Uses**
- Santonin acts as a direct poison to parasites, and is used as a remedy for round-worms, which it rapidly expels; it has also an effect on thread-worms to a lesser degree, but has no action on tapeworms.
- **Dosage** : Santonin lozenges, B.P.
- As a rule, when a single dose is to be given, it should be administered upon an empty stomach, and the patient should refrain from eating for a short time afterward. A purgative should precede and follow its use.

عشان يطلع دودي
بالسعد
بعدين ياكل

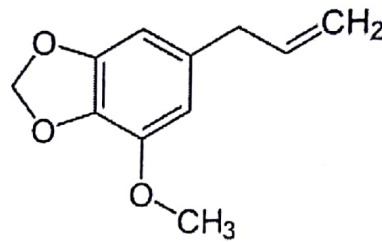
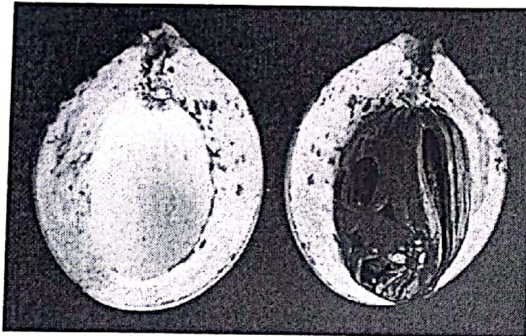
Toxicity

- **Several cases are on record of fatal poisoning by Santonin.** toxicity
- Santonin produces vision disturbances, objects first appears blue then yellow, the absorbed santonin renders urine intense yellow if acidic, while purplish yellow if alkaline.

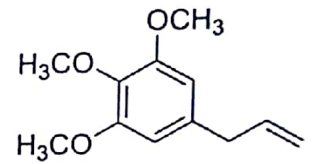
basic

جوزة الطيب ^{family} C) Seeds: Nutmegs *Myristica fragrans* Myristicaceae

- Mace: القشرة الرفيعة الداخلية التي تغطي الجدار الداخلي لثمرة جوزة الطيب
- Nutmeg: usually used as complete fruit but the V.O. is obtained from the seeds or kernel.
- The oil of the nutmeg is very expensive because the fruits need long time to be
- mature and they are very light, so when the farmer cultures large number of the plant trees he will have small weight of the fruits (nutmeg)..

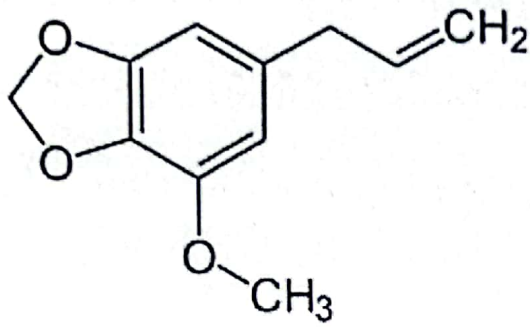


myristicine

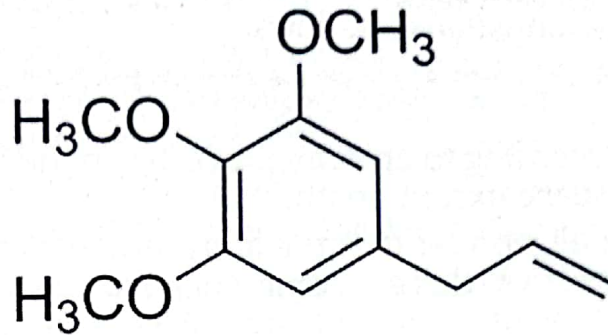


elemicin





myristicine

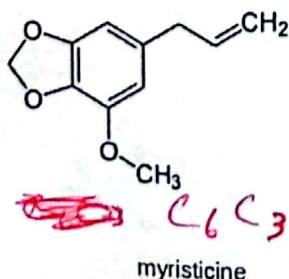


elemicin

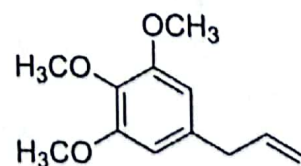
Nutmeg جوزة الطيب

Myristica fragrans Myristicaceae

- To have oil has similar odor to the nutmeg oil, they take the mace.
- In the US it's used by prisoners as alternative to hallucinogenic compounds, so it's called prison opium because it gives the same effect of the opium. (morphine)
- The effect of nutmeg is similar to that of atropine, the only difference between them is that atropine causes mydriasis but nutmeg causes miosis يقفل التوسع الحدقي dilatation
- They study the ability of use nutmeg as flavouring agent due to the presence of myristicine and elemicin.



myristicine



elemicin

الحبة السوداء

Nigella sativa

• Medicinal Uses (Black Cumin) —

- This herb apparently may be even more important to the Muslims than to the Christians and Jews.

- يقول رسول الله - صلى الله عليه وسلم إن في الحبة السوداء شفاء من كل داء إلا السأم. أخرجه البخاري

- According to an Arab proverb, "in the black seed is the medicine for every disease except death."

- Small wonder that the literature regards it as carminative, diaphoretic, digestive, diuretic, emmenagogue, excitant, lactagogue, laxative, resolvent, stimulant, stomachic, and tonic.

(Black seed)



طارد للغازات

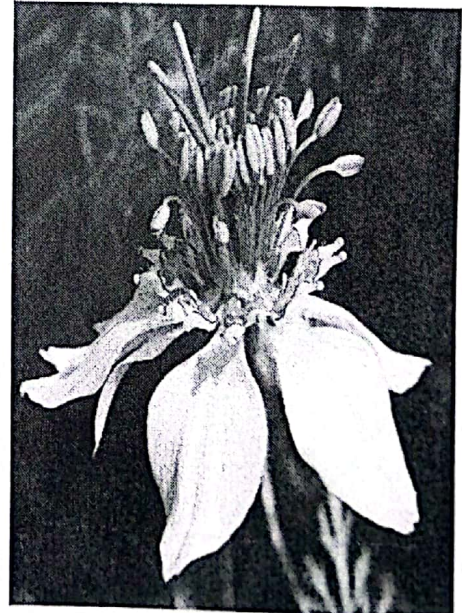
تزييد الترقق

تزييد prolactine

منه

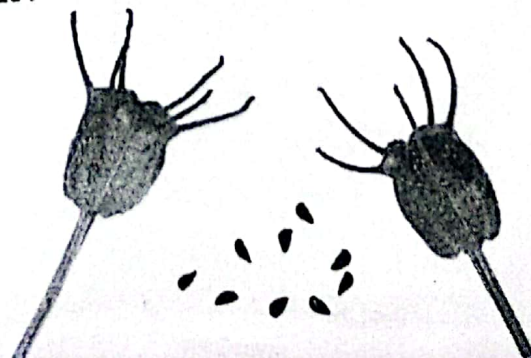
Latest Research on *Nigella sativa*

Nigella sativa (Black seed)



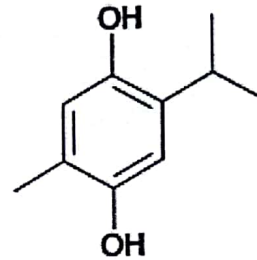
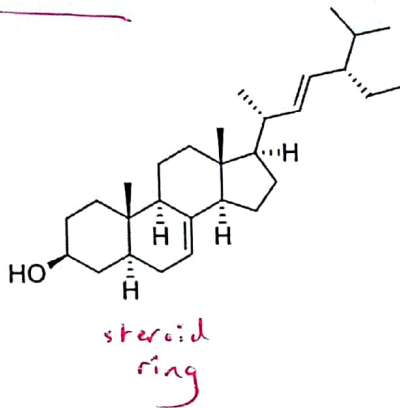
Antidiabetic Activity of *Nigella sativa* Seed Extract in Cultured Pancreatic β -cells, Skeletal Muscle Cells, and Adipocytes

Pharmaceutical Biology; Jan2008, Vol. 46 Issue 1/2, p96-104



- ALPHA-SPINASTEROL Seed: Antiinflammatory
- ASPARAGINE Seed: Diuretic
- CAMPESTEROL Seed: Antioxidant ; Hypcholesterolemic, improve memory
- CARVONE Seed: Antiacetylcholinesterase ; Antiproliferative; Antiseptic
- HEDERAGENIN Seed: Allergenic; Anticapillary-Fragility; Antiedemic; Antifibrinolytic;
- PHYTOSTEROLS Seed: Antiprostatotic; Hypcholesterolemic
- THYMOHYDROQUINONE Seed: Antibacterial MIC=6.25-100 ug/ml,
- THYMOQUINONE Seed: Antiarthritic; Antiasthmatic; Antibacterial; Antibronchitic;

ALPHA-SPINASTEROL

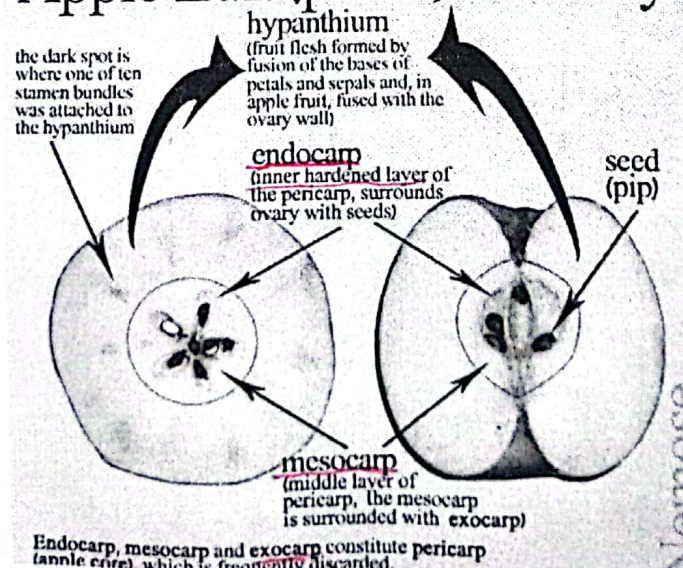


ThymoHydroQuinone

D) Fruits:

- Matured and ripened ovaries. Holds and protects the seeds until they mature.

Apple fruit (pome) anatomy



اليانسون Anise



- Pimpinella anisum L. Family: Umbelliferae or Apiaceae.
- The medicinal parts are the essential oil from the ripe fruit and the dried fruit.
- **Active constituents:**
- Volatile oil (2 to 6%): chief constituent trans-anethole (94%),
- Coumarins

major
v.o.
↖
مسؤول عن
distinctive
odor
Anise N

اليانسون Anise

- **Herbal Uses:**
- The drug is said to have an expectorant, mildly spasmolytic and antibacterial effect based on the essential oil.
- Common cold
- Cough/bronchitis

مضاد للتشنج spasmolytic

يطهر الشعب الهوائية expectorant

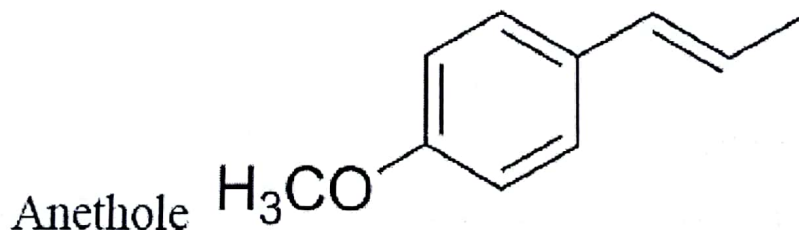
اليانسون Anise

- The main constituent is **Anethole**, it's a phenylpropene, para to it is a methoxy group, this compound is responsible for the anise odor and many biological effects, a problem is during storage a molecule of the anethole is combined to another molecule of Anethole by the propene side chain to form a dimeric compound, this dimer binds to the estrogen receptors (has estrogen-like receptors), so anyone who takes estrogen like combination pills contraceptive that contains estrogen in microgram with anise that's improperly stored in high temperatures or for long periods, a competition between the dimeric estrogen-like compound with estrogen is responsible for the failure of contraception when large amounts of the anise is used, and the treatment will be unsuccessful.

تحتفظ بخواصه
عالمية
تحتفظ بخواصه
عالمية

مادة
Anethole
عالمية

يعني
يقدم
يرتبط بال
estrogen
مكمل مكانه



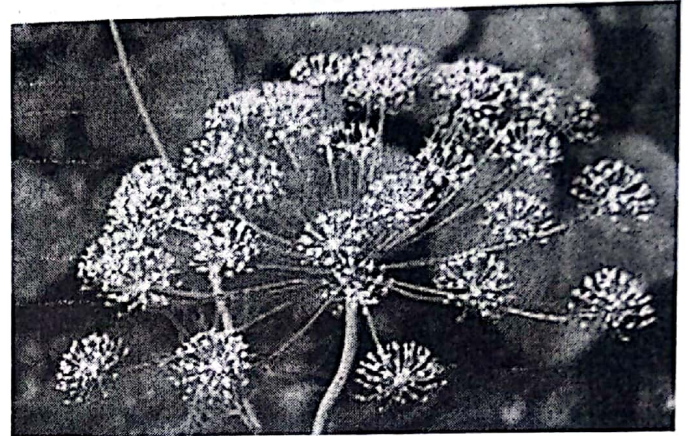
4-methoxy phenyl propene
para

anise is available as oil or the anethole is added to the cough suppressants, it reduces the trachea contractions and reduces irritation that causes the cough.

- Mainly used as a **flavoring agent** in the pharmaceutical industry, especially for indigestion products like Gaviscon® to provide a better taste for the formula.

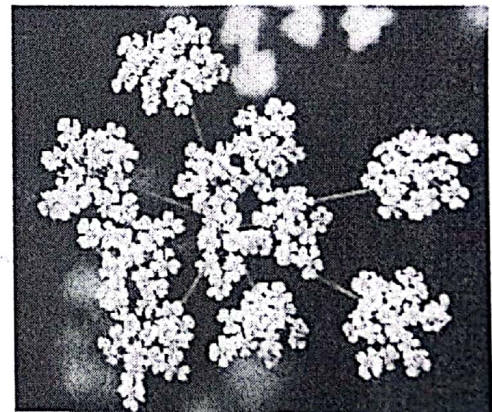
الذي

Examples of Umbellifera (Apiaceous)



Caraway ^{كراوية} (*Carum carvi*)

- Characteristics
 - Biennial in carrot family
 - Usually grown for its seed
- Only require a few plants to have enough seed for a family
- Seeds will shatter when fully mature
 - Cut off seed stalk when seeds turn brown and place inside a bag



نلقطه
در سینه

عکس
جوزة الميه
الحول يوز
كبر

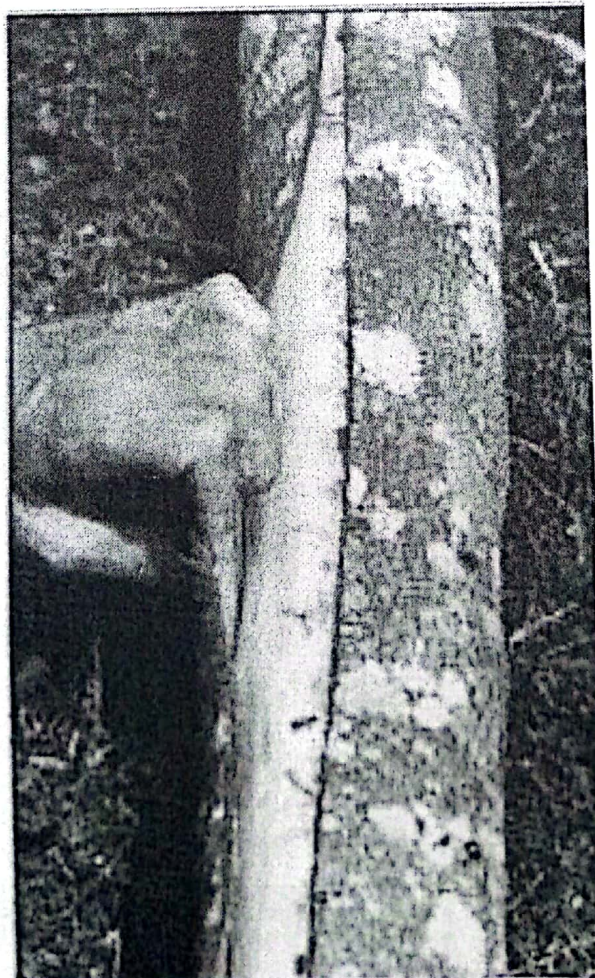
E) Barks

الانحاء
حول ال stem



- Definition:
- Barks consists of all the tissues outside the cambium of the stem or the root of the medicinal plant.
- Collection and Preparation:
- Barks are collected either from stems or roots by making transverse and longitudinal incisions and peeling the outer layers (layers outside the cambium).
- Barks are best collected in the spring (why?)
- They are sun-dried, and some barks are decorticated (e.g. Cinnamon).

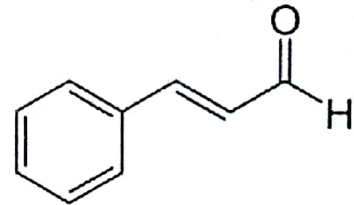
مقشر ←



Cinnamomum aromaticum Nees (Lauraceae)
CASSIA, CASSIA BARK, CASSIA LIGNEA, CHINA JUNK CASSIA, CHINESE
CASSIA,
CHINESE CINNAMON, SAIGON CINNAMON

- **Synonym** — *Cinnamomum cassia* auct.
- In South China, it is grown in a moderately cool climate, annual rainfall ca. 1200–1300 mm, elevation mostly 90–300 m, usually propagated by cutting but sometimes
- **Chemistry (Cassia)** — Here are a few of the more notable chemicals found in cassia.
- Cincassiol — Antiallergic.
- Cinnamaldehyde — Orally, cinnamaldehyde stimulates the CNS at low doses and inhibits it at high doses
- Cinnamic-ACID also found in *Cinnamomum verum*.
- Trans-Cinnamaldehyde

major
active
constituent



- **Herbal Use**
- Cinnamon is stated to possess antispasmodic, carminative antimicrobial and anthelmintic properties..
- Cinnamon bark may possess a potentiating effect on insulin (Khan et al., 1990), and can be useful in the treatment of type 2 diabetes; as well as lowering triglyceride levels and serum cholesterol (Jayaprakasha et al., 2002).
and glucose

- Cinnamon is mainly used at winter because it's carminative , antispasmodic , exerts a warming effect due to its vasodilatation effect.
- - Contraindicated in the first trimester of pregnancy because it can increase the risk of abortion due to its uterine stimulating effect.
- - Also used traditionally to induce menstruation.

extrimities

improve

(PCOS)
Polycystic ovary syndrome

Cinnamon



Cinnamon foliage

Scientific classification

Kingdom:	<u>Plantae</u>
Division:	<u>Magnoliophyta</u>
Class:	<u>Magnoliopsida</u>
Order:	<u>Lurales</u>
Family:	<u>Lauraceae</u>
Genus:	<u>Cinnamomum</u>
Species:	<u>C. zeylanicum</u>

effect / قس

يحتوي لحاء الصفصاف على مادة الساليسيلين الفعالة في تسكين الألم. وقد سميت هذه المادة بهذا الاسم نسبة إلى الجنس النباتي ساليكس وهو الجنس الذي ينتمي إليه نبات الصفصاف. ويوجد مركب آخر مابه لمادة الساليسيلين هو مركب ميثيل الساليسيلات الذي يتواجد في النباتات التي تنتمي إلى نوع الجولثيريا في زيت الوينترجرين. أما بالنسبة لعقار الأسبرين فقد قام بتصنيعه عالم ألماني يعمل لدى شركة باير، وهو من أطلق عليه اسم الأسبرين وهناك طريقتان لتصنيع الأسبرين أو الأسيتيل ساليسيلات، إما من مادة الساليسيلين أو من مادة الميثيل ساليسات

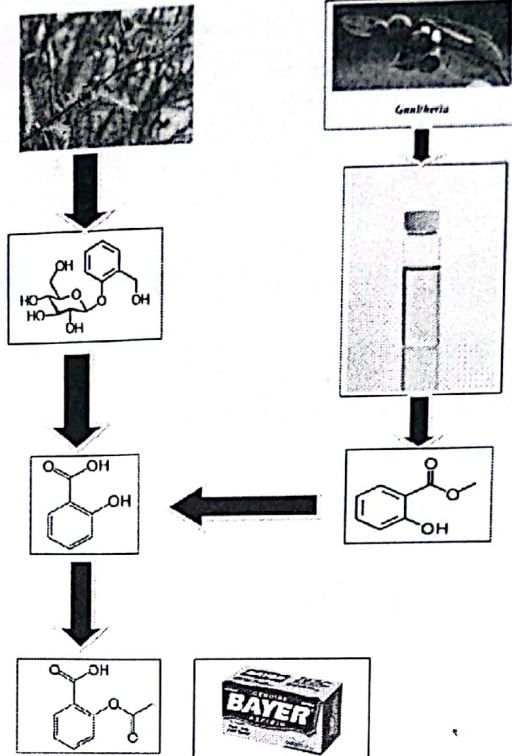
methyl salicylate

salix purpurea
salicin

sugar + salicylic acid

Salicylic acid

Acetyl Salicylic acid (Aspirin)



F) Roots & Rhizomes

Rhizome is horizontal stem growing under or sub soil surface.

Common name	Arabic name	Binomial name	Family
Ginger root	الزنجبيل	<i>Zingiber officinale</i>	<i>Zingiberaceae</i>
Ginseng root	الجنسنگ	<i>Panax ginseng</i> (Asian)	<i>Araliaceae</i>
Rhubab rhizome	الراوند	<i>Rheum officinale</i>	<i>Rubaceae</i>

Ginger (Zingiber officinale)

- from the rhizome
- Over 12 compounds with anti-oxidant activities greater than vitamin E → very strong antioxidant
- anti-tumor
- anti-emetic (inhibits vomiting)



Ginseng

- The roots of the herbaceous plants Panax ginseng (Araliaceae)
- Indigenous to China, Korea and Russia,
- ^{intensive country} Panax species have been widely used for the treatment of a number of diseases, including anaemia, diabetes, gastritis, ^{ارق} insomnia, and sexual impotence, and as a general restorative.

العصا الجينسينج

كسب الصحة العامة

- The dried and usually peeled root provides white ginseng, whereas red ginseng is obtained by steaming the root, this process generating a reddish-brown caramel-like colour.
- Ginseng is classified as an 'adaptogen', helping the body to adapt to stress, improving energy and concentration, and providing a normalizing and restorative effect. It is also widely promoted as an aphrodisiac.

يساعد على التكيف
improve sexual
performance

- Long-term use of ginseng can lead to symptoms similar to those of corticosteroid poisoning, including hypertension, nervousness and sleeplessness in some subjects, yet hypotension and tranquillizing effects in others.

يسبب اضطراب النوم

- 50:00
- 6 iso prene
- It contains a large number of triterpenoid saponins based on the dammarane subgroup, saponins that have been termed ginsenosides, or panaxo-sides.
 sugar
 عن طريق
 glycosidic linkage
 activity
 الجينسينج
 non sugar part
 - These are derivatives of two main aglycones, protopanaxadiol and protopanaxatriol, though the aglycones liberated on acid hydrolysis are panaxadiol and panaxatriol respectively.

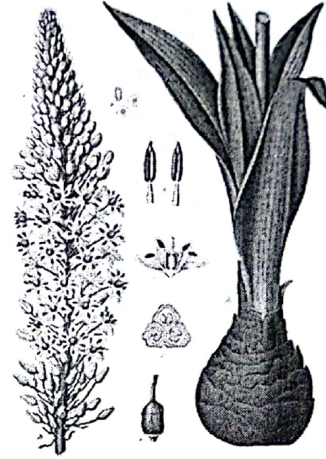
Actions and Uses

- Ginseng has been found to:
 - protect the body & nervous system from stress adaptogen
 - stimulate & increase metabolic function
 - increase physical & mental efficiency
 - lower blood pressure & glucose levels when they are high, and raise them (blood pressure & glucose levels) when they are low.
- The German Commission E approved ginseng as a tonic for fortification in times of fatigue and debility or declining capacity for work and concentration. Also approved ginseng for use during convalescence.
 للتقوية
 النظام الطاقة
 التعب
 النقص
 الشفاء

G) Bulb



Bulb is a specialized underground organ consisting outer scales of that are fleshy & contains reserve food materials.



Squill (بصل الغنصل)

• **Origin:** it is the dried, sliced bulbs of *Urginea maritima* Linn. Family Liliaceae. • **Active**

• **Constituents:**

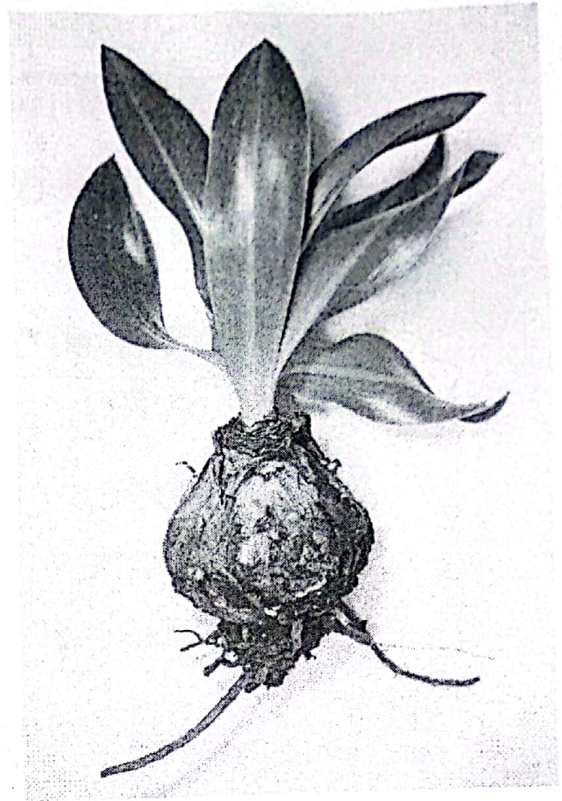
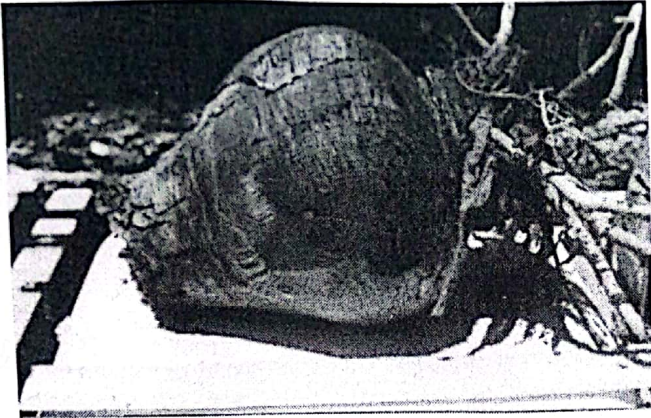
• **Cardiac glycosides:** Scillaren A and proscillaridin A (major constituents); others include glucoscillaren A, scillaridin A. → aglycon part for scillaren A (nonsugar part)

• Scillaren B represents a mixture of the squill glycosides.

• Flavonoids : Apigenin, isovitexin, luteolin & quercetin. Other constituents: Stigmasterol.



Part used:

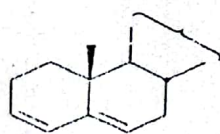


- Squill is stated to possess expectorant, cathartic, emetic, cardioactive and diuretic properties. Laxative
- Traditionally, it has been used for chronic bronchitis, asthma with bronchitis, whooping cough, and specifically for chronic bronchitis with scanty sputum.
- The aglycone components of the cardiac glycoside constituents possess digitalis-like cardiotonic properties.
- The squill has shown to have cardiac effects similar to digoxin, including positive inotropic (increase the strength of muscular contraction) and negative chronotropic effects (decrease heart rate) positive increase heart rate

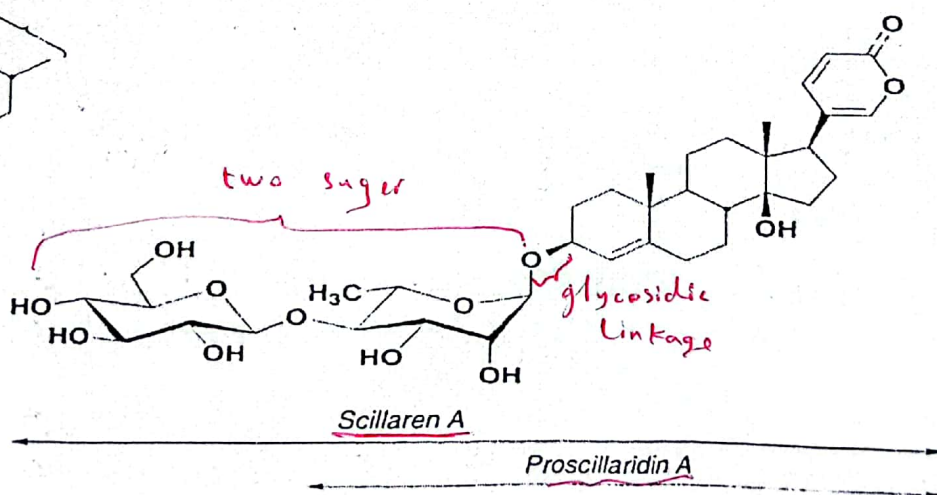
Constituents

- Crystalline glycoside, scillaren A.
- Mixture of glycosides Scillaren B, Scillaren A.
- On enzyme hydrolysis with scillarenase give Proscillaridin A and glucose.
- Under acid hydrolysis give scillaridin A (Scillarenin) and Scillabiose (Scillabiose consist of glucose and rhamnose).

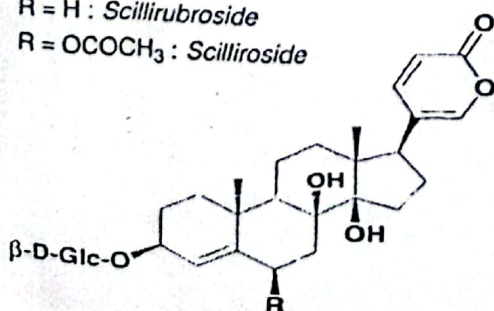
Scillarins



Scillaridin



R = H : Scillirubroside
R = OCOCH₃ : Scilliroside



R = H : Scilliglaucoside
R = OCOCH₃ : Scillicyanoside

